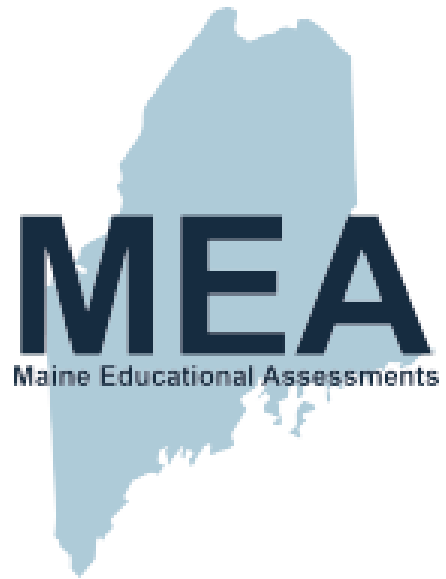




New Meridian



# Technical Report Maine Science Assessment Spring 2022

Grade 5, Grade 8, and High School  
Maine Educational Assessments (MEA)



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# Chapter 1. Overview of Maine Science Assessments

The Maine Science Assessment is administered to students in grade 5, grade 8, and their third year of high school (HS) via computer-based testing (CBT) with a wide range of accessibility features for all students (e.g., color scheme, font size, and zoom). Accommodated paper-based tests (PBT) are available for students with disabilities (e.g., Braille and large print [LP] as well as response accommodations that allow students to respond to test items using different formats). The Maine Science Assessment was administered to 33,910 publicly funded students during May and June 2022.

The Spring 2022 operational and field-test assessments leveraged the items in the New Meridian Science Exchange, a licensable collection of content contributed by states from their Next Generation Science Standards (NGSS)-aligned assessments as well as content specially developed by New Meridian. The items selected for the Maine Science Assessment measure the science standards of the Maine Learning Results (MLRs). To ensure item quality, the items in the Science Exchange are reviewed against [The New Meridian Framework for Quality Review of NGSS Science Assessment Items](#), which New Meridian developed in partnership with experts in the field of science education to articulate the critical elements of quality science assessment. The items used on the Maine Science Assessment are continuously monitored for technical quality for Maine Students.

## 1.1. Purpose of the Assessment

The Maine Science Assessment has three primary purposes:

1. To provide information to the public about school performance through the state's ESSA reporting system, the [ESSA Data Dashboard](#).
2. To support school identification within the state's ESSA compliant system of school identification and support, and
3. To provide a source of information for ongoing local program evaluation.

Student results are reported according to academic achievement descriptors utilizing cut scores established in standard setting for each of four achievement levels: Well Below State Expectations, Below State Expectations, At State Expectations, Above State Expectations.

The MLRs/NGSS that the Maine Science Assessment are designed to measure are three-dimensional learning standards that describe a vision of what it means to be proficient in science. They envision science as a body of knowledge, an evidence-based model, and a theory-building enterprise that continually extends, refines, and revises knowledge. Therefore, the standards weave together each of the following:

1. **Disciplinary Core Ideas (DCI)** – are science topics that have broad importance across multiple sciences or engineering disciplines that
  - a. provide a key tool for understanding or investigating complex ideas and solving problems;
  - b. relate to students' interests, life experiences, and societal concerns; and
  - c. are teachable and learnable over multiple grades at increasing levels of complexity.



2. **Science and Engineering Practices (SEP)** – describe behaviors in which scientists engage as they investigate and build models and theories about the natural world and are the key set of engineering practices that engineers use as they design and build models and systems.
3. **Crosscutting Concepts (CCC)** – provide an organizational framework for connecting knowledge across science disciplines to form a coherent and scientifically based view of the world.

## 1.2. Current Year Updates

Prior to 2021, the Maine Science Assessment was designed to measure both Maine's academic content standards in science and the 2007 MLRs to identify the knowledge and skills essential to prepare Maine students for work, higher education, citizenship, and personal fulfillment. The typical two-week administration windows were late March through early April for high school students and late April through early May for students in grades 5 and 8.

In addition to the new science standard alignment for the Spring 2021 administration, the Spring 2022 administration posed several challenges due to the ongoing COVID-19 pandemic. The four-week administration window for 2022 was expanded to later dates (May through early June) rather than the earlier testing dates in previous years (2020 and earlier) to allow for students in remote and/or hybrid learning environments the opportunity to come into schools to be assessed in a secure environment.



## Chapter 2. Test Design and Development

### 2.1. Test Specifications

#### 2.1.1. Criterion-Referenced Test

All items on the Maine Science Assessment forms come directly from the New Meridian Science Exchange item bank. In 2019, New Meridian launched the Science Exchange, a participatory science assessment item bank that facilitates sharing of science content. The Science Exchange includes over 2,000 science items in grades 3–8 and high school, all of which align to the NGSS. Most of the items from the exchange have been used operationally on other state forms, and all items have been reviewed for fairness, bias, sensitivity, 3 NGSS dimensions, sense-making, and technical quality.

#### 2.1.2. Item Types

To support valid measurement of the depth and breadth of the Maine Learning Results (MLRs), a variety of item types were identified and used to best elicit evidence of a student’s mastery of a DCI and an SEP. The range of item types used on the Maine Science Assessment was selected to ensure accessibility and fairness for all test takers while maintaining a tight alignment to the MLRs. Item types included selected-response, technology-enhanced, and constructed-response (i.e., prompts), which together provide a high level of reliability and validity in measuring student performance. Items on the Maine Science Assessment may appear as standalone items or be grouped together to form clusters based on a common stimulus.

A cluster includes two or more items that require students to actively use the SEPs while applying their knowledge of the CCCs and drawing on their understanding of the DCIs to explain a phenomenon or to solve a science/engineering problem. This process requires students to engage in sense-making as they actively reason and think about a phenomenon/problem. The process of sense-making is central to measuring student understanding of the NGSS and is a conceptual process in which a learner actively engages with the natural or designed world, wonders about it, and then develops, tests, and refines ideas to make sense of a phenomenon.

**Cluster Stimulus.** The items in a cluster are linked together with a grade-appropriate common stimulus and are scaffolded to help students make sense of a novel phenomenon. Stimuli are developed around phenomena or scientific problems to engage students in intriguing, realistic, and meaningful scenarios. These scientific phenomena require test takers to engage in sense-making throughout the cluster and are purposefully chosen to support multiple items that require students to demonstrate their achievement across multiple dimensions. The stimuli provide sufficient information to measure multiple dimensions of the science standards without teaching the content. All stimuli are developed to avoid subject matter that could introduce bias or sensitivity issues in student responses.

For students taking the computer-based assessment, the common stimulus in each cluster is shown on the left side of the screen and appears with every item in the cluster. The stimuli are formatted to minimize scrolling when possible and to allow for the optimal layout for student accessibility. The paper forms also contain the common stimulus on the left side of the page and the items on the right when possible. The right side of the page contains as many items as can reasonably fit in the space provided. If additional pages are required, the scenario is repeated so



students do not have to flip back to a previous page to refer to images or data tables. The students do not need to reread the background each time, but it is there for them if they need to refer to it.

**Cluster Items.** The items within a cluster are closely tied to the stimuli to provide a valid measure of the MLRs. Within each cluster, the items cover the concepts and evidence that relate to a given Performance Expectation (PE), which are central to the phenomenon or problem presented in the scenario. PEs are statements of what students should know and be able to do within the NGSS. However, the primary focus of the items is on the more specific DCIs, SEPs, and CCCs that make up each PE. This focus allows items in the Science Exchange to more carefully measure all aspects of a given PE and not constrain the assessment to only one combination of DCIs, SEPs, and CCCs. Items within a given cluster may also assess several different SEPs, DCIs, and CCCs that are found in the NGSS and are best used to make sense of the phenomenon outlined in the scenario.

**Multiple-Part Items.** Some items include multiple questions presented in multiple parts for students to answer. In some of these items, the parts are independent of each other, and in others they are dependent. In both cases, the parts are included to assess a deeper understanding of the science concepts being tested. Many times, students will progress through these multiple-part items by using one or more of the three NGSS strands (DCI, SEP, and CCC) when making sense of a scenario. The first part of these items typically asks students to make a claim or identify evidence of a claim. The second part often asks students to use scientific reasoning to support their claim or reasoning about the evidence that can be used to support their thinking. These items are generally worth two points.

### 2.1.3. Response Formats

The clusters and standalone items include three general response formats—selected-response, technology-enhanced, and constructed-response. See Appendix A for examples of item response formats.

**Selected-Response.** Selected-response (SR) items include both traditional multiple-choice (MC) (i.e., select one correct answer among four options) and multiple-select (MS) (i.e., select a specified number of correct options or all the correct options). Both are well-established, versatile item types that provide an objective, efficient, and reliable method for measuring all levels of content knowledge. SR items help identify student misconceptions that are made evident through item response and distractor analyses. Students can earn one point for each selected-response MC item and one or two points for each selected-response MS item.

**Technology-Enhanced.** Technology-enhanced items (TEIs) provide an objective, efficient, and reliable method for measuring students' readiness to engage with information with varying degrees of cognitive complexity. The range of TEIs can be used to assess the critical-thinking and problem-solving skills specified by the MLRs. Students can earn one or two points for each TEI.

A variety of TEIs were included in the test forms. These item response formats help provide a more authentic and engaging experience for students.

**Constructed-Response.** Constructed-response (CR) prompts provide another dimension of depth by requiring students to generate a written response. Thus, CR prompts may be better suited to address standards that require more cognitively complex engagement with information, including synthesis, drawing conclusions, modeling, and application. Students can earn up to two points for each constructed-response item.



## 2.1.4. Test Design

The Maine Science Assessment consists of linear fixed forms composed of three 60-minute sessions. New Meridian constructs forms based on Maine Department of Education (ME DOE)–approved blueprints and specifications for each grade. The number of items and score points per session may vary slightly, but each session is designed to be completed in the designated testing time.

## 2.1.5. Blueprints

### 2.1.5.1. Grade 5 Blueprint

#### Coverage of Science Topics.

All items on the Maine Science Assessment for Grade 5 are aligned to a science topic and to a specific performance expectation. To ensure ample coverage of all grade-level science topics, the blueprint specifies targets for the minimum and maximum number of operational score points aligned to each topic. For Grade 5, two topics—Earth's Systems and Space Systems: Stars and the Solar System—are combined in the blueprint to support reporting at the topic level.

Table 1. Grade 5 Blueprint: The Number of Operational Score Points Aligned to Each Science Topic

Science Topic	Performance Expectations (PE)	Target Percentage	Target Operational Items		Target Operational Score Points	
			Min	Max	Min	Max
<b>Matter and Energy in Organisms and Ecosystems</b>	5-PS3-1 5-LS1-1 5-LS2-1	30%	10	12	13	15
<b>Structure and Properties of Matter</b>	5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4	30%	10	12	13	15
<b>Earth's Systems and Space Systems: Stars and the Solar System</b>	5-PS2-1 5-ESS1-1 5-ESS1-2 5-ESS2-1 5-ESS2-2 5-ESS3-1	40%	13	15	17	19
<b>Total</b>		<b>100%</b>	<b>36</b>		<b>45</b>	



### Coverage of Science Practices

To ensure appropriate coverage of the science practices, the majority of the Maine Science items (at least 90%) are aligned to a Science and Engineering Practice (SEP). Items that do not measure a SEP are aligned to a Disciplinary Core Idea (DCI) and sometimes a Crosscutting Concept (CCC).

The SEPs are grouped into three more general science practices—Investigate, Evaluate, and Reason Scientifically—based on the skills they entail. The blueprint specifies the target percentage of operational score points aligned to the three science practices.

Table 2. Grade 5 Blueprint: Maine Science Item Alignment to Each Science Practice

Science Practice	Science and Engineering Practices (SEP)	Target Percent	Target Operational Items		Target Operational Score Points	
			Min	Max	Min	Max
Investigate	SEP1 SEP3	30%	10	12	13	15
Evaluate	SEP4 SEP5 SEP7	30%	10	12	13	15
Reason Scientifically	SEP2 SEP6	30%	10	12	13	15
<b>Total</b>		<b>90%</b>	<b>32</b>		<b>41</b>	





### 2.1.5.2. Grade 8 Blueprint

#### Coverage of Science Disciplines

All items on the Maine Science Assessment for Grade 8 are aligned to a science topic and to a specific performance expectation. To ensure ample coverage of all grade-level science topics, the blueprint specifies targets for the minimum and maximum number of operational score points aligned to each topic.

Table 3. Grade 8 Blueprint: The Number of Operational Score Points Aligned to Each Science Discipline

Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Physical Science	33%	12	14	16	18	Structure and Properties of Matter	MS-PS1-1 MS-PS1-3 MS-PS1-4	2	5
						Chemical Reactions	MS-PS1-2 MS-PS1-5 MS-PS1-6	2	5
						Forces and Interactions	MS-PS2-1 MS-PS2-2 MS-PS2-3 MS-PS2-4 MS-PS2-5	2	5
						Energy	MS-PS3-1 MS-PS3-2 MS-PS3-3 MS-PS3-4 MS-PS3-5	2	5
						Waves and Electromagnetic Radiation	MS-PS4-1 MS-PS4-2 MS-PS4-3	2	5



Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Life Science	33%	12	14	16	18	Structure, Function, and Information Processing	MS-LS1-1 MS-LS1-2 MS-LS1-3 MS-LS1-8	2	5
						Matter and Energy in Organisms and Ecosystems	MS-LS1-6 MS-LS1-7 MS-LS2-1 MS-LS2-3 MS-LS2-4	2	5
						Interdependent Relationships in Ecosystems	MS-LS2-2 MS-LS2-6	2	5
						Growth, Development, and Reproduction of Organisms	MS-LS1-4 MS-LS1-5 MS-LS3-1 MS-LS3-2 MS-LS4-5	2	5
						Natural Selection and Adaptations	MS-LS4-1 MS-LS4-2 MS-LS4-3 MS-LS4-4 MS-LS4-6	2	5



Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Earth and Space Science	33%	12	14	16	18	Space Systems	MS-ESS1-1 MS-ESS1-2 MS-ESS1-3	2	5
						History of Earth	MS-ESS1-4 MS-ESS2-2 MS-ESS2-3	2	5
						Earth's Systems	MS-ESS2-1 MS-ESS2-4 MS-ESS3-1	2	5
						Weather and Climate	MS-ESS2-5 MS-ESS2-6 MS-ESS3-5	2	5
						Human Impacts	MS-ESS3-2 MS-ESS3-3 MS-ESS3-4	2	5
<b>Total</b>	<b>100%</b>	<b>40</b>		<b>50</b>				<b>50</b>	



### Coverage of Science Practices

To ensure appropriate coverage of the science practices, the majority of the Maine Science items (at least 90%) are aligned to a Science and Engineering Practice (SEP). Items that do not measure a SEP are aligned to a Disciplinary Core Idea (DCI) and sometimes a Crosscutting Concept (CCC).

The SEPs are grouped into three more general science practices—Investigate, Evaluate, and Reason Scientifically—based on the skills they entail. The blueprint specifies the target percentage of operational score points aligned to the three science practices.

Table 4. Grade 8 Blueprint: Maine Science Item Alignment to Each Science Practice

Science Practice	Science and Engineering Practices (SEP)	Target Percent	Target Operational Items		Target Operational Score Points	
			Min	Max	Min	Max
Investigate	SEP1 SEP3	30%	11	13	14	16
Evaluate	SEP4 SEP5 SEP7	30%	11	13	14	16
Reason Scientifically	SEP2 SEP6	30%	11	13	14	16
<b>Total</b>		<b>90%</b>	<b>36</b>		<b>45</b>	



### 2.1.5.3. High School Blueprint

#### Coverage of Science Disciplines

All items on the Maine Science Assessment for High School are aligned to a science topic and to a specific performance expectation. To ensure ample coverage of all grade-level performance expectations, the blueprint specifies targets for the minimum and maximum number of operational score points aligned to each science topic.

Table 5. High School Blueprint: The Number of Operational Score Points Aligned to Each Science Discipline

Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Physical Science	33%	14	16	17	19	Structure and Properties of Matter	HS-PS1-1 HS-PS1-3 HS-PS1-8 HS-PS2-6	2	5
						Chemical Reactions	HS-PS1-2 HS-PS1-4 HS-PS1-5 HS-PS1-6 HS-PS1-7	2	5
						Forces and Interactions	HS-PS2-1 HS-PS2-2 HS-PS2-3 HS-PS2-4 HS-PS2-5	2	5
						Energy	HS-PS3-1 HS-PS3-2 HS-PS3-3 HS-PS3-4 HS-PS3-5	2	5
						Waves and Electromagnetic Radiation	HS-PS4-1 HS-PS4-2 HS-PS4-3 HS-PS4-4 HS-PS4-5	2	5



Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Life Science	33%	14	16	17	19	Structure and Function	HS-LS1-1 HS-LS1-2 HS-LS1-3	2	5
						Matter and Energy in Organisms and Ecosystems	HS-LS1-5 HS-LS1-6 HS-LS1-7 HS-LS2-3 HS-LS2-4 HS-LS2-5	2	5
						Interdependent Relationships in Ecosystems	HS-LS2-1 HS-LS2-2 HS-LS2-6 HS-LS2-7 HS-LS2-8 HS-LS4-6	2	5
						Inheritance and Variation of Traits	HS-LS1-4 HS-LS3-1 HS-LS3-2 HS-LS3-3	2	5
						Natural Selection and Evolution	HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5	2	5



Science Discipline	Target Percent	Target Operational Items		Target Operational Score Points		Science Topics	Performance Expectations	Target Operational Score Points by Science Topic	
		Min	Max	Min	Max			Min	Max
Earth and Space Science	33%	14	16	17	19	Space Systems	HS-ESS1-1 HS-ESS1-2 HS-ESS1-3 HS-ESS1-4	2	5
						History of Earth	HS-ESS1-5 HS-ESS1-6 HS-ESS2-1	2	5
						Earth's Systems	HS-ESS2-2 HS-ESS2-3 HS-ESS2-5 HS-ESS2-6 HS-ESS2-7	2	5
						Weather and Climate	HS-ESS2-4 HS-ESS3-5	2	5
						Human Sustainability	HS-ESS3-1 HS-ESS3-2 HS-ESS3-3 HS-ESS3-4 HS-ESS3-6	2	5
<b>Total</b>	<b>100%</b>	<b>44</b>		<b>55</b>				<b>55</b>	



### Coverage of Science Practices

To ensure appropriate coverage of the science practices, the majority of the Maine Science items (at least 90%) are aligned to a Science and Engineering Practice (SEP). Items that do not measure a SEP are aligned to a Disciplinary Core Idea (DCI) and sometimes a Crosscutting Concept (CCC).

The SEPs are grouped into three more general science practices—Investigate, Evaluate, and Reason Scientifically—based on the skills they entail. The blueprint specifies the target percentage of operational score points aligned to the three science practices.

Table 6. High School Blueprint: Maine Science Item Alignment to Each Science Practice

Science Practice	Science and Engineering Practices (SEP)	Target Percent	Target Operational Items		Target Operational Score Points	
			Min	Max	Min	Max
Investigate	SEP1 SEP3	30%	12	14	16	18
Evaluate	SEP4 SEP5 SEP7	30%	12	14	16	18
Reason Scientifically	SEP2 SEP6	30%	12	14	16	18
<b>Total</b>		<b>90%</b>	<b>40</b>		<b>50</b>	

The Operational/Field Test Form Planner in [Appendix B](#) provides additional details for the composition of each form administered in 2022 in terms of subdiscipline, performance expectation, DCIs, SEPs, and CCCs by item counts.





### 2.1.6. Depth of Knowledge/Cognitive Complexity

Traditional Depth of Knowledge (DOK) and Cognitive Complexity measures have limited utility on a multidimensional science assessment in which the focus of most of its clusters of items is based in sense-making. For 2022, simple p-values and match to blueprint were considered when selecting items for the final form. Several items on the ME science form were operationally administered in other Science Exchange states in previous years. Going forward, Cognitive Complexity will be determined using *The New Meridian Framework for Quality Review of NGSS Science Assessment Items* in [Appendix C](#). This framework outlines how items are to be judged by a group of evaluators across multiple metrics to determine the cognitive load on each student as they are answering each item. As outlined in the NGSS, the primary driver of complexity in all NGSS-aligned items is the extent to which students engage in sense-making to complete an item or a task. This process of measuring complexity as an attribute of sense-making is aligned with [A Framework to Evaluate Cognitive Complexity in Science Assessments](#) (Achieve, Inc., 2019).

The New Meridian framework relies heavily on Achieve research, and this report serves as the backbone to quantifying the complexity of all Science Exchange items and tasks. Specifically, items are evaluated using the two-step process outlined in the report. The first step is an analysis at the individual item level. At this level, four indicators are considered:

1. Scenario contributions to complexity
2. DCI or disciplinary understanding contributions to sense-making
3. SEP contributions to complexity
4. CCC contributions to complexity

Using these indicators, evaluators determine the degree to which students engage with the item or scenario and how this contributes to the level of sense-making required by this item and in what ways students' use of this dimension supports sense-making.

The second step is an analysis at the task level. This analysis includes consideration of how multiple items come together to compose a complete task. Evaluators look at how many dimensions are a part of the task and the overall scaffolding that engages students in sense-making throughout the task. Evaluating items using the New Meridian and Achieve frameworks allows for a more detailed judgment of the level of thinking required for a specific science task and builds on the multi-dimensional and progressive nature of NGSS items and clusters.

## 2.2. Test Development Process

The test forms for the Maine Science Assessment were constructed from fully licensed content from the New Meridian Science Exchange item bank. Forms include a mix of operationally ready content contributed by two state partners in addition to items developed by New Meridian. The item development and review processes for items from these three sources are described and discussed here.

### 2.2.1. Item Development

The Maine Science Assessment consists of items developed by New Meridian and content contributed by two state partners denoted here as Contributing State A and Contributing State B. As Contributing State A was new to the Science Exchange in 2021, and based on the need to match Contributing State A items to the test blueprint and to



statistics from their home state administration, some State A–contributed items, along with most of the items developed by New Meridian, required field-testing. For such items, the 2022 assessment simultaneously served both field-test and operational purposes. The contribution of items from these three sources is described below in Table 7.

Table 7. Operational Items by Contributor for Spring 2022 Forms

Grade	Contributor	Total Items	Clusters	Standalone Items
05	New Meridian	11	2	1
05	Contributing State A	15	3	4
05	Contributing State B	9	2	1
08	New Meridian	30	7	2
08	Contributing State A	3	0	3
08	Contributing State B	8	2	0
HS	New Meridian	23	5	5
HS	Contributing State A	6	2	0
HS	Contributing State B	11	3	0

### 2.2.1.1. Item Development Processes for New Meridian–Developed Items

New Meridian develops content for the Science Exchange to ensure the health of the item bank, including the quality of the items, while also ensuring that items in the bank meet specific state requirements. To fill gaps in content in the New Meridian Science Exchange item bank and to accommodate the Maine item release policy, New Meridian develops new content through the New Meridian Science Educator Cadre. The Cadre is a team of teachers, subject matter experts, and experienced contractors trained by New Meridian to develop and review science tasks.

For 2022, the majority of the clusters that were field tested in Maine came from the Science Exchange licensed item bank. To develop additional clusters to be field tested, New Meridian employed five members of the Science Educator Cadre. These cadre members were current teachers or had experience in the assessment industry and were trained by New Meridian in cluster development. All of the cadre members hold a master’s degree. In total, five clusters (or 18 items) were developed by these cadre members for field testing.

The process of item development begins with analyzing the content present in the Science Exchange item bank and comparing that to the Maine test blueprint to identify the content that needs to be developed and typically continues with

- Selection and professional development of prescreen reviewers (from the educator cadre)
- Prescreen review and results analysis of that review (identification of what moves on to the full item review)
- Selection and professional development of full item reviewers (from the educator cadre)
- Full item review with at least two cadre members reviewing each item and stimulus, adjudication of those reviews, and results analysis of that adjudication (identification of what moves on to be eligible for Maine forms or for revisions)
- Selection and professional development of item writers



- Writing and internal review of items to be considered for field-testing
- Accessibility, bias, and fairness review and copyediting
- Selection of items for forms
- Review by ME DOE personnel

New Meridian’s training for the cadre focuses on key design principles, including those described in *The New Meridian Framework for Quality Review of NGSS Science Assessment Items*, that ensure high-quality, well-aligned test items.

New Meridian’s design principles include the following:

- Analyzing high-quality stimulus materials
- Researching, analyzing, synthesizing, organizing, and using information from multiple sources
- Elaborating on and extending understanding; reasoning from models and evidence
- Citing evidence in support of a response
- Applying content knowledge through discipline-specific practices

These design principles reflect a commitment to quality and to measuring what matters most for students’ future success: critical thinking, deep understanding, and the ability to communicate ideas effectively.

### 2.2.2. Selection and Training of New Meridian Science Educator Cadre Members

All science cadre members involved in reviewing the stimuli and items on the spring 2022 test hold at least a bachelor’s degree, with over 90% holding a master’s degree. Approximately 80% of the cadre members were active K–12 classroom teachers, with the remainder being involved in education in higher ed, at the state level, or retired teachers. All cadre members had prior experience with the NGSS.

### 2.2.3. New Meridian Science Exchange Item Reviews

To ensure item quality, New Meridian, along with several experts in the fields of science education and educational assessment, have developed a framework for reviewing science assessment items (Appendix C). Using this framework, the New Meridian Science Educator Cadre reviews each item that is submitted. They review items for scenario quality, NGSS multi-dimensional performance, and technical quality. With this approach, New Meridian ensures that all items in the bank meet the highest standards of quality and that these measures are transparent to our subscribers.

All cadre members participated in a professional development session in which they learned how to use *New Meridian’s Item Review Framework for Quality Review of NGSS*. Multidimensional performance indicators determine the degree to which tasks and items require students to use the DCIs, SEPs, and CCCs to actively engage with the natural or designed world. Specifically, when reviewing multidimensional performance, New Meridian evaluates items and clusters based on evidence, models, and scientific principles (e.g., sense-making) and the extent to which items assess each dimension and multiple dimensions together.

**Reasoning with evidence, models, and scientific principles (e.g., sense-making).** This reasoning is the fundamental differentiator between three-dimensional tasks and more traditional science assessments when taken in concert with the specifics of the dimensions engaged.



**Item level.** Individual items require students to engage in generating evidence, to apply evidence to claims with reasoning, or to reason about the validity of claims related to a phenomenon or problem.

**Cluster level.** Assessment clusters require students to connect evidence (provided or student-generated) to claims, ideas, or problems (e.g., explanations, models, arguments, scientific questions, definitions of/solutions to a problem) by using the DCIs, SEPs, and CCCs as fundamental components of their reasoning.

**Assessing each dimension and multiple dimensions together.** For each dimension (DCI, SEP, CCC), alignment indicators include the element of the dimension that is required to respond to the item/cluster, at what grade band the dimension is engaged, and whether the dimension is engaged in service of sense-making (in contrast to rote information).

**Item level.** Individual items require students to use each dimension at grade level in service of sense-making.

**Cluster level.** Across a task, students are required to use at least two dimensions together to make sense of phenomena and/or problems.



## 2.2.4. New Meridian Item Writer Training

New Meridian conducted a virtual item-writer training workshop in the summer of 2021. Over the course of 35 hours, the 12 writers received professional development on the following:

- Unpacking the standards (DCIs, SEPs, and CCs)
- Phenomena brainstorming
- Equity and inclusion
- Scenario development
- Storyline development of items for a cluster that uses sense-making

There were peer reviews and content reviews throughout the development process. The final handoff was a stimulus with a phenomenon and 5–7 items aligned to a particular NGSS grade level and topic. These items then went through bias and sensitivity review, copyediting, and content review prior to field testing. They also were reviewed by other cadre members using *New Meridian’s Item Review Framework for Quality Review of NGSS*.

The agenda for the training can be found in Appendix D.

## 2.2.5. Item Selection and Test Assembly

The proposed blueprints were reviewed and approved by the ME DOE prior to item selection. Once approved, the items and tasks were selected from the New Meridian Science Exchange item bank to meet the approved blueprints. The items selected were based on operational performance on the Maine Science Assessment in 2021 or on performance in the contributing state as well as alignment to the blueprint. As described above, due to some holes in the item bank for particular science disciplines and SEPs, some items were operationally field-tested.

**Bias and fairness review.** Each item and task selected for the Maine Science Assessment went through a bias and fairness review prior to use on the test forms. During this review, New Meridian reviewed the scenarios and items selected for the test forms to confirm that there were no bias or sensitivity issues that would interfere with students’ ability to achieve their best performance. Scenarios and items were reviewed to evaluate adherence to the *New Meridian Fairness Guidelines* and to ensure that they do not unfairly advantage or disadvantage one student or group of students. New Meridian made edits and modifications to the scenarios and items to eliminate sources of bias or sensitivity and to improve accessibility for all students.

**Style and copyedit review.** Each test form for the Maine Science Assessment passed through a final style and copyedit review. The following criteria were used during this review:

- Scenarios, images, and items are clear, correct, and formatted to adhere to the New Meridian style guide.
- Scenario language and stem questions for online and paper forms are identical.
- Alt tag language is correct, clear, and consistent with other tags where possible.
- Alt tag language is free of spelling, grammatical, and mechanical errors.
- Item directions for online forms use verbs such as “Select” and “Move” based on item type.
- Item directions for paper forms resemble the online versions as closely as possible and/or are clearly stated for paper administration (i.e., ask students to “Mark” instead of “Move”).



## 2.2.6. Draft Test Forms Review

The Maine Science Assessment forms were constructed with items and tasks from the fully licensed New Meridian Science Exchange item bank. The ME DOE participated in a test form review, during which items and tasks were reviewed for blueprint alignment and fatal flaws. No items or tasks were replaced during this administration’s review.

## 2.2.7. Alternative Presentations

Technology-enhanced items were converted to paper-based versions for use on accommodated forms. For example, a computer-based drag-and-drop item may have been accommodated to a matching item on paper, in which the student draws lines to the same response options as in the online version. The items and tasks were then arranged into paper-based forms that were comparable to the approved online forms, meaning the forms were designed to measure the same content but with an alternate response format. These paper-based forms were the foundation to producing large-print and Braille accommodated forms.

## 2.3. Standards Rotational Plan

See Appendix E. Asset Development Plan for more information.

A three-year (2023–2025) rotational plan based on content in the topic arrangement of the NGSS is proposed. Maine’s blueprint is organized by topic. Per the blueprint, all topics should have a minimum of two score points and a maximum of five score points. The rotational plan was developed to cover all topics within a three-year period.

Following the intent of “A Framework for K–12 Science Education,” the DCIs can be mixed and matched with any SEP and any CCC; the PE is just one combination of these. For that reason, the topic organization of the DCIs are the focus and not the individual PEs that are in the topic. In the item review process, each individual dimension of the NGSS is aligned separately to the items. Although items are assigned a PE, the alignment of the PE is only based on the content that corresponds to a DCI within that PE. The SEP or CCC are not considered for that alignment.

The Maine Science Assessments consists of item clusters with a few standalone items sprinkled throughout. The experts recognize that standalone items do not elicit the in-depth sense-making intent of the NGSS very well, and therefore the Maine blueprint includes very few of these items. Each item cluster is designed to assess students’ deeper understanding of the DCIs found within the NGSS. Using various SEPs and CCCs to assess the content of the DCIs found within the NGSS, each item cluster will assess unique combinations of DCIs, SEPs, and CCCs that are not necessarily found within the PE. This use is also consistent with the way Maine’s achievement level descriptors (ALDs) are constructed.

Each cluster will assess at least one DCI, CCC, and SEP; however, no one item is expected to assess all three. In other words, items can be one (only assess one dimension of the NGSS) to three-dimensional (assess all three dimensions). The clusters are developed to dig deeper into the content of the DCIs. Students are presented with a discrepant event (phenomenon) and are asked to make sense of the phenomenon as they work through the item cluster. Students need to apply their knowledge of the content as well as their science and engineering practices and skills and their ability to make connections across the different content areas through the crosscutting concepts to make sense of the phenomenon given.



Because most of the items are cluster-based and are asking students to make sense of a phenomenon, most clusters can only assess one, possibly two, content pieces (DCIs). Each cluster consists of 2–7 items, which means there will be at least 2–7 score points for a given topic. The intent of the NGSS is to strive for deeper understanding of more complex content and skills, emphasizing depth over breadth. Item clusters allow for the assessment of deeper understanding by giving students the opportunity to apply multiple DCIs, SEPs, and CCCs to make sense of a phenomenon. (Student & Gong, 2012. Reference: [Recommendations to Support the Validity of Claims in NGSS Assessment](#).) Therefore, the three-year rotational plan shows that all NGSS topics will be covered as outlined in the blueprint. It is also important to note that the SEPs are represented in three categories and that all categories will be equally represented in each administration.

Other considerations were made when developing the rotational plan. One is the size of the student population. Administration is to roughly 40,000 students throughout the state, which includes grades 5 and 8 and high school. For validity, Maine has two forms with 13 field test (FT) score points each. With a total of 26 FT score points in each administration, 5 or 6 new content pieces found in the topics that are lacking adequate coverage can be added each year.

Another consideration is the organization of PEs in middle school and high school. The PEs within middle school and high school are not broken out by grade level. For example, high school may have courses in biology, physics, chemistry, and/or Earth science. Maine only assesses high school science one time, and a student will most likely take the assessment during grade 11. Therefore, there are 67 PEs to consider for inclusion in a high school assessment. According to the National Research Council, “Because externally developed assessments cannot, by design, assess the full range and breadth of the performance expectations in the Next Generation Science Standards (NGSS), they will have to focus on selected aspects of the NGSS (reflected as particular performance expectations or some other logical grouping structure)” (National Research Council, 2014). Instead of trying to assess every PE, which is not how items are aligned or written, ME DOE has used the topic organization of the NGSS to ensure each topic is equally covered and equally emphasized. Some topics encompass more PEs than others, but equally weighting the content at the topic level helps support teachers in their understanding that each topic is equally important to teach.



## Chapter 3. Assessment Administration

### 3.1. Responsibility for Administration

Principals and their designated assessment coordinators are primarily responsible for the assessment's overall security and ethical administration, scheduling logistics, materials handling, and training and supervision of all assessment administrators/proctors. Manuals were provided to ensure uniformity in assessment procedures across schools and districts ([Appendix F](#)). The [Principal and Assessment Coordinator \(PAC\) Manual](#) and [Assessment Administration Manuals \(AAM\)–Grade 5](#) stress the importance of assessment security and ethics throughout the administration process. These manuals contain explicit directions and scripts for assessment administrators to read aloud to students.

### 3.2. Administration Procedures

Maine districts and schools were provided with eight types of manuals/guides conveying best practices and procedures to successfully administer the Spring 2022 Maine Science Assessment. The materials were available for download on the [Maine Science Support site](#).

List of manuals/guides

1. Principal and Assessment Coordinator Manual (PAC Manual)
2. Assessment Administrator Manuals (one for each grade)
3. Proctor User Guide
4. Accessibility Guide
5. Device, System, and Lockdown Browser Installation Guide
6. ADAM Platform User Guide
7. Quick Guide – Starting Your Maine Science Assessment
8. Practice Assessment Administration Manuals (one for each grade level)

The PAC and AAMs set expectations for assessment security and ethics and provided procedure checklists for use before, during, and after administration. These checklists were designed to assist with the logistics for preparing, administering, and cleaning up for the online and paper-based assessments.

The AAMs provided critical information for preparing to administer the Maine Science Assessment, including the materials to be provided for student use, the types of questions students encounter, instructions for assessing students who require accommodations, and final preparations. The AAMs also included scripts for administering the assessment and descriptions of the universal features, designated supports, and accommodations available for students.

The [Proctor User Guide](#) provided the procedures to proctor the online assessment in the Assessment Delivery and Management (ADAM) platform. It detailed how to log in to ADAM as a proctor; how to access and manage assessment session dashboards; how to confirm which students are in an assessment proctoring group; and how to start, pause, and end an assessment session.





For district and school assessment administrators and technology coordinators, the [Accessibility Guide](#) provided the necessary information for the embedded and non-embedded accessibility tools available for the Maine Science Assessment. The ADAM platform featured a range of onscreen tools that enhanced the accessibility of the online assessments for all students, including those who required visual, auditory, and attention-focus supports. This guide explained the accessibility features and provided a brief tutorial for each tool, including where to find it within the assessment platform and how to use it.

Two of the guides, the [Device, System, and Lockdown Browser Installation Guide](#) and the [ADAM Platform User Guide](#) contained procedures and information that helped districts and campuses prepare their networks, systems, and devices for the technology needs of the online assessment system.

In addition, the [Quick Guide – Starting Your Maine Science Assessment](#) was meant to be used along with the online tutorial in ADAM. From a student's perspective, the guide and the tutorial explained how to sign into the Maine Science Assessment in the lockdown browser, how to navigate the assessment from the welcome page to the review page, and how to use the universal tools.

The Practice Assessments in ADAM are an online set of scenarios and items meant to familiarize students with the types of questions they may encounter when they take the Maine Science Assessment. The practice test is not scored nor are the students' answers retained. Each online question can be answered and checked via the online interface.

[The Practice Assessment Administration Manual](#) is meant to be used in conjunction with the Practice Assessments for the Assessment Administrators Manual. The two manuals explain the uses of the Practice Assessments and contain the rationales and exemplars for those assessments.

Together, these manuals document the knowledge and procedures needed to support the successful administration of the Maine Science Assessment.

### 3.3. Participation Requirements and Documentation

The Maine Science Assessment assesses all publicly funded Maine students in grades 5, 8, and third year of high school. Students with significant cognitive disabilities who qualify for the alternate assessment to the Maine Science Assessment will participate in the MSAA-Science. The Maine Science Assessment does not need to be submitted for any student who was assessed through the alternate assessment. ME DOE included out-of-state students, students from regional programs, and students from private nonsectarian schools for this administration. Districts and/or schools could optionally offer the assessment for students who were homeschooled.

No assessments were allowed to be administered at home. All assessments had to be administered by trained assessment administrators at a school building unless the ME DOE approved special considerations (i.e., medical exemptions). Students who answered at least one question were considered participants and received scale scores. However, only those students who answered at least 25% of the entire assessment (within any sessions) were included in the data matrix .

[Appendix G](#) presents the participation in the Maine Science Assessment by publicly funded students by grade and demographic group. Two hundred and forty-nine students classified as either homeschooled, privately funded at a non-private (PRI) school, or from the Bureau of Indian Education (BIE) are omitted from the reported score results.



### 3.4. Administrator Training

The Maine School Administrative Units (SAUs) and schools were offered three avenues to obtain training for the Maine Science Assessment.

First, New Meridian, in partnership with ME DOE, provided a prerecorded virtual session to introduce administrators to the Maine Science Assessment and to its alignment to the NGSS. This session was posted [online](#) and left open for viewing by the field at their leisure.

Second, three (3) live virtual question-and-answer sessions were provided for districts, schools, and coordinators to ask questions about three key topics—[Maine Science Assessment - Install Lockdown Browser](#), [Maine Science Assessment - Rostering in ADAM Platform & Accessibility](#), and [Maine Science Assessment - Administering, Proctoring & Accessibility Review](#). These live sessions were recorded and made available [online](#) for districts and schools to view at a later time if they could not attend the live session.

Third, several short videos were created and made available on the [ZenDesk support website](#) to help principals and coordinators with standard process questions in ADAM regarding the following:

- [Rostering students for the online Maine Science Assessment](#)
- [Adding new users for the online Maine Science Assessment](#)
- [Proctoring the online Maine Science Assessment](#)
- [Creating an alias proctor group](#)
- [Adding a class and enrolling all students in the grade](#)

Together, these videos helped secure a successful first year operational Maine Science Assessment administration.

#### 3.4.1. Support Center

A support center was established to provide support for districts, campuses, principals, and coordinators before, during, and after the assessment administration. As this was the second year of the new Maine Science Assessment, the support center opened for phone, chat, email, or website support requests starting April 4, 2022, from 7:30 a.m. to 4:00 p.m. EST. Starting April 18, 2022, until the last day of the administration (June 10, 2022), the support center was open from 6:30 a.m. to 6:00 p.m. EST. Then, for one week after the assessment, the support center was open June 13–17, 2022, from 7:30 a.m. to 4:00 p.m. EST. for phone, chat, email, or website support. The support center then resumed its normal operating hours of 7:30 a.m. to 4:00 p.m. EST for email or website support. No matter how the field contacted the support center, all contacts were documented as a ZenDesk support ticket and tracked from first contact to resolution (as shown in Table 8).

Table 8. Support Center Operating Hours

Date Range	Hours	Support Type
June 14, 2021–April 1, 2022	7:30 a.m.–4:00 p.m. EST	Email or the support center website
April 4, 2022–April 15, 2022	7:30 a.m.–4:00 p.m. EST	Phone, chat, email, or the support center website
April 18, 2022–June 10, 2022	6:30 a.m.–6:00 p.m. EST	Phone, chat, email, or the support center website
June 13, 2022–June 17, 2022	7:30 a.m.–4:00 p.m. EST	Phone, chat, email, or the support center website
June 20, 2022–April 14, 2023	7:30 a.m.–4:00 p.m. EST	Email or the support center website

### 3.5. Universal Tools, Designated Supports/Features, and Accommodations

The *Maine Science Assessment Accessibility Guide* is divided into two sections, *ADAM Accessibility Tools* and *Online Accessibility Tools User Guide*. The *ADAM Accessibility Tools* section is divided into three sections based upon student need: universal tools for all students, designated supports/features for some students, and accommodations. Supports/features and accommodations are available to all students based on individual needs regardless of disability status. The student’s educational team must make decisions regarding supports/features and accommodations on an individual basis. Supports/features and accommodations must also be consistent with those used during the student’s regular classroom instruction, including test-taking. In some cases, a student who uses supports/features and accommodations may need to complete the test in a separate setting to eliminate distractions to other students and to ensure the test’s security and confidentiality. Principals and assessment coordinators are responsible for ensuring that assessment administrators/proctors understand the proper implementation of these resources.

#### 3.5.1. Universal Tools for All Students

Universal tools are made available to all students. There were two types of universal tools available to students, embedded (shown in Table 9) and non-embedded (shown in Table 10).

- Embedded universal tools are provisions within the online assessment platform (ADAM).
- Non-embedded universal tools are provisions outside the online assessment platform.

Table 9. *Embedded Universal Tools—Provisions Within ADAM*






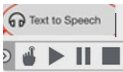
Tool	Tool Icon	Description
Review		A page that shows flagged items for review and items not attempted
Accessibility		Accessibility options of Color Scheme / Font Size / Zoom enlargement
Flag or Bookmark		Ability to flag or bookmark an item to return to for review
Line Reader		A tool that helps focus on reading one line of text at a time
Response Masking		Ability to hide/cover an answer choice—not available on all item types, such as technology enhanced
<b>Provision within online platform that must be assigned to individual student by DAC/ITC/SAC</b>		
Text-to-Speech (TTS)		Text is read aloud to the student via (embedded) TTS technology. TTS should be consistent with the student’s normal routine during classroom instruction. Headphones/earbuds are necessary unless tested individually in a separate setting.

Table 10. Non-Embedded Universal Tools—Provisions Outside of ADAM

Tool	Description
Scrap/Scratch Paper	The student uses scratch paper, an individual erasable whiteboard, or an assistive technology device to make notes or record responses. All scratch paper must be collected and securely destroyed at the end of each test to maintain test security.

### 3.5.2. Designated Supports/Features for Some Students

Some students are provided with designated supports/features designed to provide increased accessibility within the assessment beyond the universal features. Utilization and implementation of supports and features is determined on an individual basis by an educational team such as part of a multitiered system of supports (MTSS), Response to Intervention (RTI), Individual Language Acquisition Plan (ILAP), and/or a Student Assistance Team.

Designated supports/features used by a student must be consistent with the student’s regular routine during instruction; their provision does not alter the measured construct of any test item. For the Maine Science Assessment, the designated supports/features were non-embedded (i.e., provisions outside the ADAM online assessment platform). (See Table 11.)

Table 11. Non-Embedded Designated Supports—Provisions Outside of ADAM

Support	Description
Breaks	Multiple or frequent breaks may be required by students whose attention span, distractibility, and physical and/or medical condition require shorter working periods.
Extended Time	Extended time is time beyond recommended/average of 60 minutes per session(s) 1, 2, and 3.
Preferential Seating	Students may have predetermined seating locations to reduce distractions for themselves or others or to increase physical access to special equipment.
Individual/Separate Setting	Individual testing or testing in a separate setting may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
Small Group Setting	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
Movement	This opportunity may be used in a setting other than the classroom for a student who cannot focus when seated for sustained periods of time.
Alternate Aids/Supports	A student who uses alternative or assistive technology daily may have the test presented through their regular communication system. The test may be presented using visual aids such as visual magnification devices, reduction of visual print by blocking or other techniques, acetate shields, or auditory devices such as special acoustics, amplification, noise buffers, whisper phones, or calming music.
Distraction Reduction	Noise buffers, place markers, carrels, etc. may be used to minimize distractions for the student. This support does NOT include assistive devices such as templates, graphic organizers, or other devices intended specifically to help students organize thinking or develop a strategy for a specific question.

Support	Description
Directions Clarification	After directions have been read, the test administrator may ask the student to explain what he/she has been asked to do. If directions have been misunderstood by the student, the directions may be paraphrased or demonstrated. Test items <b>MUST NOT</b> be paraphrased or explained.
Bilingual Word Glossary for ELLs	A bilingual/dual language word-to-word glossary is provided to students who are English Learners as a language support per ILAP.

### 3.5.3. Accommodations Requiring IEP/504 Documentation

Accommodations that required Individualized Education Program/Plan (IEP) or 504 Plan documentation were available for student use. These accommodations are changes in procedures or materials that do not alter what the assessment measures and are used to increase equitable access during the assessment for students for whom there is documentation of the need on an IEP or 504 Plan. One category of accommodation was available for the Maine Science Assessment: non-embedded. Read aloud/human reader or American Sign Language, Braille, scribe, paper-based, or paper-based large print were provided as non-embedded accommodations. (See descriptions in Table 12.)

Table 12. Non-Embedded Accommodations—Provisions Outside of ADAM Based on IEP or 504 Plan

Accommodation	Description
Read Aloud/Human Reader OR American Sign Language	Text is read aloud or translated via sign language interpreter to student by test administrator or human reader as documented in the IEP/504 plan.
Braille	Both contracted and uncontracted Braille (English Braille, American Edition or Unified English Braille) are available. Students who require a Braille assessment will be sent a transcribed paper-based assessment.
Scribe	The student may dictate answers to a human scribe in an individual setting. Human scribe records verbatim what a student dictates and must give the student an opportunity to review scribed text. Scribed text must be entered into the online testing platform—no paper submissions accepted.
Paper-Based OR Large Print	This accommodation is for students with an IEP/504 plan that requires assessments to be paper-based and not administered online.

### 3.5.4. Universal Tools, Designated Supports/Features, and Accommodations Summary

Universal tools, designated supports/features, and accommodations allowed students to complete the assessment to the best of their ability.

Principals and assessment coordinators and their designees assigned students to the appropriate universal tools, designated supports/features, and/or accommodations in the ADAM assessment platform prior to the administration. Assessment coordinators verified that the correct tool(s), support(s)/feature(s), and/or accommodation(s) were assigned for those students who used one or more during the Maine Science Assessment administration. For additional information on how and where to notate these tool(s), support(s)/feature(s), and/or accommodation(s) in ADAM, see the [ADAM Platform User Guide](#).



Table 13 indicates the number of publicly funded students who assessed without any accommodations versus the number of students for whom at least one accommodation was provided.

Table 13. Number of Students Tested, Without and With Accommodations

Grade	Without Accommodations	With Accommodations
05	9,382	2,353
08	9,999	2,209
HS	9,246	710

[Appendix H](#) provides the accommodation frequencies observed for each grade level administration.

### 3.6. Assessment Security

The quality and usefulness of the assessment data generated by the Maine Science Assessment depend primarily on the uniformity of the assessment administration and the security of assessment materials. Valuable information about student achievement of the content standards and the effective measuring of MLRs would be seriously compromised if assessment security was not strictly implemented and maintained.

School principals are responsible for ensuring that the Maine Science Assessment administration takes place under these guidelines. Duplication of any portion of the Maine Science Assessment content is strictly forbidden, including but not limited to audio recording, video recording, photographing, photocopying, and handwritten copying. No assessment or record of student work or computer-generated responses may be retained, discarded, recycled, removed, or destroyed.

Principals and assessment coordinators were directed in the [Principal and Assessment Coordinator \(PAC\) Manual](#) to collect, inventory, and account for all secure assessment materials before, during, and after completion of the assessment administration, whether that administration was online or on paper. The principals and coordinators were to ensure that all assessment materials were returned by each assessment administrator/proctor and regional program, including the Student Assessment Cards, Student Assessment Booklets, and Assessment Administrator Manuals.

All SAUs and schools were directed to call the ME DOE in the event of a situation that could have caused the assessment administration to be compromised.

### 3.7. Assessment Administration Window

The test administration window was May 2, 2022, through June 10, 2022, for all assessments in grade 5, grade 8, and the third year of high school. Originally, the assessment window for grades 5 and 8 was May 2–13, 2022, and the high school administration window was May 16–27, 2022. Each window was expanded beyond the normal practice of two weeks to increase its accessibility to students during COVID-19 educational parameter restrictions. The resultant grades 5 and 8 assessment window became May 2–27, 2022, and the high school assessment window became May 16–June 10, 2022.



## 3.8. Assessment and Administration Irregularities

No irregularities were reported. ME DOE had one possible “alert response,” in which it was determined that the student was typing inappropriate lyrics.

## 3.9. Quality Assurance of Results

Rigorous quality control procedures were implemented throughout the test development, administration, scoring, and analyses phases.

### 3.9.1. Quality Control of Assessment Administration

[The Administrator Training](#) section (3.4 and 3.4.1) provided details regarding the Support Center that included tutorials, training, and administration manuals that supported the standardized administration and security of the Maine Science Assessment.

Furthermore, to ensure against loss of data during online administration, ADAM by default transmits student responses back to the MZD cloud-based servers every 15 seconds. As an additional precaution against interruptions in connectivity, ADAM also automatically downloads a copy of the test content to the browser cache, allowing student responses to be saved locally in the event of slow connections or temporary outages. Should an interruption occur, responses are transmitted back to the server upon reconnection. At the close of the test session, the content is automatically removed from the browser cache, meaning that the browser caching solution is also more secure than other local storage methods. Per an agreement with ME DOE, all test sessions still open at 11:59 EST are considered idle. ADAM automatically submits the results and closes the session. ME DOE authorization is required to reopen the session.

### 3.9.2. Paper-Based Assessments

For paper-based assessments, Strategic Measurement and Evaluation, Inc. (SME) used rigid and redundant secure materials–processing procedures to ensure that test booklets and the associated processing boxes remained secure throughout test administration, document processing, scanning, and storage. Material movement was constantly monitored as documents were shipped to schools, returned to SME, and processed through the scanning center. SME’s processing procedures ensure 100 percent accounting of all materials.

SME created pre-ID labels based on student registration information and applied these labels to test booklets that were then sorted and shipped to the student’s designated testing site. To facilitate tracking and security, SME precoded each test booklet with a unique sequential identification number. SME inventoried the test booklet numbers that were sent to each test administration site prior to shipping and audited return shipments to ensure all test booklets were returned. Specific packing and shipping instructions were included to support the distribution, collection, and return of test booklets to SME.

Materials were securely delivered in sealed boxes with a clear directive that only the test center supervisor was designated as a recipient. The delivery required the signature and printed name of the designated recipient. No package was allowed to be left at a school without a signature. A dedicated courier service picked up and returned



test booklets directly from each testing site. Immediately upon receipt of return shipments, SME scanning staff inventoried the test materials.

After inventory, test booklets were boxed (by grade/subject) and placed in secure temporary storage at SME's scanning site. Access to the secure temporary storage area was restricted to authorized personnel. Processing boxes were numbered, inventoried, and recorded in the electronic inventory system. Handling and retrieval of boxes was limited to authorized personnel.

All student test booklets received by SME were scanned according to strict quality assurance (QA) procedures to ensure the accuracy of the data capture. QA procedures included the following:

- The preparation and testing of all scanning programs using test decks with known characteristics
- Constant monitoring of scanner operations including scanner calibration, document alignment, and scanner speed and clerical checks, as well as monitoring of documents that generate an error code
- Verifying image file counts against expected page counts with deviations triggering an immediate alert

After being scanned, test booklets were stored at a secure warehouse for the time period required by the contract and then securely recycled on site.



## Chapter 4. Overview of Standard Setting for the Maine Science Assessment

### 4.1. Introduction

This chapter presents an overview of the standard-setting workshop conducted by New Meridian in partnership with the Maine Department of Education for the Maine Science Assessment. The workshop took place from July 26 to July 28, 2022, in Augusta, Maine. The workshop purpose and methodology, background on participants and their preparation, and final recommendations are highlighted.

### 4.2. Purpose

The purpose of the Maine Science Assessment standard setting was to facilitate a panel of Maine educators in the development of recommendations for thresholds separating the four performance levels:

- Well Below State Expectations
- Below State Expectations
- At State Expectations
- Above State Expectations

Progressing from lower to higher performance levels, a cut score represents the point at which a higher performance or achievement level begins. Therefore, for each grade level, standard-setting workshop participants identified performance thresholds and made recommendations for cut scores defining the boundaries separating *Well Below* and *Below*, *Below* and *At*, and *At* and *Above State Expectations*. Recommendations from the workshop were presented to the ME DOE for review and consideration as cut scores for reporting results.

### 4.3. Methodology

The Bookmark standard-setting procedure (Lewis, Mitzel, & Green, 1996) was developed in 1996 and fully documented in *Setting Performance Standards: A Guide to Establishing and Evaluating Performance Standards on Tests* (Cizek & Bunch, 2007). The modified Bookmark standard-setting methodology was applied to develop cut score recommendations for the Maine Science Assessment.

The modified Bookmark approach begins with the development of Achievement Level Descriptors (ALDs) that represent the knowledge, skills, and abilities (KSAs) of students within each of the four achievement levels (Well Below, Below, At, and Above State Expectations). An additional key component of the modified Bookmark approach is the Ordered Item Booklet (OIB), in which each page represents one item or one score point from lowest to highest difficulty. For items worth more than one point, one page is included for each possible score point, excluding 0. The difficulty progression within the OIB is aligned with the ALDs. Beginning with the lowest performance level in mind, workshop participants consider the OIB one page at a time, evaluating whether the threshold student would have a 0.67 probability of answering correctly or achieving the represented score. The page at which the answer is “No” is defined as the threshold, or bookmark, between the achievement levels. This process continues across all four achievement levels for each grade level.



The key activities for the Maine Science Assessment standard setting included the following:

- Sitting for the Maine Science Assessment
- Group discussion of ALDs and students at the “just barely” threshold
- Subject Matter Expert examination of the OIB and group discussion of items
- Training on the Bookmark standard-setting process
- Individual panelist bookmark placement (Round 1 rating)
- Group discussion of Round 1 results and impact data
- Individual panelist bookmark placement (Round 2 rating)
- Group discussion of Round 2 results and impact data
- Individual panelist bookmark placement (Final rating)
- Group discussion of Final results and impact data

In adherence to standard-setting best practices (Hambleton, Pitoniak, & Copella 2012; Tannenbaum & Katz, 2013), the following criteria were established and met.

- A careful selection of panelists to represent varying perspectives
- Sufficient time devoted to developing a common understanding of the assessment domain
- Adequate training of panelists
- Development of a description of student performance at each threshold
- Multiple rounds of judgments
- The inclusion of data, where appropriate, to inform judgments

#### 4.4. Standard-Setting Panels

A critical aspect of the standard-setting workshop is the recruitment of SMEs as panelists. Best practices dictate that a standard-setting panel reflects the educators of those who will be assessed due to their in-depth knowledge of the subject matter.

ME DOE carried out recruitment with the goal of including eight panelists per grade level. The final representation was six panelists for grade 5, five panelists for grade 8, and eight panelists for high school. All panelists described themselves as White and non-Hispanic, and all but three panelists on the High School panel were female. Most panelists had an education level of master’s degree or equivalent; only one panelist had a highest education level of bachelor’s degree, and one panelist had a doctoral degree or equivalent. Most panelists fell within 11–15 years and 21–25 years of teaching experience categories, and educators with qualifications and/or experience in the education of English language learners, students with disabilities, and honors/advanced placement classes were adequately represented.

## 4.5. Panelist Training

Prior to the workshop, all panelists were provided with orientation activities for completion that introduced them to the Maine Science Assessment and other information relied upon during workshop activities.

The pre-workshop activities included the following:

- **Completing a nondisclosure agreement** certifying that the panelists would keep all workshop materials and discussions secure
- **Reviewing tutorials** that introduce the testing environment, the item types comprising the assessments, and the various tools students have access to when completing the assessment
- **Reviewing reference materials** to be used during the workshop
- **Completing a survey** with information about the panelists' current teaching position, teaching experience, and demographic information

## 4.6. Final Recommendations

Three panels of Maine educators, one panel for each grade level of the Maine Science Assessment, recommended cut scores differentiating the four achievement levels identified by the ME DOE for reporting results. In general, the threshold scores were consistent between Rounds 2 and 3, except for the *At/Above* threshold for grade 8.

(Differences between Rounds 1 and 2 were observed for all thresholds at Grades 5 and 8.) Table 14 through Table 16 present the final threshold results for grade 5, grade 8, and high school. These tables are reproduced from the *Standard-Setting Technical Report for the Maine Science Assessment (New Meridian, 2022)*.

Table 14. Median Bookmarks by Round: Grade 5

Threshold	Round 1	Round 2	Final
Well Below/Below	7	8	8
Below/At	17	21	20
At/Above	38	37	37

Table 15. Median Bookmarks by Round: Grade 8

Threshold	Round 1	Round 2	Final
Well Below/Below	6	5	5
Below/At	18	13	13
At/Above	34	21	31

Table 16. Median Bookmarks by Round: High School

Threshold	Round 1	Round 2	Final
Well Below/Below	6	6	6
Below/At	23	23	23
At/Above	43	42	43



Table 17, also reproduced from the *Standard-Setting Technical Report for the Maine Science Assessment* (New Meridian, 2022), describes the expected distribution of students produced by the recommended cut scores based on the May 2022 administration of the assessment.

*Table 17. Impact Data Based on Panel Recommendations by Grade*

Threshold	Grade 5	Grade 8	High School
Well Below State Expectations	44.39%	33.37%	41.51%
Below State Expectations	31.31%	18.67%	20.12%
At State Expectations	20.03%	44.01%	32.24%
Above State Expectations	4.27%	3.96%	6.13%

## Chapter 5. Item-Level Scoring

The Maine Science Assessment consisted of a variety of item types, including selected-response, technology-enhanced, and constructed-response formats. Certain item types, such as selected-response and technology-enhanced, were configured for automatic, rule-based machine scoring in ADAM, the test administration platform. Scoring rules are documented on the test maps as part of the test form development process and verified during the initial key check validation process.

This section describes the scoring process for both the machine-scored items and the range-finding and hand-scoring process for the constructed-response prompts. Along with the detailed description of the range-finding process, it provides information about scorer qualification, training, and monitoring.

### 5.1. Machine-Scored Items

Machine-scorable items were scored within the ADAM test delivery platform for both online and paper administration modalities.

**Online Administrations:** The ADAM platform technology is designed to automatically process scores upon student submission. Machine-scorable assessment questions include items for which the test taker response is an online interaction with the item, such as multiple-choice, drag-and-drop, and other technology-enhanced items. These item interaction types include the programming necessary to correctly score student response(s) as designated by the item author. Programming also includes specific response-processing instructions, embedded in technical encoding, based on the item interaction type. ADAM uses the Question and Test Interoperability (QTI) technical encoding standard to render and score assessment items.

**Paper-Based Administrations:** Student responses for the machine-scorable items that were delivered on paper were entered into the ADAM system by Strategic Measurement and Evaluation, Inc. (SME) during the processing of students' returned paper forms. Specifically, all responses were entered by the first transcriber. Then a second trained transcriber reviewed all the answer choices entered by the original transcriber. The second transcriber viewed all the items and the related transcription for 100% accuracy. If a discrepancy was found, the second transcriber logged the discrepancy and made the correction. A third transcriber reviewed each record as a final QA check.

Quality control systems and methodology included as part of the item review and approval process ensure that item scoring rules are configured correctly, and each item is properly machine scored when administered as part of an assessment. The ability to review simulated student responses to items and review the machine-scored output is also native to the item authoring/review process, and further ensures scoring accuracy.

### 5.2. Human-Scored Prompts

This section describes the complete range-finding and scoring process for all the constructed-response prompts on the Maine Science Assessment.

After the test administration, operational scoring was conducted for all the constructed-response prompts (i.e., two prompts for grade 5, four prompts for grade 8, and four prompts for high school). The operational scoring guides



consisted of anchor papers, a practice set, and qualification sets. The final scoring guides with ME DOE–approved scores were used to train all scoring staff.

Student responses to constructed-response prompts were human-scored using MZ Development, Inc.’s (MZD) Online Scoring and Reporting (OSCAR) electronic scoring platform. Through OSCAR, qualified scorers accessed responses created by online test takers (i.e., in the ADAM online test administration platform). Scorers evaluated each response according to the scoring rubric and recorded its score via mouse entry through the OSCAR system. When a scorer finished evaluating one response, the next response immediately appeared on the computer screen.

Electronic responses in OSCAR were organized by grade and prompt. Access to student responses was controlled using role-based permissions to limit platform interaction and to enhance test security. Scorers were assigned to a specific grade-level team and were given a unique OSCAR login that allowed them to view specific prompts only once the qualification criteria were achieved. In the OSCAR system, scorers see only the student response; they do not have access to any student demographic information.

After test administration and operational scoring, range-finding was conducted for all constructed-response field-test prompts (i.e., four prompts for grade 5, four prompts for grade 8, and six prompts for high school) to finalize the scoring rubrics and to identify samples of student responses for each score point. These samples were reviewed by the ME educator range-finding committee and used to build field-test scoring guides. The field test scoring guides with ME DOE range-finding committee-approved scores were used to train all scoring staff.

### 5.2.1. Scoring Location and Staff

Scoring for the Maine Science Assessment was completed at SME’s scoring center in Lafayette, Indiana. All training and scoring activities were conducted in person at the scoring center.

SME used a hierarchical structure to manage the Maine Science Assessment scoring project. The project had a designated scoring manager and scoring content specialist who reported directly to SME’s scoring director. Based on experience and qualifications, scorers were assigned to a grade-level scoring team with a designated scoring supervisor and table leader. Scoring teams were physically separated into different rooms. These rooms were organized in such a way as to allow for constant supervision and monitoring of computer screens, facial expressions, and body language.

#### 5.2.1.1. SME Staff Positions

The following SME staff positions were involved with scoring activities for the Maine Science Assessment:

- **Scoring Director** – oversaw program communication and coordination of all scoring activities
- **Scoring Manager** – coordinated range-finding activities, oversaw daily scoring operations, managed scoring training, and monitored scoring supervisors and table leaders
- **Scoring Content Specialist** – managed the range-finding team(s) and coordinated the creation of all scoring guides; with the scoring manager, trained grade-level scoring supervisors and table leaders and monitored their work
- **Assessment Manager** – participated in range-finding activities and consulted with scoring leadership as needed
- **Grade-Level Scoring Supervisors** – worked under direct supervision of the scoring manager to assist with range-finding, helped prepare scoring materials, and trained and supervised scorers and table leaders



- **Table Leaders** – were experienced scorers who assisted scoring supervisors with read-behinds, answering questions, and monitoring group performance
- **Scorers** – worked as part of grade-level teams based on qualifications and experience

### 5.2.2. Range-Finding

Upon completion of operational scoring, SME facilitated range-finding for all field-test constructed response prompts that appeared on the Maine Science Assessment (i.e., four prompts for grade 5, four prompts for grade 8, and six prompts for high school).

Due to COVID-19 travel restrictions, SME and the ME DOE completed range-finding for the Maine Science Assessment virtually (via Zoom) in June and July. ME DOE sent out a general notice for recruitment to all Maine educators on June 15, 2022. At that time of publication, the ME DOE presented the educators with opportunities to participate in upcoming committees for the remainder of 2022 consisting of range-finding, standard setting, and data review. Once the ME DOE educator recruitment form closed, the ME DOE reviewed the list to confirm the educators were indeed certified science educators and then sent New Meridian the list with the educators' contact information. New Meridian then contacted the educators that signed up for range-finding to confirm their participation and provide them with further details, as well as the virtual Zoom meeting links and codes.

The educator participants' range-finding grade-level assignment was as follows: three educators for the grade 5 assessment, four for the grade 8 assessment, and four for the high school assessment. Of those eleven certified educators, three identified their area of expertise as Life Science, three as Chemistry, two as Earth & Space Science, and one as Physics. Two educators did not indicate their area of expertise; they were certified in Elementary K–6 for science. All were certified in the grade levels that they participated in range-finding for. All educators were required to sign an NDA to participate.

Representatives from the New Meridian content and program management teams also participated in the range-finding meetings.

To prepare for virtual range-finding meetings with ME educators, an internal SME range-finding committee consisting of SME's assessment manager, scoring director, scoring manager, scoring content specialist, and experienced scoring supervisors reviewed the draft scoring rubrics. This review process included discussions with New Meridian's test development and content teams.

After the scoring rubric discussions, SME's scoring manager and scoring content specialist reviewed samples of student responses and selected approximately 100 sample responses per prompt to be scored as part of the internal range-finding process. The final set of responses included for each range-finding item was chosen to be representative of the types of answers students produced. OSCAR was used to select, organize, score, and annotate the sample responses for ME educator review. These sample responses covered a range of score points and represented a variety of issues and patterns across student responses.

Next, SME's range-finding committee conducted initial range-finding for all prompts. The purpose of the initial SME range-finding sessions was to identify 30–45 representative samples for ME DOE educator review and approval. The range-finding process for an individual item began with a review of the item prompt and the draft scoring rubric. Following this review, each SME range-finding participant (typically 4 or 5 per item) independently reviewed all the initial sample responses for a particular item and assigned a score. Participants were encouraged to also



annotate each sample response to document questions, comments, patterns, or issues that needed further clarification.

After each participant independently reviewed and scored the sample responses, the range-finding facilitator (e.g., the scoring content specialist, scoring manager, or scoring director) led a group discussion of each sample response. The purpose of the group discussion was to assign a consensus score and an annotation to each sample response. If questions arose during the group discussion (e.g., regarding something that was not covered by the scoring rubric), the issue was discussed by the participants to identify the elements that led to the assignment of different scores. After discussion, the facilitator recorded the consensus score assigned to each sample response. Responses for which a score could not be agreed upon were noted as “do not use.” The facilitator documented the discussions and noted any decisions that were made.

The range-finding targets (i.e., the number of sample responses pulled) for each score point appear in Table 18. The range-finding process described above was repeated, as needed, until the SME committee was satisfied with the sample responses and associated scores and annotations.

*Table 18. Targets for Initial Range-Finding*

Item Max Points	Target		
	0 points	1 point	2 points
1	15–20	15–20	N/A
2	12–15	12–15	12–15

SME and the ME DOE range-finding committee met virtually via Zoom for 3- to 4-hour sessions to discuss all the sample responses and scores, as well as to finalize the scoring notes and rubrics for each prompt. These discussions included decisions about the defining characteristics and thresholds for responses at each score point.

Representatives from the New Meridian content and program management teams also participated in the range-finding meetings and documented group feedback related to item development and content.

Following the ME DOE/SME range-finding meetings, SME staff made any required edits to the scores, annotations, or rubrics as directed by the ME educator range-finding committee. Then SME used the final committee-approved samples to construct item-level field-test scoring guides. These field test scoring guides were used by senior scoring staff to score all the field-test responses.

After field-test scoring, the item data were reviewed to determine if a field-test item was eligible for inclusion on a future operational form. SME's internal range-finding committee followed the procedures described in this chapter to complete additional range-finding for all new items that were eligible for an operational form. This additional range-finding produced a sufficient quantity of responses to build operational scoring guides. Each item-level operational scoring guide included one anchor set, one practice set, and two qualification sets. The approved specifications for the scoring guides are presented in Table 19. The master copies for each scoring guide (for table leaders, scoring supervisors, and scoring leadership) included the ME DOE range-finding committee's comments and annotations



Table 19. Specifications for Scoring Sets

Set Name	Set Specifications
Anchor Set	<ul style="list-style-type: none"> <li>1 client-approved sample response per score point</li> <li>May also include a second sample for each score point if there is more than one plausible way to illustrate the merits of a score point</li> </ul>
Practice Set	<ul style="list-style-type: none"> <li>1 set that includes a selection of 10–15 responses designed to help establish the full score point range and the range of possible responses within each score point</li> </ul>
Qualification Sets 1 and 2	<ul style="list-style-type: none"> <li>10 responses per set that are comparable to anchor sets</li> </ul>

### 5.2.3. Flagging Criteria for Field-Test Items

Items were flagged as Red, Yellow, or Green based on their item statistics as seen in Table 20.

- Red items are expected to be rejected. The data review committee may review Red items to inform future item development; however, these items typically do not progress past data review.
- Yellow items will be accepted or rejected based on the recommendations of the data review committee after their review.
- Green items have item statistics that are acceptable for all categories. The data review committee may use these items as a reference in reviewing Yellow- or Red-flagged items.

Table 20. Data Review Flagging Criteria for Field-Test Items

Analysis	Classification		
	Red	Yellow	Green
P-value	$< 0.05$	$> 0.90$ OR $0.05 \leq p\text{-value} < 0.25$	$0.25 \leq p\text{-value} \leq 0.90$
Item Total Correlation (ITC)	$< 0.10$	$0.10 \leq ITC < 0.25$	$\geq 0.25$
Item Response Theory (IRT)	Could not compute		
Differential Item Functioning (DIF)		C Flag	A or B Flag

### 5.2.4. Scorer Recruitment & Qualifications

For scoring the Maine Science Assessment, SME sought a diverse pool of scorers with a broad range of backgrounds, including current teachers, retired teachers, scientists, and graduate students. SME used a proprietary multistep recruiting and screening process to identify successful scoring candidates.

At a minimum, all scoring staff had a B.S. or B.A. degree and were experienced with the nuances of rubric application and scoring. The highest level of education for the scorers is presented in Table 21.

Table 21. Scorer Educational Degrees

Degree	Scoring Leadership	Scorers
Doctorate	1	1
Master's	3	3
Bachelor's	2	16

All scorers were required to sign confidentiality and nondisclosure agreements. Once selected as a potential scorer for the project, all scorers had to pass the project-specific training and qualification process before scoring live student responses. The qualification process is described in more detail in section 5.2.6.

### 5.2.5. Methodology for Scoring Polytomous Items

The range of possible score points for the polytomous items on the Maine Science Assessment was 0 to 2. Scoring procedures for polytomous items included both single-scoring and double-blind scoring. Each response received at least one score. As described in more detail in section 5.2.8, 10% of all responses were independently scored by a second scorer who was not provided any information regarding the first assigned score. The first and second scores were compared, and the results were used to calculate the level of inter-rater agreement.

Responses that could not be assigned a numeric score based on the rubric were assigned a non-score code. The list of valid non-score codes appears in Table 22<sup>1</sup>. Non-score codes assigned by scorers were included in read-behind protocols and were monitored by scoring leadership to ensure accuracy and consistency in scores. Responses that received a non-score code counted as zero points toward student scores.

Table 22. Non-Score Codes

Non-Score Code	Non-Score Code Explanation
B	Blank (no attempt to respond)
U	Unreadable (illegible, incoherent, random keystrokes [online only])

### 5.2.6. Scorer Training

Once selected as a potential scorer, all scorers were required to pass the initial training and qualification process before scoring live student responses. SME selected experienced scoring staff to serve as trainers, and their presentation of the scoring materials to potential scorers was closely monitored by the scoring director and scoring manager. The scorer training for each item was based on the scoring guides developed from the responses scored during prior range-finding sessions.

Scoring training began with an introduction of the scoring staff and an overview of the purpose, goals, and guidelines for the Maine program. This included a discussion about the security, confidentiality, and proprietary nature of all scoring materials, student responses, and procedures.

<sup>1</sup> Other types of responses not meeting the rubric requirements, including off-topic, direct copy of the prompt, or language other than English, were assigned a score of zero.



The scoring training was structured around a three-step process during which the trainer facilitated a review of anchor, practice, and qualification sets. SME administered practice and qualification sets electronically via OSCAR, which provided a concrete record of training and qualification outcomes and allowed trainers to identify challenging content and when scorers needed additional training.

**Anchor Set.** The anchor set was used by the scoring trainer to introduce the item and scoring rubric to scorers and to calibrate scorers to the response criteria required to achieve each score point. To accomplish this, the scoring trainer reviewed the validated annotation for each response with the scorers and explained how the student response mapped onto the requirements listed in the scoring rubric.

**Practice Set.** Once the anchor set was reviewed and the trainer answered all content or rubric questions, the scoring trainees scored the responses in the practice set. The practice set responses were delivered electronically in OSCAR. Trainees logged into OSCAR and accessed the practice set associated with the item on which they just received training. The trainees independently read and scored each practice set response using the online system. After reviewing the group practice set scores to see if there were common errors or misunderstandings, the trainer facilitated a group discussion to review the practice set on a response-by-response basis. The trainer reviewed each response in detail and discussed the ME DOE–approved score and annotation and explained why the response received the score it did.

**Qualification Sets.** Following the presentation of the anchor set responses and the scoring and discussion of the practice set, scoring trainees demonstrated their ability to apply the scoring criteria by qualifying (i.e., for operational scoring) with acceptable agreement to the true scores on the qualification sets. The selected qualification responses covered all score points on the targeted rubric and were representative of the range of possible responses. The specific qualifying criteria provided by ME DOE were as follows:

- Responses were scored with at least 80% exact agreement and at least 90% exact or adjacent agreement on at least one qualifying set.
- Scorers were allowed 1 discrepant score (i.e., 1 score out of 10 that was more than one score point from the predetermined true score), provided they had at least 8 exact scores.

All scorers took both qualifying sets. Upon completion of Qualification Set 1, the trainer reviewed the group scores to see if there were common errors or misunderstandings. The trainer then facilitated a discussion of each response and explained the true score. This process was repeated for Qualification Set 2. A scorer had to qualify on at least one set to become eligible to score a particular item. The scoring platform was configured to lock out a user if the qualification criteria were not met. Trainees not meeting the qualification standard were either dismissed from the item and given the opportunity to train on a different item, or they were dismissed from the project scoring team.

**Retraining.** Individual scorers might receive retraining during the scoring process if deemed necessary by table leader or scoring supervisor observations and/or from the results of various reports. More specifically, the need for retraining was identified if scorers had a large number of nonadjacent scores (e.g., on the 10% of responses requiring a second read), unsatisfactory exact agreement rates, or anomalies detected during the read-behind process.

Retraining by scoring leadership involved several techniques:

- Discussion of student response(s) and the scores involved in the resolution
- Discussion of specific responses identified during the read-behind process
- Review and discussion of anchor papers

### 5.2.7. Scoring Leadership Training

Prior to beginning the scoring process, SME's scoring manager conducted leadership training for scoring supervisors and table leaders. The scoring supervisors and table leaders were expert scorers who had experience in all facets of scoring. Scoring supervisors were assisted by table leaders, and both were responsible for carefully monitoring the scoring accuracy of all scorers on their assigned team. Scoring supervisors and table leaders are the next-level experts regarding the prompts and the scoring requirements and procedures for the project.

During the leadership training sessions, the logistics of the scoring sessions and scoring routines were discussed. This included the criteria by which scorers would qualify, procedures for monitoring accuracy and reliability, and procedures for retraining and evaluating scorers on their team.

### 5.2.8. Scoring Quality Control Methods

Scorers were required to demonstrate and maintain their ability to score student responses accurately and consistently throughout the scoring window. SME used several quality assurance techniques to ensure that scoring was valid and reliable for the duration of the scoring window:

- Creating small scoring teams
- Embedding validity papers
- Implementing read-behind protocols
- Implementing double-blind scoring
- Implementing recalibration sets

**Small Scoring Teams.** For scoring the Maine Science Assessment, the ratio of table leaders to scorers was approximately 1:8. Maintaining the ratio of table leaders to qualified scorers to below 1:10 allowed the table leader to meaningfully observe and interact with each member of their assigned scoring team and to intervene when questions or concerns arose.

**Embedded Validity Papers.** Embedded validity papers were reviewed by ME DOE and SME during the range-finding process and assigned ME DOE–approved scores. These validity responses were loaded into OSCAR and automatically inserted into the scoring queue so that they did not distinguish themselves from the live student responses.

Eight to ten embedded validity papers were distributed at random throughout the first full shift of scoring to ensure that scorers were sufficiently calibrated at the beginning of the scoring period. After submitting a score for an embedded validity paper, scorers received immediate confirmation or corrective feedback. The feedback included the true score and a brief annotation to highlight why the response received the score that it did. Embedded validity papers were used for all constructed-response prompts.



**Read-Behind Protocols.** Table leaders, under the supervision of a scoring supervisor, were responsible for reading behind each scorer on his or her scoring team. As an additional quality assurance check, scoring supervisors conducted additional read-behinds to monitor table leader performance.

Read-behinds were conducted at a rate of at least 5–10% per scoring shift. If a scorer was struggling or falling below the expected rate of agreement, additional read-behinds were conducted. The OSCAR scoring platform randomly selected responses scored by each scorer and directed those responses to the table leader or scoring supervisor for review. Table leaders could see the score assigned by the original scorer for each reviewed response. During read behinds, table leaders looked for scoring patterns or issues requiring clarification and addressed issues on an individual or a group basis. Percentages of read-behinds conducted for each item are provided in [Appendix I](#).

If the table leader determined that a response had been scored incorrectly, he or she provided the correct score, appropriate feedback, and/or retraining to the initial scorer. This retraining focused on using the language of the rubric and referring to the appropriate anchor, practice, or qualification papers. A score that was changed by a table leader (or any scoring leadership) became the new score of record.

The scoring director, scoring manager, and scoring content specialist monitored the status of read-behinds as well as monitored any score changes applied by table leaders or scoring supervisors to ensure consistency and accuracy across all scores.

**Double-Blind Scoring.** OSCAR was configured to automatically select 10% of student responses to all constructed-response prompts to be double scored. This double-blind scoring was used to calculate inter-rater agreement rates that scoring leadership used to monitor accuracy and consistency. In OSCAR, these second reads are tagged as “reliability papers” and are equally distributed across scorers throughout the scoring window for a particular item. [Appendix I](#) presents the percent exact and exact/adjacent agreement between scorers for each item by grade.

The reliability papers (i.e., second reads) with discrepant first and second scores were automatically flagged in OSCAR for a third score resolution. Resolution papers were reviewed on an ongoing basis by scoring leadership, and the scoring supervisor assigned the appropriate resolution score and provided immediate feedback to the scorer who assigned the discrepant score. The resolution score (e.g., third score) assigned by the scoring supervisor became the official score of record. The scoring manager and scoring content specialist monitored resolution scores applied by scoring supervisors to ensure consistency and accuracy across all scores.

If a scorer fell below the expected rate of agreement (e.g., 80%), the scorer was retrained or removed from the item. If a scorer was retrained, the scoring manager and scoring supervisor reviewed all scores assigned prior to retraining to determine if those scores should be deleted. If the scores were deleted, the responses were returned to the scoring queue and rescored by a different scorer. If a scorer was removed from an item, his or her scores were deleted, and the responses were returned to the scoring queue and rescored by a different scorer.

**Recalibration Sets.** If scoring for a particular item extended past one day, scorers were required to take an online recalibration set to determine if they were still calibrated to the scoring standards. Each recalibration set consisted of approximately five responses representing the entire range of possible scores. Any recalibration results that showed discrepant scores or two or more adjacent scores required a review with scoring leadership before the scorer could continue scoring. Recalibration sets were used, as needed, for all constructed-response prompts.

## 5.2.9. Scoring Quality Control Reports

OSCAR includes multiple quality control tools and reports that provide detailed data for scoring leadership. These scoring metrics, including scorer performance and reliability, were available in real-time for users with authorized roles and allowed staff to constantly monitor the accuracy, consistency, and productivity of scoring.

The reports, generated by individual scorer and the scoring team, provided the results of scoring on an ongoing basis. The information in these reports included the number of responses scored by the reader during a specific period, scorer agreement (or reliability) rates, score point distribution by item/prompt, and other useful metrics.

The following reports were generated and used each day by SME scoring leadership (including table leaders, scoring supervisors, the scoring content specialist, the scoring manager, and the scoring director). They were also posted daily for ME DOE review:

- **Completion Report:** This report is designed to show the real status of every response loaded into the scoring system. A scoring supervisor or administrator can quickly see the state of all responses and how close an item/project is to completion. Included in this report is the total number of responses by grade and item. This report details responses that are unscored, withheld for supervisor review, waiting for a second read, in third-score resolution, flagged, complete, backread, and requiring resolution.
- **Scorers Report:** This report can be run by section (grade) or across all sections for one item or all prompts and for a specified date or date range. It lists the total score time, average score time, scoring rate, number of scores assigned, number of resolution responses (i.e., 1st and 2nd read discrepancies), number of validity and calibration response scores, and percent of resolutions required.
- **Daily Report:** This report is run by section (grade) and item (or across all prompts) and includes additional filters for team, trait, user, or date range. For each scorer, it lists the total number of responses scored, the average scoring time, the score point distribution of assigned scores, and the percentage of exact and adjacent agreement (for reliability responses).
- **User Summary:** This report provides a detailed view of individual scorer performance for a particular item and includes a summary of practice, qualification, validity, and calibration set scores; the total number of scores assigned; scoring time and average scoring rate; inter-rater reliability (IRR); exact and exact/adjacent validity; exact and exact/adjacent agreement; percent of resolutions required and changed; and a summary of recent activity in the platform.
- **Item Summary:** This report is run by grade and item across users or for a specific user and allows for the following comparisons of scores in an agreement matrix: 1st vs. 2nd, 1st vs. resolution, 2nd vs. resolution, 1st vs. backread, and 2nd vs. backread. The report also provides IRR by score and trait (if applicable).
- **User Agreement:** This report, used by table leaders and scoring supervisors, is run by grade and item and provides a summary by user and across all users of IRR (exact and exact/adjacent), validity (exact and exact/adjacent), and resolution (required and disagreed).
- **Project Agreement:** This report is used by scoring leadership to summarize IRR (exact and exact/adjacent) and validity scores (exact and exact/adjacent) for the project on an item-by-item basis.
- **QC Reports:** The QC reporting dashboard is utilized by scoring leadership to review scores for the sets used for training, qualification, validity, and calibration. The dashboard summarizes scorer performance at the item level, making it easy to identify patterns and responses that require further clarification.



## 5.3. Quality Assurance of Results

Rigorous quality control procedures were implemented throughout the test development, administration, scoring and analyses phases.

### 5.3.1. Quality Control of Scoring

Hand-scoring quality control processes were described in detail throughout section 5.2. Scorers were required to demonstrate and maintain their ability to score student responses accurately and consistently throughout the scoring window. OSCAR scoring metrics, including scorer performance and reliability, were available in real-time for users with authorized roles (i.e., scoring leadership) and allowed staff to constantly monitor the accuracy, consistency, and productivity of scoring.

Furthermore, for machine-scored items New Meridian conducted statistical keycheck and item-response adjudication reviews to verify that items were properly scored according to the rules in ADAM prior to item analyses and calibrations.



## Chapter 6. Classical Item Analysis

This chapter describes the results of the classical item analyses conducted from the scored operational items that were selected after the preliminary item analyses and ME DOE content review. Item analyses included data from the following item types: key-based selected-response items, rule-based machine-scored items, and hand-scored constructed-response prompts. For each item, analyses were conducted at both the item level and response option level. These analyses included difficulty (p-value and pseudo p-values), discrimination (item-total correlations), and frequencies (proportions of students selecting each option or obtaining each score point). Differential Item Functioning (DIF) analyses and student testing time analyses were also conducted.

Item analyses were conducted by test form based on administration mode.<sup>2</sup> Paper-based results are not included in the report due to the small sample size.

### 6.1. Final Item Analyses and Calibration Data Screening Criteria

Student results files were available in a single file layout. That file contained both student item-level data and test-level data. A single record contains all test information for a student, including demographic variables, form identification, item scores, and total raw scores, as well as the student responses and scores for each item and for separate parts of composite items (when applicable). Some parts of a composite item will have scores if there is a one-to-one relationship between the number of item parts and the overall score for the composite item.

For this administration, there was a limited number of paper-based forms (i.e., Mode of Administration for Paper, Large Print, or Braille). Rather than scanning the test documents into the published paper-based forms, student results were key-entered into the online version of the assessment. Therefore, the results for these assessments were recoded to correspond to the correct session form names, unique item number (UIN) for the paper version of TEIs, and any item time associated with the assessment stripped from the results file prior to analysis. The crosswalk for the correct UINs is generated from the approved test maps.

Analyses were performed on an Incomplete Data Matrix (IDM) that was generated from the results file. These analyses were done by form. Student records were removed prior to running the analyses if the records met any of the following criteria:<sup>3</sup>

1. Record had an invalid form number (e.g., if Student Grade  $\neq$  Grade Form Name);
2. Record was flagged as “not valid” (e.g., flagged scilnvSes1, scilnvSes2, scilnvSes3 OR SciTestStatus is blank);
3. Record was a duplicate (if a student has duplicate valid records, include only the record with the higher raw score);
4. Record indicated that the student attempted less than 25% of items within any session; or
5. Record indicated that the Test Type Mode of Administration did not match the accommodation received (e.g., Test Type Mode of Administration = 2 (Paper) but accomPaper = 0 (No); Test Type Mode of Administration = 3

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<sup>2</sup> Paper-based forms did not have sufficient volumes of students to generate meaningful statistical interpretation.

<sup>3</sup> Criteria for the keycheck/adjudication screening were slightly different since these analyses are intended as diagnostic of potential scoring issues.





(Large Print) but accomLargeprint = 0 (No); Test Type Mode of Administration = 4 (Braille) but accomBraille = 0 (No); or Test Type Mode of Administration = 1 (Online) but at least one of the paper accommodations is 1).

Items may not be scored due to a student omitting the item or to the student not yet reaching an item within the test. “Omitted” (i.e., skipped) items are items for which a student did not provide a response when items coming before and after have student responses. These are designated with “?” in the response file. “Not administered” (i.e., “not reached”) items are those at the end of the session for which no responses were provided — items that the student probably did not reach during the administration—or the items of an entire session that were not administered. Item response scores for “omits” are recoded as ‘0’ in the CTT analyses and IRT IDM files whereas “Not reached” and “Not administered” items are considered missing and therefore do not contribute to the statistics.

## 6.2. Classical Difficulty and Discrimination Indices

### 6.2.1. Item p-value (Pseudo p-value for Polytomous Items)

The p-value represents the mean item score as a proportion of the maximum obtainable score points, indicating the item difficulty. Values range between 0 and 1. Higher values indicate easier items while lower values indicate more difficult items. For dichotomous items (item scored as either correct = 1 or incorrect = 0) the formula is

$$p\text{-value} = \bar{x}_i = \frac{1}{n} \cdot \sum_1^n x_i$$

where  $x_i$  are the individual student item scores on item  $i$  and  $n$  is the total number of students for whom the item was administered.

For polytomous items, the pseudo p-value is calculated by further dividing by the maximum obtainable points possible for the item:

$$\text{pseudo } p\text{-value} = \frac{\bar{x}}{T}$$

where  $\bar{x}$  is the mean item score and  $T$  is the maximum obtainable points possible for the item.

Frequently, the p-value is reported as a percentage by multiplying by 100. For instance, a p-value of 0.67 means that 67 percent of the students answered a dichotomous item correctly.

### 6.2.2. Response Option or Score Point Proportions

A dichotomous item’s alternate response options (i.e., distractors) are plausible but incorrect options that are included to test common misconceptions or miscalculations. Ideally, all response options should garner a proportion of student selections. These are calculated by the simple proportion formula:

$$\text{proportion} = \frac{N_o}{N_T}$$

where  $N_o$  is the number of students selecting the specific option and  $N_T$  is the total number of students for whom the question was administered, including those who did not record a response (i.e., omitted the item).

In the case of polytomous items, the numerator becomes the number of students obtaining the specific score point ( $N_{SP}$ ):

$$proportion = \frac{N_{SP}}{N_T}$$

### 6.2.3. Item-Total Correlations

The item-total correlation is the relationship between students' performance on the item and students' performance on the criterion.<sup>4</sup> Possible values range between  $-1$  and  $+1$ . The correlation will be positive when the mean test score of the students answering the item correctly is greater than the mean test score of the students answering the item incorrectly. Negative values may indicate that an item has multiple correct answers or an incorrect answer key.

The point-biserial correlation (Crocker & Algina, 1986) is one possible item-total correlation for dichotomously scored items. However, the correlation will be spuriously high because the item of interest is also included in the total test score (i.e., correlating with itself; Henrysson, 1963). Therefore, a correction is made by using the means with the item deleted (i.e., the total operational test score not including the item of interest) from the calculation:

$$r_{pbis} = \frac{(\bar{M}'_+ - \bar{M}')}{S'} \sqrt{p/(1-p)}$$

where  $\bar{M}'_+$  is the mean score with the item deleted for students who answered the item correctly,  $\bar{M}'$  is the mean score with the item deleted for all students,  $S'$  is the standard deviation with the item deleted for all students, and  $p$  is the item  $p$ -value (difficulty).

The Pearson correlation (polyserial) with the item of interest deleted is typically calculated for polytomous items by this equation:

$$r = \frac{\sum(x_i - \bar{x})(y'_i - \bar{y}')}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y'_i - \bar{y}')^2}}$$

where  $x_i$  is the student score point on the item,  $\bar{x}$  is the mean score for the item,  $y'_i$  is the total score with the item deleted for the student, and  $\bar{y}'$  is the mean total score with the item deleted for all students (Lemke & Wiersma, 1976).

### 6.2.4. Response Option or Score Point Correlations

Similar to the overall item point-biserial correlation calculation, a correlation can be calculated for each incorrect response option (O) for multiple-choice single-response items, or the score point in the case of other item types, using the generalized formula

$$r_{pbis_o} = \frac{(\bar{M}_O - \bar{M}')}{S'} \sqrt{p_o/(1-p_c)}$$

where  $\bar{M}_O$  is the mean score for students who selected the distractor,  $\bar{M}'$  is the mean score for all students with the item deleted,  $S'$  is the standard deviation of all students with the item deleted,  $p_o$  is the proportion of students selecting the distractor, and  $p_c$  is the proportion of students selecting the correct response.

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<sup>4</sup> For the keycheck it is the machine-scorable total raw score. Otherwise, it is the total raw score.



### 6.2.5. Classical Item Analyses Results

Items are flagged during the analysis based on the criteria listed in Table 23. During the earlier preliminary analyses, the flagged items were provided to the science test development manager for review. All items were then reviewed by the ME DOE to determine the final item status (i.e., scored or unscored).

Table 23. Preliminary Item Analysis Flagging Criteria

Analysis	Criteria
p-value (pseudo p-value)	p-values above 0.95 or below 0.20
Item-Total Correlation	Item-total correlations below 0.10
Distractor-Total Correlation	Distractor-total correlations above 0.00
Omits	5% omit rate for a dichotomous item 15% omit rate for a polytomous item
Polytomous Item Score Distribution	A low percentage (<3%) of students obtaining a score point or no students obtaining a score point

Table 24 through Table 26 present the aggregated results for the classical item analyses statistics by item type and for the operational form. Item-level statistics are provided in [Appendix K](#).

Table 24. Grade 5 Summary of Item Difficulty and Discrimination Statistics

Item ID	Item Type	Difficulty	Discrimination	Item Mean	Item SD	Item Range
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Table 25. Grade 8 Summary of Item Difficulty and Discrimination Statistics

Item ID	Item Description	Difficulty	Discrimination	Item ID	Item Description	Difficulty	Discrimination
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Table 26. High School Summary of Item Difficulty and Discrimination Statistics

Item ID	Item Description	Difficulty	Discrimination	Item ID	Item Description	Difficulty	Discrimination
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

### 6.3. Differential Item Functioning

Differential item functioning (DIF) is a procedure that matches students based on total test scores to compare the performance of similarly able students across subgroups. The procedure identifies two contrasting groups (i.e., focal and reference) for which differences in item performances are computed. Table 27 indicates potential comparison groups depending on sufficient volumes of students (i.e., at least 100 focal and at least 300 reference). For the procedures described next, positive values indicate that, for students of similar ability, the focal group has a higher mean item score than the reference group. Negative DIF values indicate that, for students of similar ability, the focal group has a lower mean item score than the reference group.

Table 27. DIF Comparison Groups

Comparison Type	Focal Group (N≥100)	Reference Group (N≥300)
Gender	Female	Male
Ethnicity	African American	White
	Asian	White
	American Indian/Alaska Native	White
	Hispanic	White
	Pacific Islander	White
	Multiple	White
Economic Status	Economically Disadvantaged	Not Economically Disadvantaged
English Learners	English Learner	English Proficient (including former English learners)
Students with an IEP	IEP	No IEP

#### 6.3.1. Dichotomous Items: Mantel-Haenzel

The Mantel-Haenzel (MH) chi-square approach (Mantel & Haenzel, 1959) is used to detect DIF in dichotomously scored, one-point items. The range of total scores is divided into 10 stratifications (S), and those strata are used to match samples from each group. Contingency tables (such as Table 28) for each stratum are constructed for the responses to the item in which S represents the strata,  $W_{rs}$  and  $W_{fs}$  represent the number of students (in the reference and focal groups, respectively) who answer the item incorrectly,  $R_{rs}$  and  $R_{fs}$  represent the number of students (in the reference and focal groups, respectively) who answer the item correctly, and  $N_{ts}$  represents the total number of students ( $W_{rs} + R_{rs} + W_{fs} + R_{fs}$ ).

Table 28. Mantel-Haenzel Contingency Table

Score Stratum (S)	Incorrect/Wrong (0)	Correct/Right (1)	Total
Reference	$W_{rs}$	$R_{rs}$	$W_{rs} + R_{rs}$
Focal	$W_{fs}$	$R_{fs}$	$W_{fs} + R_{fs}$
Total	$W_{rs} + W_{fs}$	$R_{rs} + R_{fs}$	$N_{ts}$

A common odds ratio is computed across all intervals of matched groups using the following formula (Dorans & Holland, 1993):

$$\hat{\alpha}_{MH} = \frac{\sum_{s=1}^S R_{rs}W_{fs}/N_{ts}}{\sum_{s=1}^S R_{fs}W_{rs}/N_{ts}}$$

Furthermore, the Mantel-Haenszel delta statistic ( $MH_{D-DIF}$ ) (Holland & Thayer, 1988) is computed to measure the degree and magnitude of DIF using the formula

$$MH_{D-DIF} = -2.35 \ln(\hat{\alpha}_{MH}).$$

### 6.3.2. Polytomous Items: Standardized Mean Difference

For polytomous items, the  $MH_{D-DIF}$  is not calculated. Rather, a standardized mean difference ( $SMD$ ) is calculated using a contingency table that extends the possible items scores beyond 1 point using this formula:

$$SMD = \sum_s w_{Fs}m_{Fs} - \sum_s w_{Fs}m_{Rs}$$

where  $w_{Fs} = n_{F+s}/n_{F++}$  is the focal group proportion at the  $s$ th stratification variable;  $m_{Fs} = (1/n_{F+s})F_s$  is the focal group's mean item score in the  $s$ th stratum; and  $m_{Rs} = (1/n_{R+s})R_s$  is the reference group's mean item score in the  $s$ th stratum. Because the focal group proportion is used in both terms of the equation, the reference group's item mean is weighted, whereas the focal group's item mean is unweighted.

The effect size ( $ES$ ) is then computed by dividing by the total group standard deviation ( $SD$ ) using this equation:

$$ES = \frac{SMD}{SD}.$$

By using Mantel's chi-square statistic (1963), the magnitude of the  $ES$  is interpreted using Golia's (2012) rules.

### 6.3.3. DIF Classification

Based on the DIF statistics and significance tests, items are classified into three categories: A, B, or C (as in Table 29). Category A items contain negligible DIF and Category B items exhibit slight to moderate DIF, while Category C items possess moderate to large DIF values. Items flagged with C-DIF during the preliminary analyses were provided to both the science test development manager and the accessibility, accommodations, and fairness (AAF) specialist as part of the preliminary analysis communication plan.

Table 29. DIF Classifications

Analysis	Criteria
Differential Item Functioning (DIF)	+ Favors the focal group – Favors the reference group
Mantel-Haenszel	A. Negligible – MH is not significantly different from 0 OR (MH is significantly different from 0 AND has a delta absolute value < 1). B. Slight to Moderate – MH is significantly different from 0 AND the absolute value of delta is < 1.5 AND has a delta absolute value greater than or equal to 1. C. Moderate to Large – MH is significantly different from 1 AND delta has an absolute value greater than or equal to 1.5.
Standardized Mean Difference	A. Negligible – is not significantly different from 0 OR has an absolute value $\leq 0.17$ . B. Slight to Moderate – is significantly different from 0 AND $0.17 <  ES  \leq 0.25$ . C. Moderate to Large – is significantly different from 0 AND has an absolute value $> 0.25$ .

### 6.3.4. Differential Item Functioning Results

Table 30 through Table 32 present the C-DIF results for each assessment.<sup>5</sup> [Appendix L](#) provides the DIF classification for items exhibiting B- or C-DIF by focal group. Although there were some C-flagged items, reviews by New Meridian and ME DOE staff did not find inherent bias in the way those items were written. Items that exhibited C-DIF will be limited in future form development to the extent possible.

Table 30. Grade 5 C-DIF

Form Name	No C-DIF Flags	At Least One C-DIF Flag	Percent with C-DIF
SP2022_GR05_SS1	14		
SP2022_GR05_SS2	11		
SP2022_GR05_SS3	9	1	10.0%
Total Test	34	1	2.9%

Table 31. Grade 8 C-DIF

Form Name	No C-DIF Flags	At Least One C-DIF Flag	Percent with C-DIF
SP2022_GR08_SS1	12	2	14.3%
SP2022_GR08_SS2	13		
SP2022_GR08_SS3	14		
Total Test	39	2	4.9%

<sup>5</sup> The American Indian/Native American and Alaska Native/Pacific Islander focal groups did not reach the minimum threshold for analyses and were excluded from these tables.



Table 32. High School C-DIF

Form Name	No C-DIF Flags	At Least One C-DIF Flag	Percent with C-DIF
SP2022_GRHS_SS1	17	2	10.5%
SP2022_GRHS_SS2	11	1	8.3%
SP2022_GRHS_SS3	10		
Total Test	38	3	7.3%

## 6.4. Student Testing Time Analyses

As noted in [Chapter 2](#), each assessment was administered as three 60-minute sessions. To ensure that students were provided sufficient time to answer all items and that their assessment experience was not speeded (i.e., not enough time provided for administration), time on items (both scored and unscored) was aggregated at the session level and compared to the allotted 60 minutes. ME DOE required that 80 percent of students complete each session within the allotted time. Not all students attempted all three sessions. For the purpose of this analysis, students who did not answer all items within a session were omitted so as to exclude extremely short session times due to few attempted items. Between 96.5% and 98.4% of students answered all questions within the sessions. Analyses presented in Table 33 indicate that 80 percent of all students (Percentile 80) completed each session within 40 minutes with most sessions taking approximately 20 minutes or less to complete.

Table 33. Summary of Time in Minutes to Complete Each Session

Grade	Session	N	Minimum	Median	Percentile 80	Maximum	Mean	Std. Dev.
05	1	11,472	1.4	25.8	35.6	122.8	27.6	11.0
05	2	11,523	0.7	14.3	20.4	82.0	15.6	6.9
05	3	11,416	0.8	13.9	19.7	72.3	15.0	6.6
08	1	12,154	1.3	22.6	30.2	108.4	23.8	9.1
08	2	11,991	0.8	16.1	21.9	75.1	17.0	6.9
08	3	11,953	0.4	17.5	24.6	133.7	18.6	8.3
HS	1	9,755	0.9	24.1	31.9	113.6	24.7	10.2
HS	2	9,739	1.0	13.2	17.7	68.6	13.6	5.9
HS	3	9,606	0.9	12.3	17.9	85.4	12.9	6.8



## Chapter 7. Calibration and Scaling

This chapter describes the procedures used to calibrate and scale the Maine Science Assessment online forms. Calibration and scaling were conducted according to the processes outlined in the psychometric OPM ([Appendix J](#)). The Rasch and partial credit (GPC) models were implemented using the program Winsteps Version 5.1.7.0 (Linacre, 2006) as noted in the OPM Addendum.

### 7.1. Item Response Theory

All Maine Science Assessment forms are calibrated using Item Response Theory (IRT) models. One advantage of using IRT models over classical test theory is that items and students are calibrated to a common scale (Figure 1).

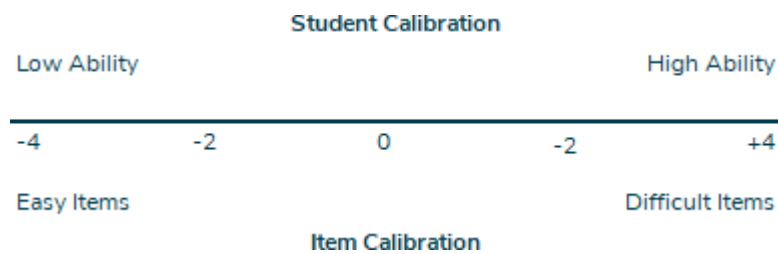


Figure 1. Item Response Theory Calibration

#### 7.1.1. Dichotomous Items

Item response theory for dichotomous items (e.g., items with two score classifications such as 0 or 1) is commonly expressed as a three-parameter logistic model (3PL):

$$P_i(\theta) = c_i + (1 - c_i) \frac{\exp[Da_i(\theta - b_i)]}{1 + \exp[Da_i(\theta - b_i)]}$$

where  $P_i(\theta)$  is the probability that a student gets item  $i$  correct,  $a_i$  is the discrimination parameter,  $b_i$  is the difficulty parameter,  $c_i$  is the lower asymptote (i.e., the guessing parameter), and  $D$  is a scaling factor approximately equal to 1.701 that generates the normal ogive function (Hambleton & Swaminathan, 1985; Kolen & Brennan, 2014).

The 3PL model is designed for dichotomously scored multiple-choice items. For dichotomous items that are not multiple-choice (e.g., multiple-select items, constructed-response prompts), the guessing parameter is set to 0 because it is assumed that guessing does not occur. Lastly, the 3PL model is not appropriate for items with more than two score categories (i.e., polytomous items; Kolen & Brennan, 2014).

The Rasch model can be expressed as a reduced 3PL model since the discrimination parameter,  $a_i$ , is fixed to 1 and the guessing parameter,  $c_i$ , is set to 0 for all items:

$$P_i(\theta) = \frac{\exp[(\theta - b_i)]}{1 + \exp[(\theta - b_i)]}$$

where  $P_i(\theta)$  is the probability that a student gets item  $i$  correct, and  $b_i$  is the difficulty parameter,

### 7.1.2. Polytomous Items

The Partial Credit Model (PCM; Masters, 1982) and is used for the ordered categorization of responses when there are two or more ordered categories. The PCM is defined as:

$$P_{ih}(\theta) = \frac{\exp[\sum_{v=1}^h Z_{iv}(\theta)]}{\sum_{c=1}^{m_i} \exp[\sum_{v=1}^c Z_{iv}(\theta)]}$$

and

$$Z_{ih}(\theta) = (\theta - b_{ih}) = (\theta - b_i + d_h),$$

where  $b_{ih}$  is an item-category parameter,  $b_i$  is an item-location parameter, and  $d_h$  is a category parameter. Further, if the number of categories is  $m_i$ , then only  $m_i - 1$  item-category parameters can be identified, and  $b_{i1} \equiv 0$ .

## 7.2. Calibration and Item Response Theory Results

Item and person parameters were estimated using The Joint Maximum Likelihood Estimation (JMLE) method. The default setting of Winsteps was used for all of the estimations and calculations. Each Winsteps calibration ended via normal termination using the following parameter estimation controls: Both LCONV= for "Logit change size" and RCONV= for "Residual size" were controlled. Iteration stopped when both the biggest logit change was less than or equal to LCONV=.00001 and the biggest residual score was less or equal to RCONV=.001 or when both the biggest logit change size increased and the biggest residual size increased (divergence). IRT parameters are provided in [Appendix M](#).

In addition, [Appendix N](#) presents the test characteristic curves (TCCs), test information functions (TIFs) and conditional standard error of measurements (CSEMs) for the assessment overall as well as for each session.

**Test Characteristic Curves (TCCs).** The TCC represents the relationship between expected test performance and estimates of the science trait underlying test performance. The x-axis represents the underlying trait (referred to as *theta*), and the y-axis represents expected performance on the assessment, which ranges from zero to the maximum possible raw score.

**Test Information Function (TIF) Curves.** The TIF indicates the amount of information about student ability provided by the assessment at different points along the continuum from low to high ability. When an assessment provides more information, reliability (measurement precision) is greater. The peak of the TIF indicates the ability level at which the assessment is the most reliable.

**Conditional Standard Error of Measurement (CSEM) Curves.** The CSEM indicates the amount of measurement error across the theta scale. Note that the CSEM is lowest where the test information is greatest. (CSEM equals 1 divided by the square root of the test information.)

## 7.3. Model Assumption Analyses and Results

The Rasch and PCM models are appropriate when these certain assumptions are met:

- A unidimensional trait denoted by  $\theta$
- Local independence of items
- Items fit the model

### 7.3.1. Dimensionality

Unidimensionality is one of the essential assumptions of the IRT models commonly used in large-scale summative assessments (Hambleton & Swaminathan, 1985; Hambleton, Swaminathan, & Rogers, 1991). That is, all items on the assessment are measuring a single construct, or a dominant dimension.

A bifactor model within the multidimensional IRT (MIRT) framework was used to evaluate test dimensionality for the Maine Science Assessment across all grades. At each grade level of the Maine Science Assessment, scree plots, omega, angles of items, explained common variance (ECV; Sijtsma, 2009; Ten Berge & Socan, 2004), and relative parameter bias (RPB) were used to evaluate dimensionality.

- **Scree plot:** A scree plot is a line plot of the eigenvalues of factors or principal components in an analysis. It always displays the eigenvalues in a downward curve, ordering the eigenvalues from largest to smallest. According to the scree test, the "elbow" of the graph where the eigenvalues seem to level off is found and factors or components to the left of this point should be retained as significant.
- **Omega hierarchical (OmegaH) and Omega hierarchical subscale (OmegaHS):** OmegaH estimates the proportion of variance in total scores that can be attributed to a single general factor. OmegaHS is the reliability of a subscale score after controlling for the variance due to the general factor. For a unidimensional test, OmegaH should be high and OmegaHSs should be small. If the opposite is observed, meaning that OmegaH is small and OmegaHSs are large, that would indicate multidimensionality.
- **Angles of items:** Items that are closer to the first-dimension axis primarily measure the first ability while items that are closer to the dimension axis primarily measure the second ability. Items that have an angle of 45° with both ability axes equally measure both of the abilities (Ackerman, 1994; Ackerman, Gierl, & Walker, 2003). The cut point for measuring the first dimension was set as 20° based on the literature (Ackerman, 1994; Ackerman, Gierl, & Walker, 2003; Walker, Gocer Sahin, 2017). Accordingly, items with more than 20° angles were flagged as complex items, meaning measuring more than one dimension.
- **ECV:** The ECV index shows the percent of common variance explained by the general factor and is a more direct way to measure the strength of the general factor in comparison to the content-domain specific factors.
- **Relative parameter bias (RPB):** An item parameter estimate could be biased when a test with multidimensional structure is forced to conform to a unidimensional model. That is, a unidimensional model is fit to data with a multidimensional structure. RPB reflects the amount of bias in the item loadings when the test with a bifactor structure is fitted using a unidimensional model and is defined as

$$RPB = \sum (\hat{\gamma}_g - \hat{\gamma}_u) / n$$

where  $\hat{\gamma}_g$  is the item loading on the general factor in a bifactor model and  $\hat{\gamma}_u$  is the item loading in a unidimensional model.

The bifactors models were structured based on the item type, SEP, CCC, and content domain. The content of each structure is provided in Table 34.

Table 34. Hypothesized Dimensional Structures in the Study

Dimensional Structures	Number of Levels	Levels
Content Domain	3 <sup>6</sup>	<ul style="list-style-type: none"> <li>• Structure and Properties of Matter</li> <li>• Life Sciences (LS)</li> <li>• Earth and Space Sciences (ESS)</li> </ul>
Item Type(s)	2	<ul style="list-style-type: none"> <li>• CR items</li> <li>• MC items</li> </ul>
Science and Engineering Practice	3	<ul style="list-style-type: none"> <li>• Investigate (based on SEP 1: Asking questions [science], defining problems [engineering] and SEP 3: Planning and carrying out investigations)</li> <li>• Evaluate (based on SEP 4: Analyzing and interpreting data, SEP 5: Using mathematics and computational thinking, and SEP 7: Engaging in argument from evidence)</li> <li>• Reason Scientifically (based on SEP 2: Developing and using models and SEP 6: Constructing explanations [science], Designing solutions [engineering])</li> </ul>
Crosscutting Concept	7	<ul style="list-style-type: none"> <li>• CCC 1: Patterns</li> <li>• CCC 2: Cause and effect</li> <li>• CCC 3: Scale, proportion, and quantity</li> <li>• CCC 4: Systems and system models</li> <li>• CCC 5: Energy and matter</li> <li>• CCC 6: Structure and function</li> <li>• CCC 7: Stability and change</li> </ul>

When convergence issues occurred, omega statistics were not calculated. Instead, New Meridian used other stats to evaluate dimensionality results. For simplicity, we provided results of the most basic structure—item type. Since the results of item type were satisfied, results of other complex models are not included in this technical report. For more information, an internal report can be provided.

Table 35. Omega, ECV, and RPB Science Test Structured Based on Item Type

Grade	OmegaH	OmegaHS <sub>1</sub>	OmegaHS <sub>2</sub>	ECV	RPB
05	NA	NA	NA	0.92	0.001
08	0.89	0.00	0.00	0.88	0.006
HS	0.81	0.00	0.00	0.94	0.000

According to Table 35, when the grade 5 test is structured based on item type, the ECV for item type is 0.92, which means that 92 percent of the common variance was explained by the general factor and eight percent by the two

<sup>6</sup> Content domains vary by grade level. Some grades have fewer than three domains.

factors. The RPB is 0.001, indicating that if the data has a multidimensional structure but is fitted with a unidimensional model, the average bias in the factor loadings is small and negligible.

When the grade 8 Maine Science Assessment is structured based on item type, OmegaH is 0.89, showing that 89 percent of the variance in the total score was explained by a single general factor. The values of OmegaHS for dichotomous and three categories' items are zero, suggesting that, after accounting for the general factor, the group-specific factors only accounted for almost none of the total score variance. Like Omega, the ECV for item type shows that 88 percent of the common variance was explained by the general factor. The value of 0.006 of RPB shows that if the data have a multidimensional structure but are fitted with a unidimensional model, the average bias in the factor loadings is small and negligible.

When the high school Maine Science Assessment is structured based on item type, OmegaH is 0.81; the values of OmegaHS for dichotomous and three category items are zero, suggesting that, after accounting for the general factor, the group-specific factors only accounted for almost none of the total score variance. The ECV for item type is 0.94, which means that 94 percent of the common variance was explained by the general factor and eight percent by the two factors. The RPB is 0.000 indicating that if the data have a multidimensional structure but are fitted with a unidimensional model, the average bias in the factor loadings is small and negligible.

Angles of items for grade 5 and high school science tests are given in Table 36.

Table 36. Item Angles for Exploratory Multidimensional Estimation Conducted Based on Item Type

	Grade 5 Science				High School Science			
	Item	Item	Item	Item	Item	Item	Item	Item
1	15°	15°	15°	15°	15°	15°	15°	15°
2	15°	15°	15°	15°	15°	15°	15°	15°
3	15°	15°	15°	15°	15°	15°	15°	15°
4	15°	15°	15°	15°	15°	15°	15°	15°
5	15°	15°	15°	15°	15°	15°	15°	15°
6	15°	15°	15°	15°	15°	15°	15°	15°
7	15°	15°	15°	15°	15°	15°	15°	15°
8	15°	15°	15°	15°	15°	15°	15°	15°
9	15°	15°	15°	15°	15°	15°	15°	15°
10	15°	15°	15°	15°	15°	15°	15°	15°
11	15°	15°	15°	15°	15°	15°	15°	15°
12	15°	15°	15°	15°	15°	15°	15°	15°
13	15°	15°	15°	15°	15°	15°	15°	15°
14	15°	15°	15°	15°	15°	15°	15°	15°
15	15°	15°	15°	15°	15°	15°	15°	15°
16	15°	15°	15°	15°	15°	15°	15°	15°
17	15°	15°	15°	15°	15°	15°	15°	15°
18	15°	15°	15°	15°	15°	15°	15°	15°
19	15°	15°	15°	15°	15°	15°	15°	15°
20	15°	15°	15°	15°	15°	15°	15°	15°

<sup>7</sup> Items with angles larger than 20° are in bold type.



Taken together, the body of dimensionality analyses demonstrate that the Maine Science Assessment is approximately unidimensional at all three grade levels. While some individual items load on two dimensions, there is clearly one single dominant factor along with minimal additional small factors.

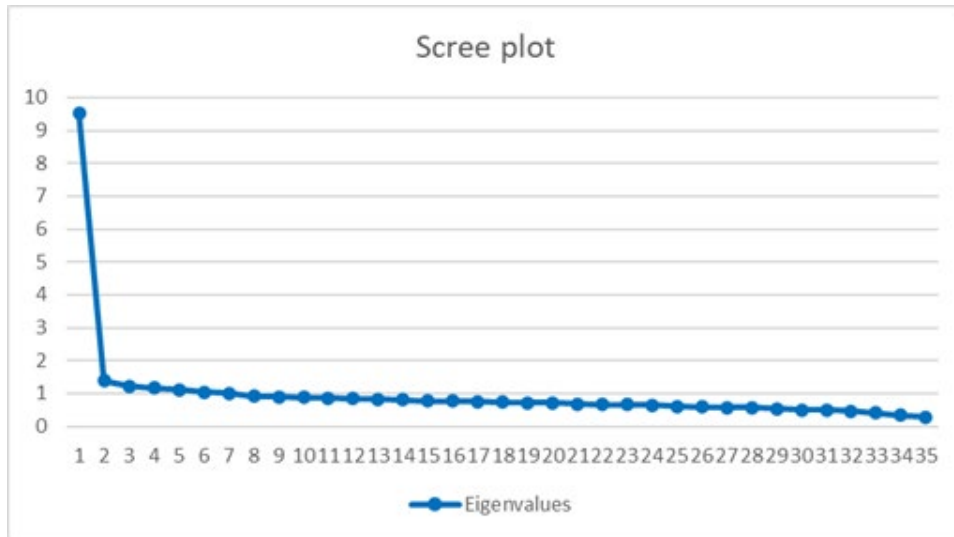


Figure 2. Scree Plot for Grade 5

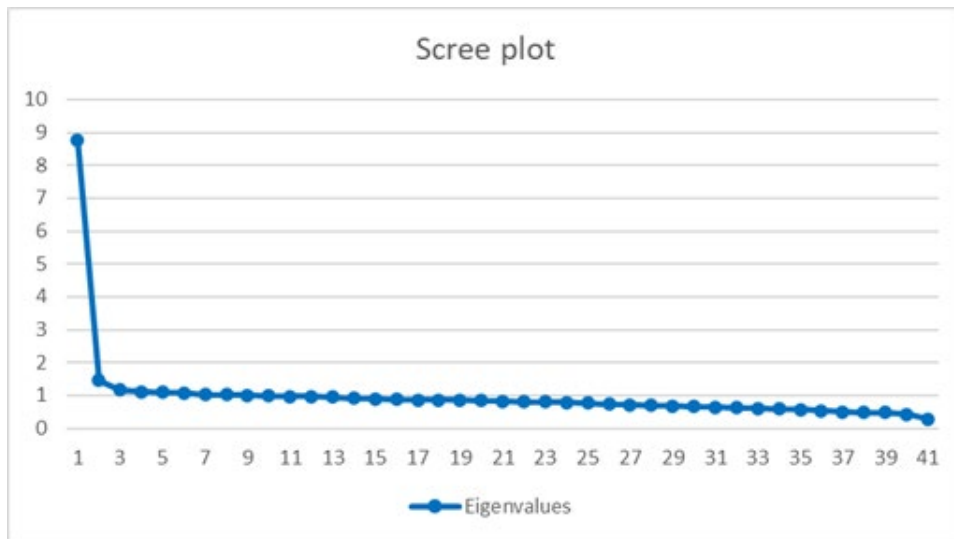


Figure 3. Scree Plot for Grade 8

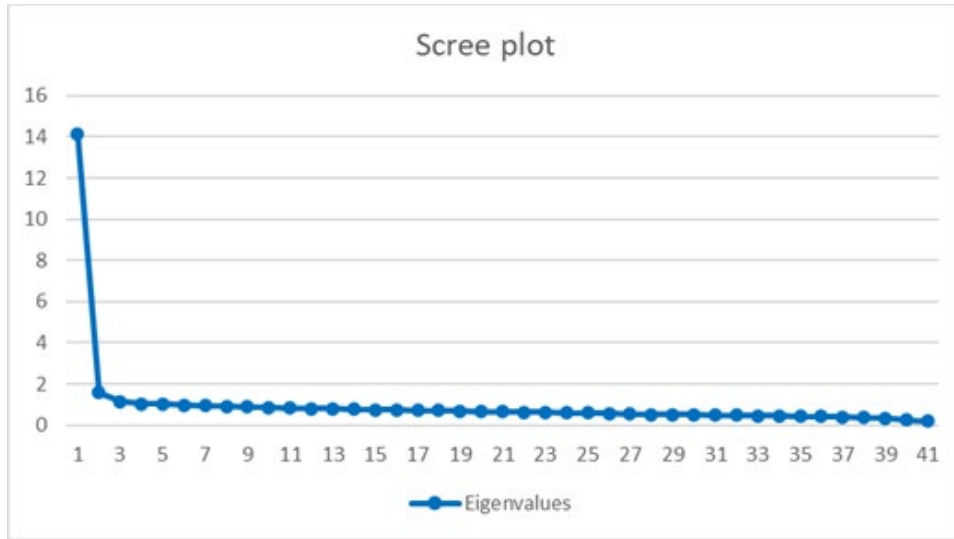


Figure 4. Scree Plot for High School

### 7.3.2. Model Fit Index

Fit statistics indicate how accurately or predictably data fit the IRT model. Fit statistics for the Rasch model are calculated by comparing the observed empirical data with the data that the Rasch model would be expected to produce if the data fit the model perfectly. The outfit mean-square statistic is computed for all scored responses excluding responses in extreme total scores. This is a chi-square statistic divided by its degrees of freedom. Infit is an information-weighted statistic that is more sensitive to unexpected behavior affecting responses to items near the respondent’s ability level. The expectation for both statistics is 1, meaning that values near 1 are of least concern and values less than 1 indicate that the response and rating patterns are too predictable and thus redundant but are not of great concern. High values are of greater concern. The interpretation criteria according to Linacre (2002) for infit and outfit statistics for dichotomous items is given below.

- Values greater than 2.0 “distort or degrade the measurement system.”
- Values between 1.5 and 2.0 are “unproductive for construction of measurement, but not degrading.”
- Values between 0.5 and 1.5 should be considered “productive for measurement.”
- Values below 0.5 are “less productive for measurement, but not degrading.”

Table 37. Range of Fit Statistics

Grade	Infit		Outfit	
	Min	Max	Min	Max
05	0.821	1.514	0.659	1.839
08	0.779	1.393	0.727	2.823
HS	0.804	1.574	0.698	2.222

According to Table 37, infit and outfit statistics range from 0.659 to 1.839 for grade 5, indicating that grade 5 science items fit the model well. Infit statistics ranging from 0.779 to 1.393 for grade 8 and 0.804 to 1.574 for high





school indicate good model fit. Outfit statistics range from 0.727 to 2.823 and 0.698 to 2.222 in grade 8 and high school, respectively. The values exceeding 2 represent only one item in grade 8 and two items in high school. Therefore, it can be concluded that in general, items fit well across all grades.

## 7.4. Scaling

Scaled scores were derived by applying a linear transformation to the total student IRT theta scores calculated in Winsteps from the raw points earned by each test taker. Each scaled score is reported as an integer. For grades 5 and 8 and for high school respectively, the lowest obtainable scale scores (LOSS) are 6, 3, and 4, and the highest obtainable scale scores (HOSS) are 80, 90, and 90.

Table 38 reports the scaling constants used for score transformation at each grade level. For a linear transformation, the A constant is the slope, and the B constant is the intercept. Two sets of values, C1 & C2 and C3 & C4, are presented for each grade level. Each set was derived from the scaled scores representing the three cut scores. For instance, the C1 & C2 cut scores differentiate level 1 from level 2 and level 3 from level 2.

For each grade, final scaled scores were calculated from the first set of values presented—the C1 & C2 values. The second set of values for each grade were calculated and are presented here as evidence of the appropriateness of the scale derived via linear transformation.

Table 38. Reported Scale Score Transformation Constants

Grade	C1 & C2 (Levels 2 & 3)		C2 & C3 (Levels 3 & 4)	
	Slope (A)	Intercept (B)	Slope (A)	Intercept (B)
05	7.434944	37.05204	7.658643	36.75274
08	14.25178	46.16152	14.74926	45.67847
HS	7.949126	38.95866	7.763975	39.21584

Scoring tables are provided in [Appendix O](#). Students were required to answer at least 25% of the assessment questions to receive a scaled score. The distributions of scaled scores are provided in [Appendix P](#).

## Chapter 8. Reliability

Reliability focuses on the extent to which score differences reflect true differences in the knowledge, skills, and abilities being assessed rather than chance fluctuations. Thus, reliability measures the consistency of the scores across conditions that can be assumed to differ at random; for example, which form of the assessment the student is administered or which raters are assigned to score constructed-response prompts. In statistical terms, the variance in the distributions of scores, essentially the differences among students, is partly due to real differences in the knowledge, skills, and abilities being assessed (true variance) and partly due to random errors in the measurement process (error variance). Reliability is an estimate of the proportion of the total variance that is true variance.

There are several different ways to estimate reliability. The type of raw score reliability estimate reported here is an internal-consistency measure, which is derived from analysis of the consistency of the performance of students across items within an assessment. It is used because it serves as a good estimate of alternate forms reliability, but it does not consider form-to-form variation due to lack of test form parallelism, nor is it responsive to day-to-day variation due to, for example, the student’s state of health or the administration environment.

Reliability coefficients range from 0 to 1. The higher the reliability coefficient for a set of scores, the more likely students would be to obtain very similar scores upon repeated administrations if the students do not change in their level of the knowledge or skills measured by the assessment. Moderate to acceptable ranges of reliability tend to exceed 0.5 (Cortina, 1993; Schmitt, 1996). Estimates lower than 0.5 may indicate a lack of internal consistency.

Classically based standard error of measurement (SEM) quantifies the amount of error in the scores.<sup>8</sup> SEM is the extent by which students’ scores tend to differ from the scores they would receive if the test were perfectly reliable. As the SEM increases, the variability of students’ observed scores is likely to increase across repeated administrations. Observed scores with large SEMs pose a challenge to the valid interpretation of a single score. Reliability and SEM estimates were calculated at the full assessment level.

### 8.1. Reliability and Standard Errors of Measurement

Coefficient alpha (Cronbach, 1951) is a reliability measure for dichotomously scored and polytomously scored items (Brennan, 2001). The coefficient is calculated by substituting the variance of both items and total raw scores as follows:

$$\alpha_x = \frac{n}{n - 1} \left( 1 - \frac{\sum_{i=1}^n \sigma_i^2}{\sigma_x^2} \right)$$

in which  $n$  is the number of items,  $\sigma_i^2$  is the variance of scores on each item, and  $\sigma_x^2$  is the variance of the total raw score. When other administration constraints are held constant, the more items the assessment includes, the greater the reliability coefficient. Conversely, when sample sizes become smaller and more homogeneous, lower reliability estimates are obtained.

The formula for the classical SEM is this:

$$SEM = \sigma_x \sqrt{1 - \alpha_x}$$

where  $\sigma_x$  is the standard deviation of the raw score and  $\alpha_x$  is the estimated coefficient alpha computed above.



Student population descriptive statistics for the raw score, reliability (alpha), and SEM estimates are provided in Table 39.

Table 39. Raw Score Descriptive Statistics, Alpha, and Standard Errors of Measurement (SEM) by Grade

Grade	N	Maximum	Mean	Std. Dev.	Alpha	SEM
05	11,774	43	19.37	8.01	0.85	3.06
08	12,294	45	20.54	7.15	0.81	3.10
HS	10,091	51	24.83	10.85	0.91	3.27

Since each grade has a different blueprint (e.g., number of items) and there were variations in the percent of state students assessed, it is inappropriate to make inferences regarding the quality of the assessments by comparing the reliabilities.

## 8.2. Subgroup Reliability

As with the entire assessed student population, reliabilities and measurement error can be investigated for various subgroups of interest when the group size has a minimum of 25 students. [Appendix Q](#) contains the computed estimates by gender, ethnicity, English learner status, Individual Education Pan (IEP) status, economically disadvantaged (SE) status, migrant status, and 504 Plan status. Because subgroup sample sizes vary considerably, results should be interpreted with caution.

## 8.3. Inter-rater Consistency

The interrater agreement in scoring CR items is reported in [Appendix I](#) shows how different raters score consistently. [Chapter 5](#) describes the processes SME used to monitor the quality of the hand-scored item prompt responses. Prompt level inter-rater reliability results are provided in [Appendix I](#).

## 8.4. Accuracy and Consistency

Classification accuracy is defined as the extent to which the actual classifications of test takers (on the basis of their test scores) agree with those that would be made on the basis of their true scores, if their true scores could somehow be known. The term consistency refers to the agreement between classifications based on two nonoverlapping, equally difficult forms of the test (parallel forms) (Livingston & Lewis, 1995).

We used Livingston and Lewis's (1995) approach, which is intended to handle situations where items are not equally weighted and/or some or all the items are polytomous scored. This method is formulated as

$$\tilde{\eta} = \frac{(\mu_x - X_{min})(X_{max} - \mu_x) - r\sigma_x^2}{\sigma_x^2(1-r)},$$

where  $X_{min}$  is the lowest score for X,  $X_{max}$  is the highest score,  $\mu_x$  is the mean,  $\sigma_x^2$  is the variance, and  $r$  is the reliability. This method models the distribution of the true scores and of scores on a parallel form by using a four-parameter beta distribution.

As seen in the above formula, classification accuracy and consistency indices rely on the interaction between several different factors related to test design and standard-setting decisions. These factors include the number of score

cuts, test reliability, measurement accuracy at the cut score, distance between adjacent cuts, location of the cut scores on the ability scale, and percentage of students around a cut score (Ercikan & Julian, 2002; Lee, Hanson, & Brennan, 2002). Because these statistics are influenced by the interplay between a variety of factors, only a very limited number of studies to date have investigated the ideal or expected levels of decision consistency and accuracy needed for educational assessments.

Classification accuracy indices quantify the percentage of students who are accurately placed below and/or above a given cut score. For example, a classification accuracy index of 0.886 for cut score 1/2 means that were students to be classified twice, once according to their observed score and once according to their true score, 88% of those students would be classified in the same category both times.

Similarly, classification consistency indices give the percentage of students classified consistently below and/or above a given cut score. For example, a classification index of 0.840 for cut score 1/2 means that were two parallel forms to be administered to students, 84% of those students would be classified in the same way for both forms.

In this technical report, we summarized the range of classification accuracy and consistency of tests across grades. As shown in Table 40, classification accuracy ranged from 0.886 to 0.968; from 0.864 to 0.969; and from 0.915 to 0.959 for grade 5, grade 8, and high school, respectively. As seen in Table 41, classification consistency ranged from 0.840 to 0.956; from 0.811 to 0.957; and from 0.881 to 0.943 for grade 5, grade 8, and high school, respectively. The lowest classification accuracy and consistency values were found for students in grade 8 around achievement level 2/3. Table 42 shows CSEMs at the cut score level. The lowest consistency and accuracy indices are obtained for middle cut scores. This finding is consistent with the literature (Ercikan & Julian, 2002; Lee, Hanson, & Brennan, 2002). As demonstrated, even though CSEMs are low in general, in grade 8 they are higher than the CSEMs of the other two grades. CSEMs did not change across cut score levels.

Table 40. Classification Accuracy Indices at Cut Score Level

	Achievement Level 1/2	Achievement Level 2/3	Achievement Level 3/4
Grade 5	0.886	0.910	0.968
Grade 8	0.875	0.864	0.969
High School	0.916	0.915	0.959

Table 41. Classification Consistency Indices at Cut Score Level

	Achievement Level 1/2	Achievement Level 2/3	Achievement Level 3/4
Grade 5	0.840	0.875	0.956
Grade 8	0.824	0.811	0.957
High School	0.881	0.881	0.943

Table 42. CSEMs at Cut Score Level

	Achievement Level 1/2	Achievement Level 2/3	Achievement Level 3/4
Grade 5	2	2	2
Grade 8	4	4	4
High School	2	2	2



## Chapter 9. Validity

The *Standards for Educational and Psychological Testing*, issued jointly by the American Educational Research Association (AERA), American Psychological Association (APA), and National Council on Measurement in Education (NCME) (2014), reports that

validity refers to the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests. Validity is, therefore, the most fundamental consideration in developing tests and evaluating tests. The process of validation involves accumulating relevant evidence to provide a sound scientific basis for the proposed score interpretations (p. 11).

Therefore, the purpose of test validation is not to validate the test itself but to validate interpretations of the test scores for specific uses. Test validation is not a quantifiable property but an ongoing process that begins at initial conceptualization and continues throughout the life cycle of an assessment. Every aspect of an assessment provides evidence in support of its validity (or evidence of lack of validity), including design, content specifications, item development, and psychometric characteristics.

Validity was examined by looking at evidence based on assessment content, evidence based on internal structure and evidence based on external variables. Test items were matched with blueprints and NGSS standards to ensure content validity. For construct validity, item correlations and factor structure were examined. Also, relationships with external variables such as student questionnaire data were used. Those results also support content and construct validity.

### 9.1. Evidence Based on Assessment Content

Evidence based on content of achievement tests is supported by the degree of correspondence between test items and content standards. The Maine Science Assessments adhere to the principles of evidence-centered design, in which the standards to be measured (the MLRs) are identified, and the performance a student needs to achieve to meet those standards is delineated in the performance expectations. As noted in [Chapter 2](#), all assessment items have been thoroughly reviewed with the New Meridian Science Exchange Framework. Assessment items are further reviewed for adherence to universal design principles, which maximize the participation of the widest possible range of students prior to the items being selected for administration.

The form planners shown in Appendix B represent how the test forms matched the blueprints in terms of the reporting categories of science discipline and science and engineering practices. The number of items for each form is given for various dimensions of the NGSS. The science educator cadre performed reviews on the Maine Spring 2022 forms and across all items administered (FT and OP) the average percent to which the standard provided matched the educator cadre standard was as follows:

- Performance Expectation (PE): 73%
- Science and Engineering Practices (SEP) 58%

## 9.2. Evidence Based on Internal Structure

Analyses of the internal structure of an assessment typically involve studies of the relationships among items and/or test components (i.e., subclaims) in the interest of establishing the degree to which the items or components appear to reflect the construct on which a test score interpretation is based (AERA, APA, & NCME, 2014, p. 16). The term *construct* is used here to refer to the characteristics that a test is intended to measure; in the case of the operational tests, the characteristics of interest are the knowledge and skills defined by the test blueprint.

Evidence based on internal structure is discussed in detail in [Chapter 6](#) and [Chapter 7](#). Technical characteristics of the internal structure of the assessments are presented in terms of classical item statistics (item difficulty, item-test correlation), differential item functioning (DIF) analyses, item response theory (IRT) parameters and procedures, and dimensionality assumption analyses. In general, item difficulty and discrimination indices were in acceptable and expected ranges given the circumstances for this administration. Positive discrimination indices for the final, operationally scored items indicate that most items were assessing consistent constructs, and students who performed well on individual items tended to perform well overall. Also, multidimensionality results which are evidence for construct validity proved that tests are unidimensional.

The reliability analyses presented in [Chapter 8](#) provide information about the internal consistency of the assessments. Internal consistency is typically measured via correlations among the items on an assessment and provides an indication of how much the items measure the same general construct. Except for a few subgroups, all reliabilities were greater than 0.80.

*Consequences of testing* refers to intended and unintended consequences associated with test result interpretation. Evidence for the consequences of testing is addressed with item analyses information in [Chapter 6](#) and in the scaling information in [Chapter 7](#). However, all chapters speak to the efforts undertaken to provide accurate and clear information regarding test scores. Evidence of the consequence of testing will also accrue with the continued implementation of the MLRs and the continued administration of the Maine Science Assessment.

## 9.3. Evidence based on External Variables

External validity for the Maine Science Assessment may be described by the relationship of the test scores with situational variables such as student self-image, curriculum, and various instructional patterns. The situational variables were all based on student questionnaire data collected during Session 4 of the administration. The questions varied slightly by grade. The pertinent questions are presented in [Appendix R](#). Student performance on the assessment was broken out by quartiles for these analyses.

The relationship between students' performances with other variables known to be related (Crocker & Algina, 1986) is another way to examine validity. For example, it is known that there is a relationship between intelligence and school success or job performance. Although these are not two equivalent constructs, intelligence is a predictor of these variables, therefore it is interpreted as an indicator of validity. As seen in Self Image results, the number of students who describe themselves as being good or very good in science is higher in the third quartile (Q3) and the fourth quartile (Q4), which are the categories with higher performances for students in grade 5 and high school. For grade 8, the number of students who describe themselves as being good or very good in science is higher in Q2, Q3, and Q4. This finding can be interpreted as evidence for construct validity since it's projecting students' thinking.

Different than self-image results, not only the students in Q3 and Q4 but also all of the students across all grades agree that the questions that they have been given on this MEA test somehow match what they have learned in school about science. This finding can be interpreted as evidence for content and construct validity.

### 9.3.1. Self-Image

All students were asked how they would rate themselves as a student in science. The figures below (Figure 5–Figure 7) provide the results by performance quartile for each grade separately.

Question: Which of the following best describes how you rate yourself as a student in science?

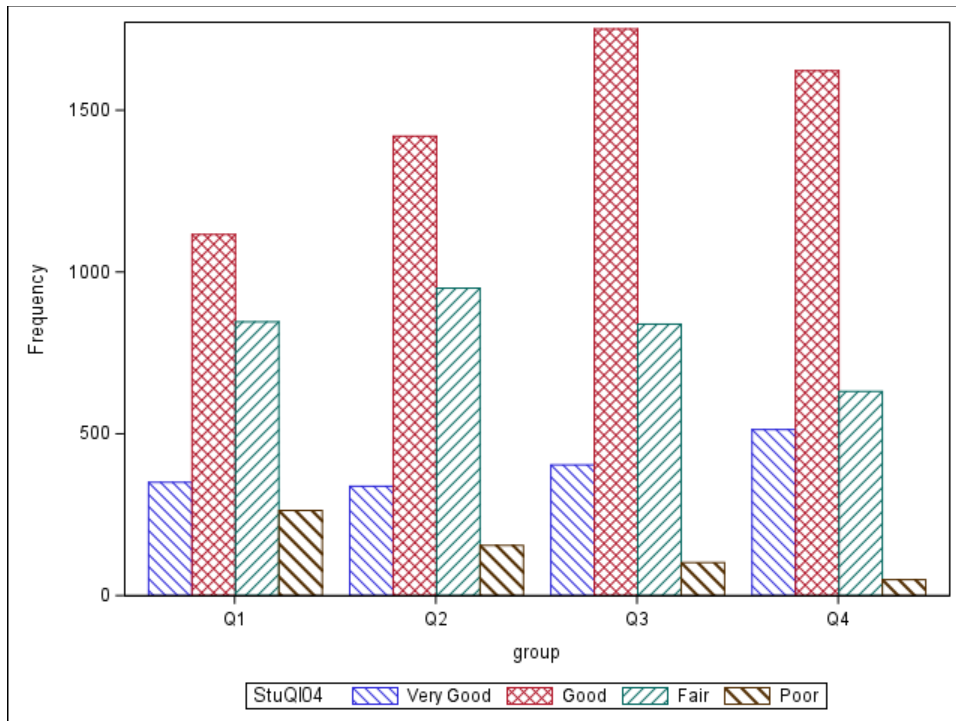


Figure 5. Grade 5 Self-Image

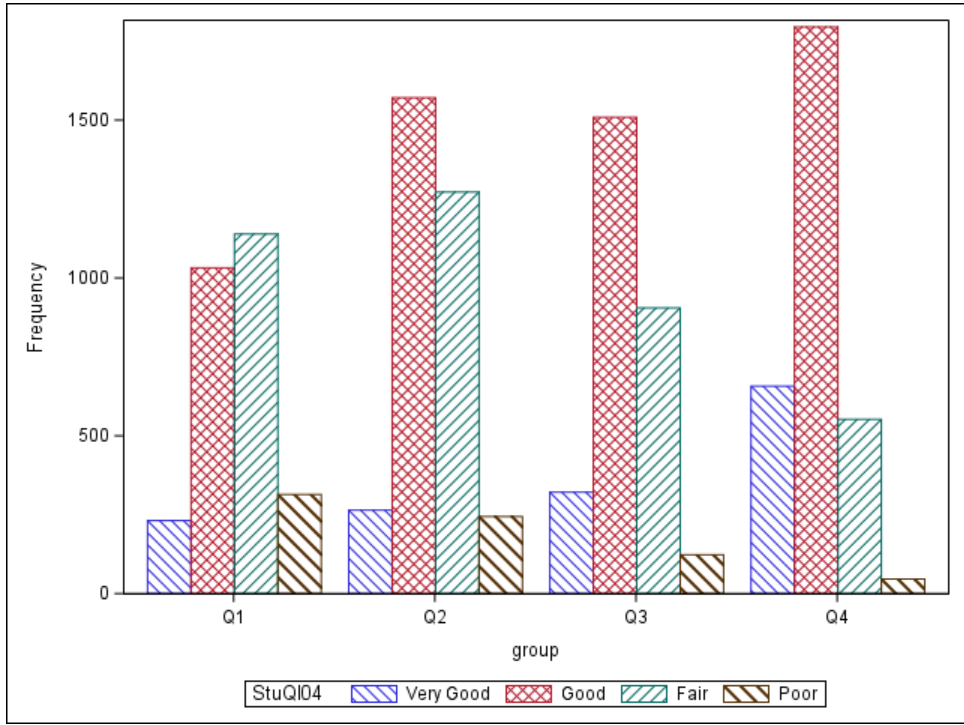


Figure 6. Grade 8 Self-Image

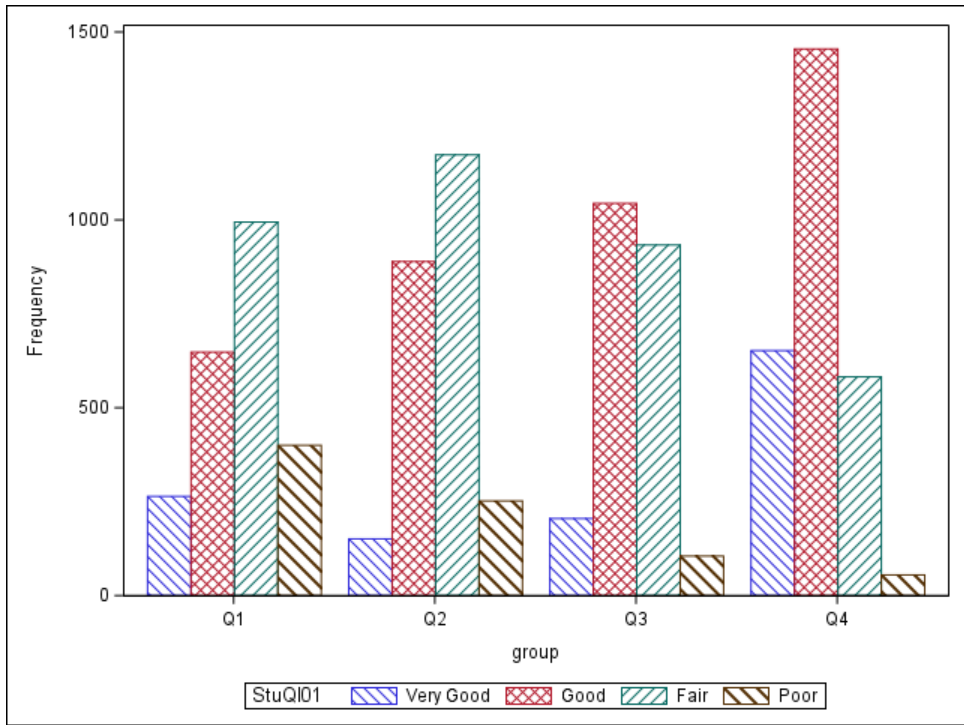


Figure 7. High School Self-Image



### 9.3.2. Match with Curriculum

All students were asked how well the content of the assessment matched what they learned in the classroom. The figures below (Figure 8–Figure 10) provide the results by performance quartile for each grade separately.

Question: How well do the questions that you have just been given on this MEA test match what you have learned in school about science?

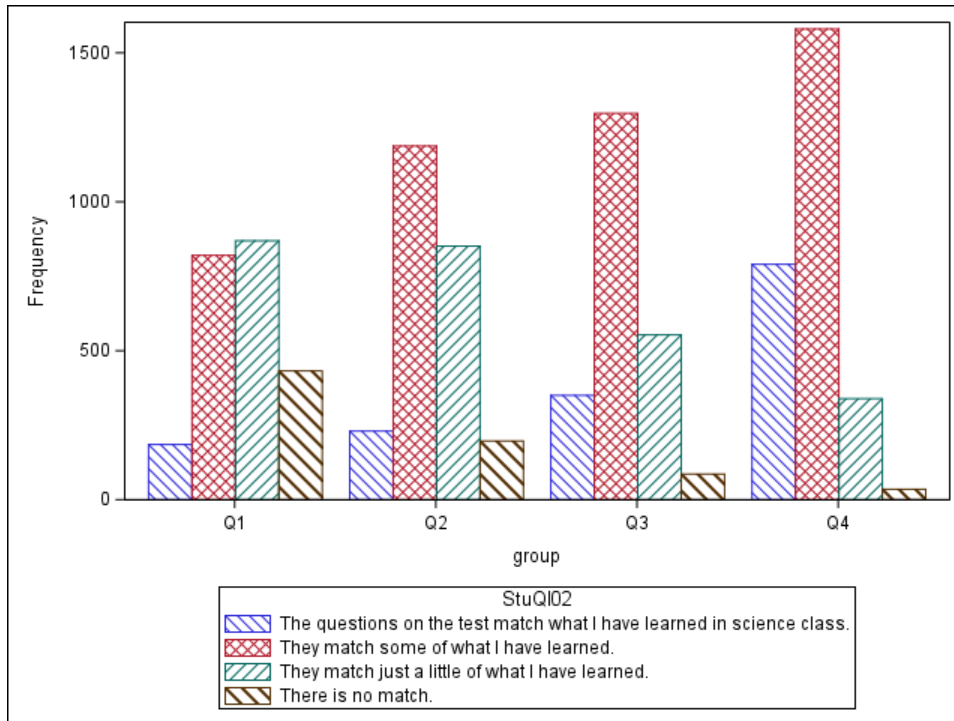


Figure 8. Grade 5 Assessment Match with Curriculum

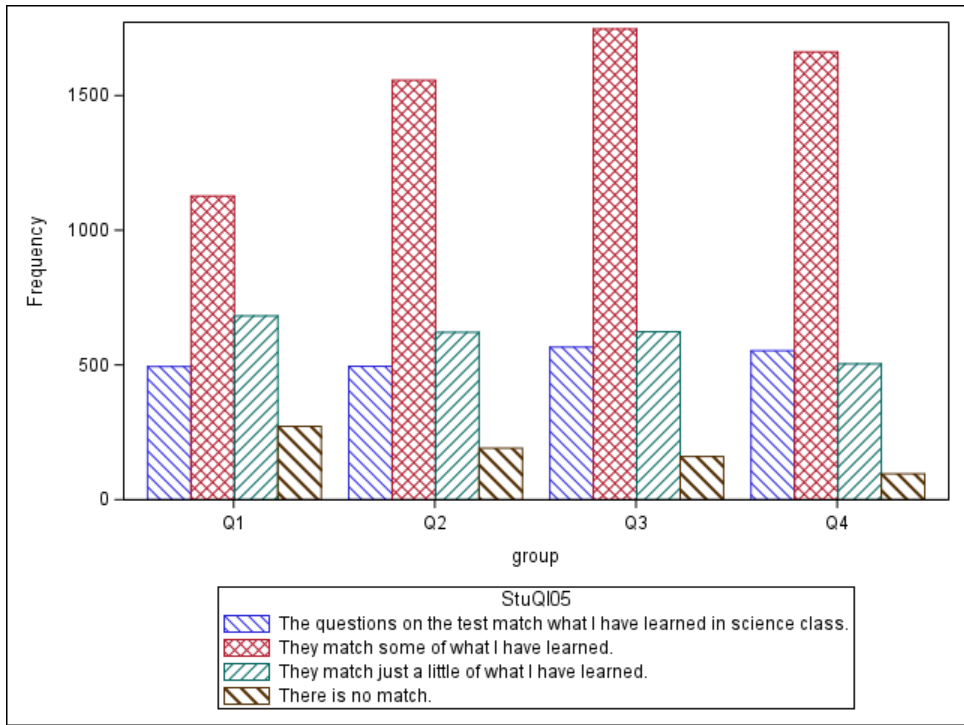


Figure 9. Grade 8 Assessment Match with Curriculum

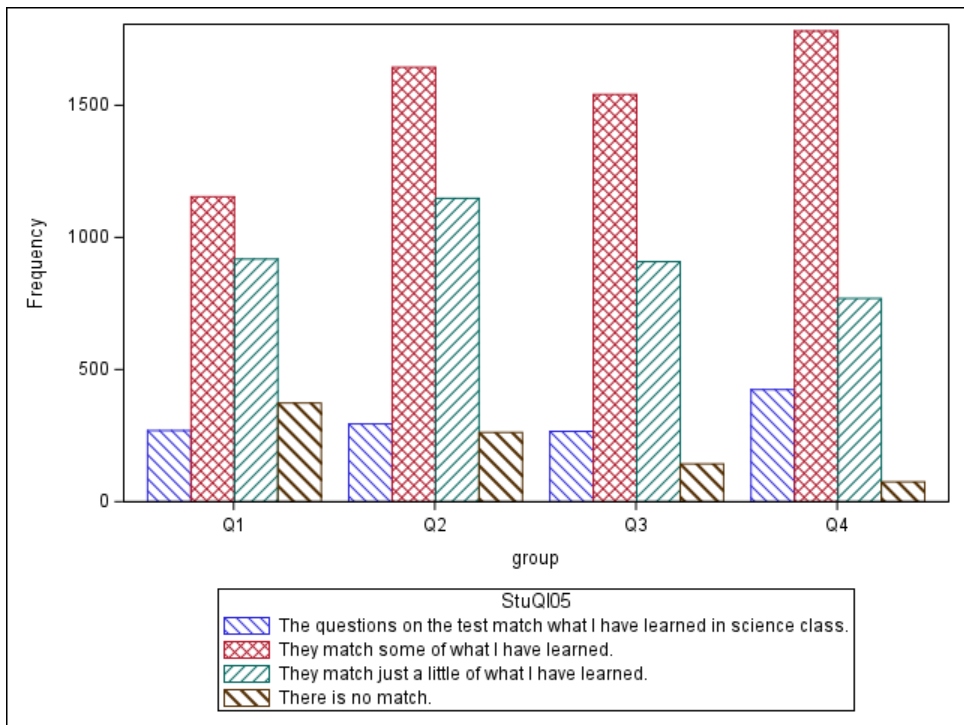


Figure 10. High School Assessment Match with Curriculum



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## Appendix A. Item Response Type Examples

### Multiple-Choice

**Question Type: Select one answer.**

This is an example of a question where you will choose only one answer. You will choose the best answer by selecting one answer choice option. If you change your mind, you can select a different answer option by selecting a new answer.

Which animal is a common house pet?

A	dog
B	lion
C	tiger
D	bear

### Multiple-Select



**Question type: Select one or more answers.**

There will be questions on the assessment that ask you to choose all answers that apply. For these types of questions, there may be more than one answer. Other questions will tell you exactly how many answers to choose. For these questions, select the appropriate number of answers .

Which activities are typically held outside? Select **all** that apply.

A	camping
B	gymnastics
C	hiking
D	skiing
E	watching tv



## Order

**Question Type: Order items on a list.**

This is an example of an item where a list needs to be put in order. Place answers to the appropriate places by moving them up or down.

What are the different content areas of science, in alphabetical order? Place the science content areas into alphabetical order.

☰ Chemistry
☰ Physical Science
☰ Biology
☰ Earth Science

## Matrix

**Question Type: Select buttons in a table.**

This is an example of another type of question you will encounter during your science assessment. To answer these types of questions, you will need to select one answer in each row in the table. Select an empty circle to choose the answer.

Which statements can be used to describe yourself? Select Yes or No for each statement.

	Yes	No
I wonder about space.	<input type="radio"/>	<input type="radio"/>
I like to solve complex problems.	<input type="radio"/>	<input type="radio"/>
I like to observe animal behavior.	<input type="radio"/>	<input type="radio"/>
I like thinking about how things work.	<input type="radio"/>	<input type="radio"/>

## Drop-Down Menu

**Question Type: Use drop-down menus to complete a sentence.**

For these types of questions, you will select one option from a drop-down list. Select a box and a list of options will pop up. When you make a selection, that text will fill the box.

What is your favorite animal? Complete the sentence with the words that fit **best** for you.

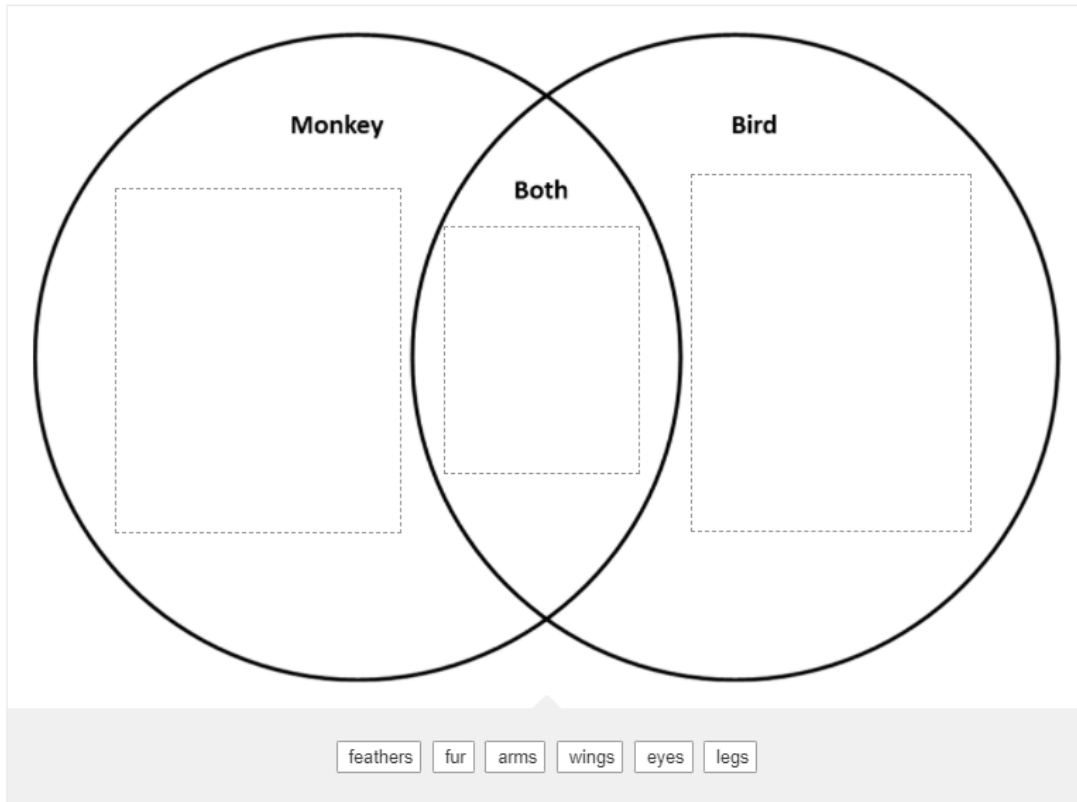
My favorite animal is a  because it is .

## Gap Match

**Question Type: Move text or pictures to classify.**

In this type of item, you will need to move text or pictures in order to classify them or complete a model. The possible answers can be found in a grey area either below or to the right of the containers in which you will place them. To move the answer choices, select the answer choice and drag it to the appropriate location. Another way to move the answer choices is to select the answer choice and then select the appropriate location. The answer choice will "pop" into the location you have selected.

Which characteristics are found on the monkey and bird? Move the characteristics to the appropriate place in the Venn diagram.



A Venn diagram with two overlapping circles. The left circle is labeled "Monkey" and the right circle is labeled "Bird". The overlapping area in the center is labeled "Both". Each of the three regions (Monkey only, Both, Bird only) contains a dashed rectangular box for placing characteristics. Below the diagram is a grey bar containing six draggable text boxes: "feathers", "fur", "arms", "wings", "eyes", and "legs".



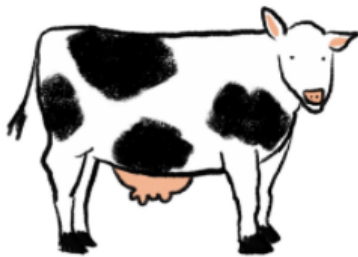
## Graphic Gap Match: Multiple Answer Choices in One Container

**Question Type:** Move multiple text or pictures to create a model.

In this type of item, you will need to move multiple text or pictures in order to create or complete a model. The possible answers can be found in a grey area either below or to the right of the containers in which you will place them. To move the answer choices, select the answer choice and drag it to the appropriate location. Another way to move the answer choices is to select the answer choice and then select the appropriate location. The answer choice will "pop" into the location you have selected. Once you use an answer choice, another identical answer choice will appear.

The farm animals are hungry. The cow is really hungry. The pig is somewhat hungry. The chicken is not really hungry, but can eat.

What things do each of the animals eat? Move the food to the appropriate place in the model to show what each animal eats.







## Appendix B. Spring 2022 Form Planner

(Document begins on next page.)



# Maine Science Form Planner

Spring 2022 Online Forms

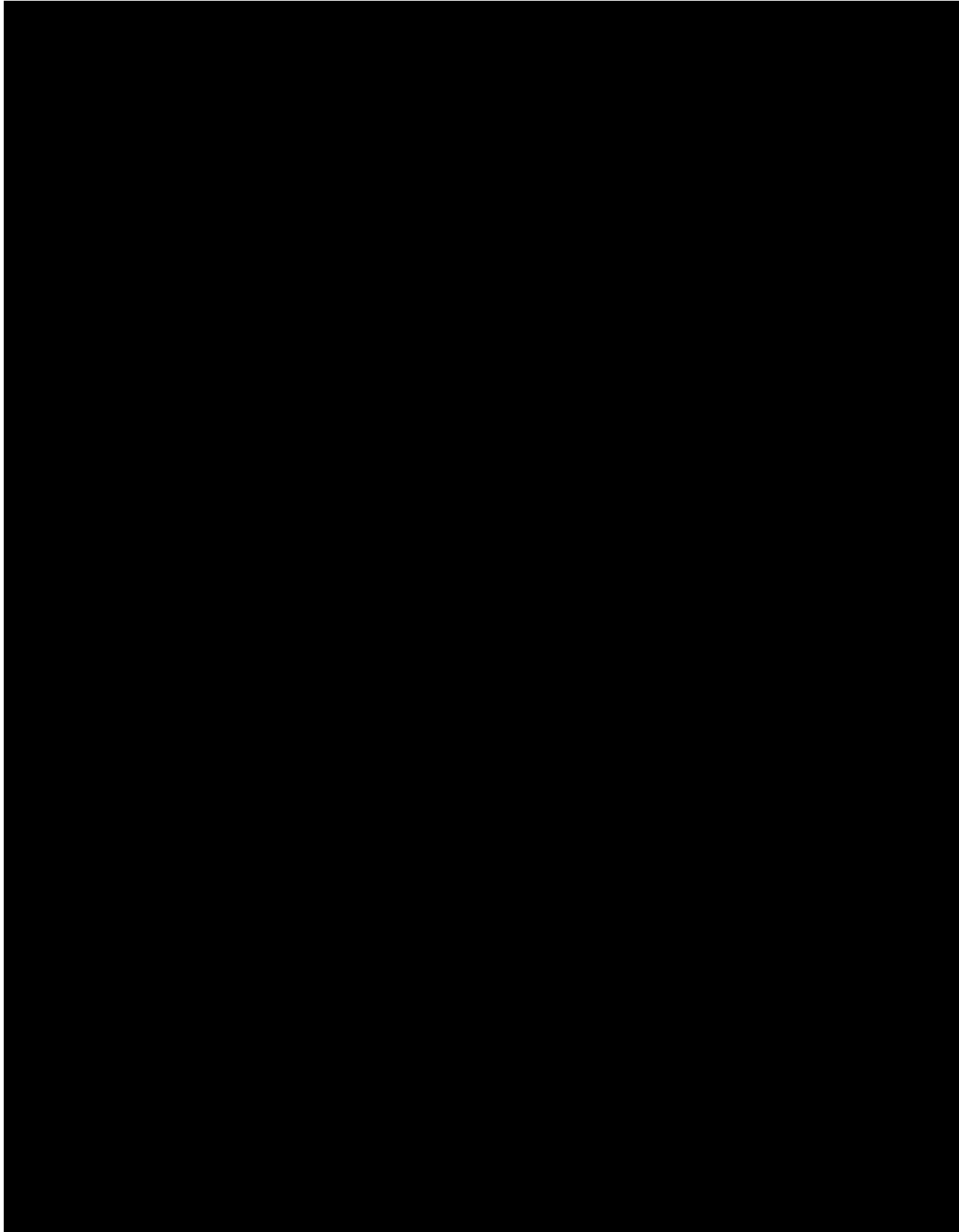
Grades 5, 8, and High School

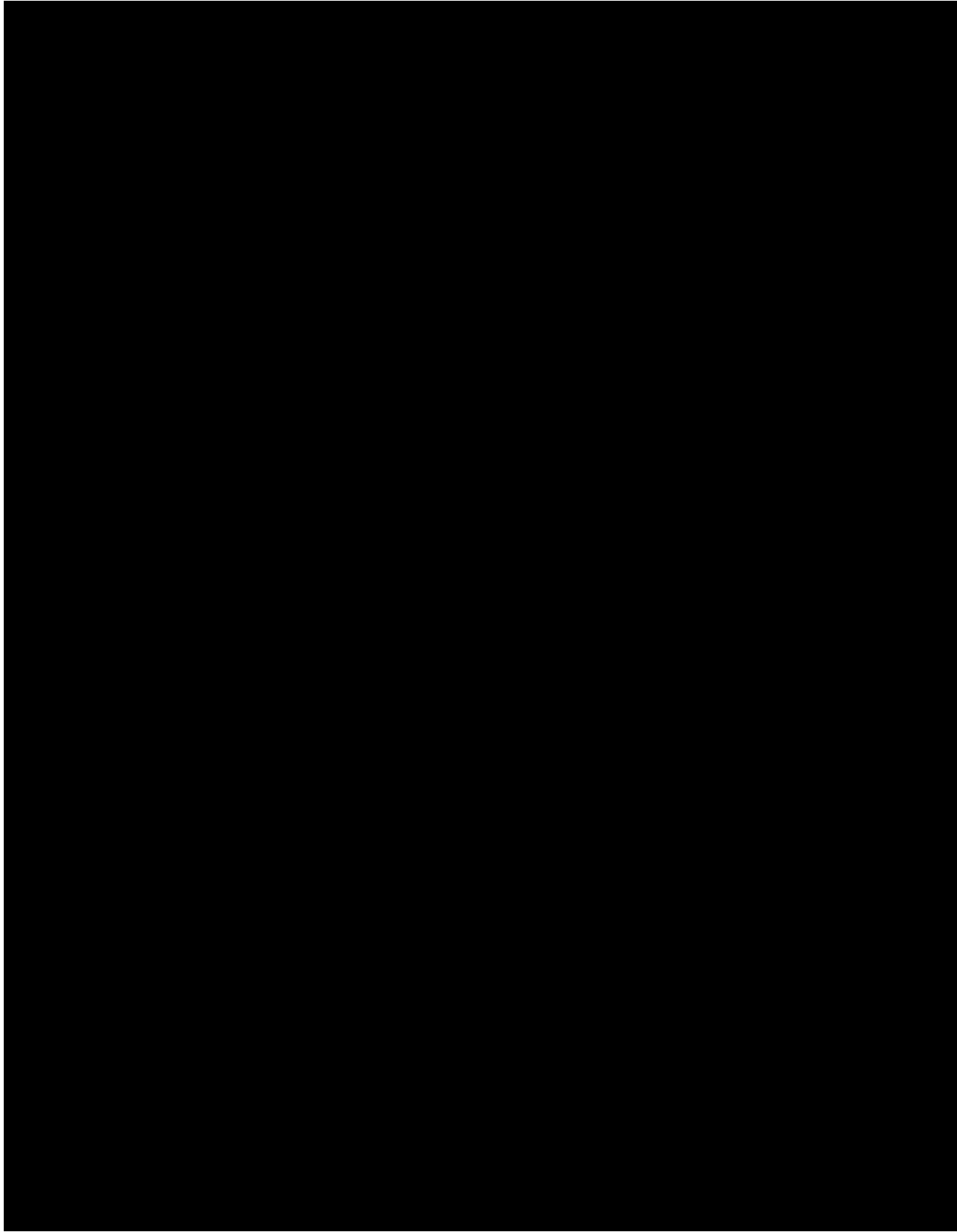


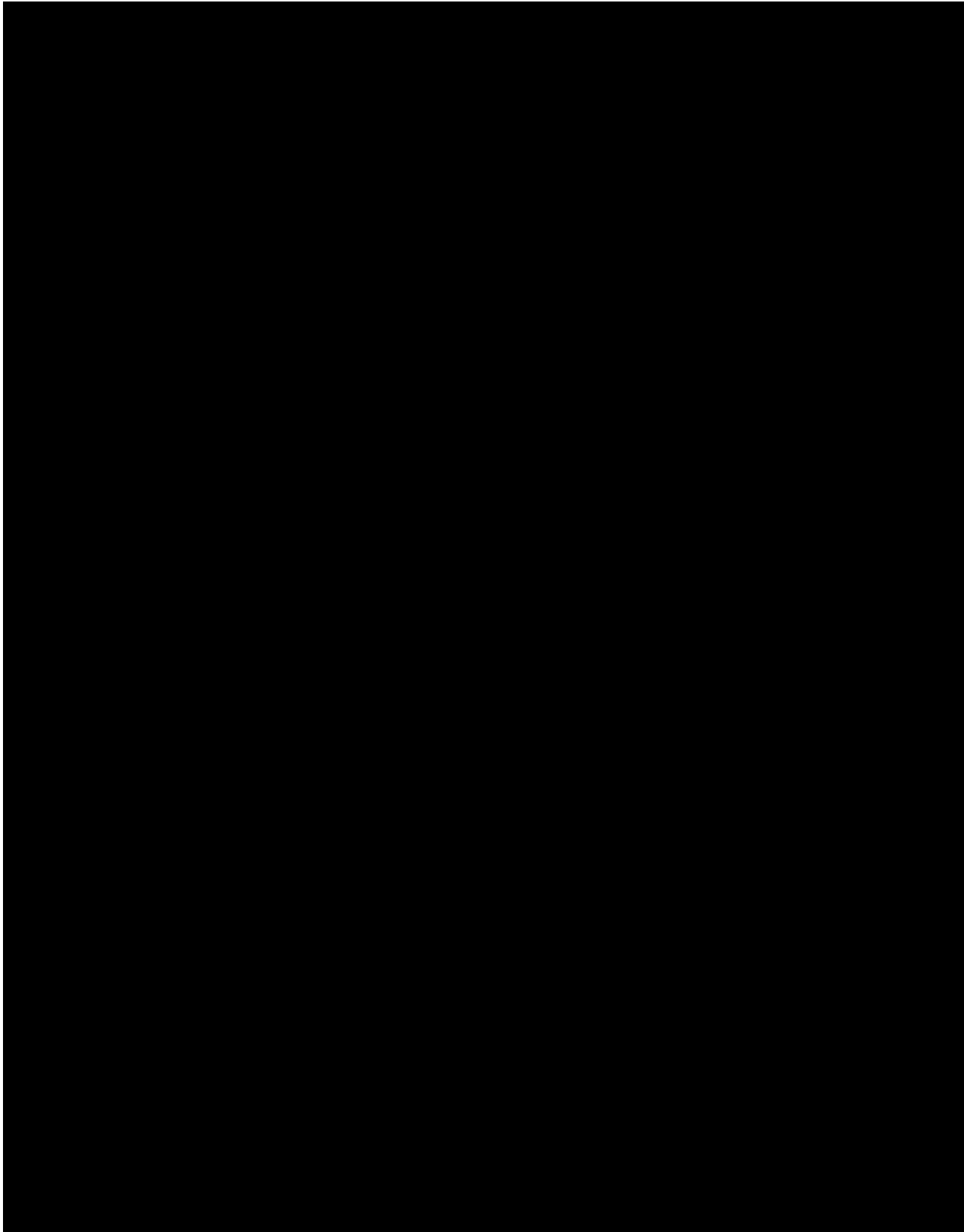


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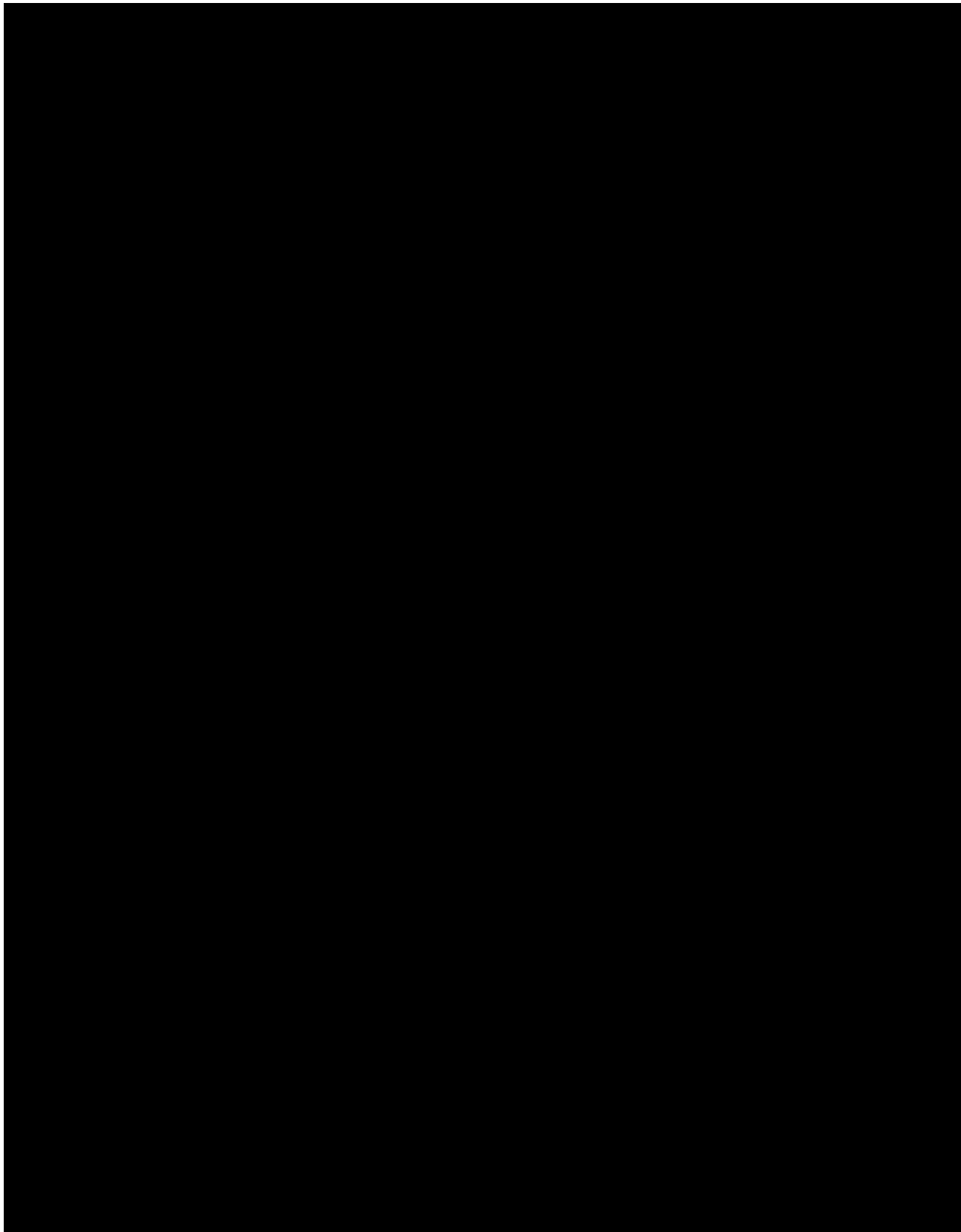
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Blueprint Item Counts .....	1
Blueprint Point Totals .....	1
Discipline Item Counts .....	2
Subdiscipline Item Counts .....	2
Performance Expectation Item Counts .....	3
Disciplinary Core Ideas (DCI) Item Counts .....	3
Science and Engineering Practices (SEP) Item Counts .....	4
Cross Cutting Concepts (CCC) Item Counts .....	5
Grade 8 .....	5
Blueprint Item Counts .....	5
Blueprint Point Totals .....	6
Discipline Item Counts .....	7
Subdiscipline Item Counts .....	7
Performance Expectation Item Counts .....	8
Disciplinary Core Ideas (DCI) Item Counts .....	9
Science and Engineering Practices (SEP) Item Counts .....	10
Cross Cutting Concepts (CCC) Item Counts .....	11
High School .....	12
Blueprint Item Counts .....	12
Blueprint Point Totals .....	13
Discipline Item Counts .....	14
Subdiscipline Item Counts .....	14
Performance Expectation Item Counts .....	15
Disciplinary Core Ideas (DCI) Item Counts .....	16
Science and Engineering Practices (SEP) Item Counts .....	18
Cross Cutting Concepts (CCC) Item Counts .....	19

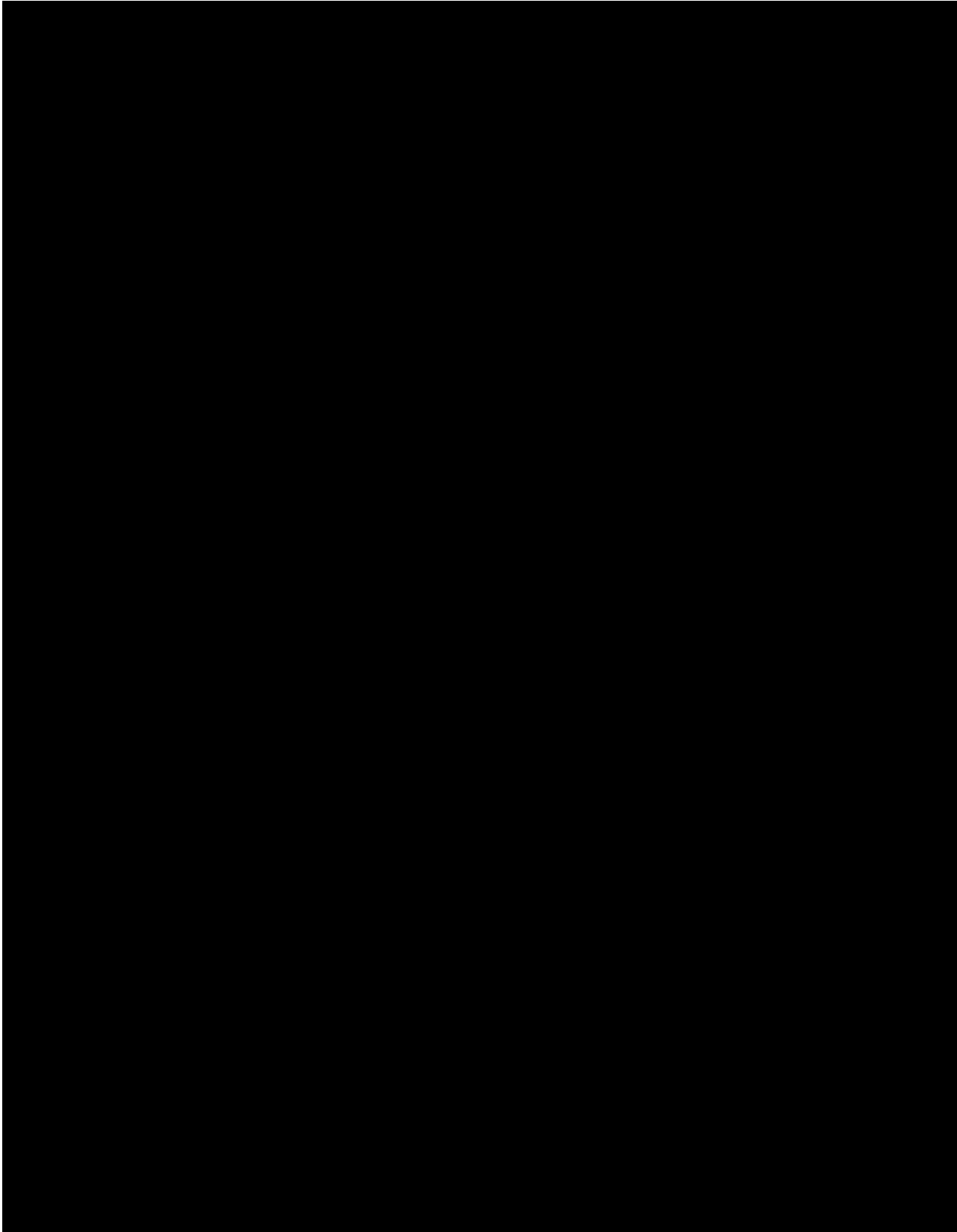


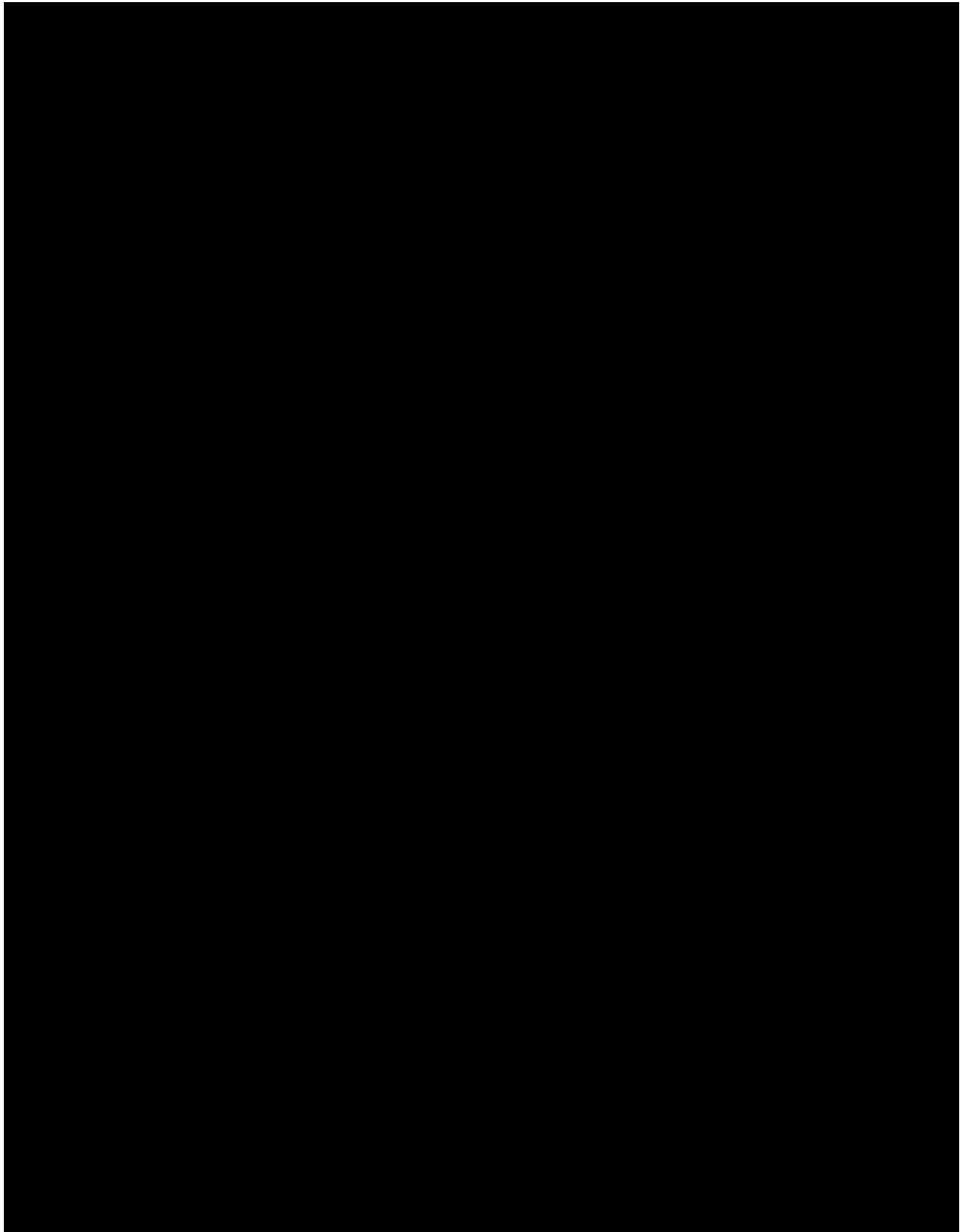


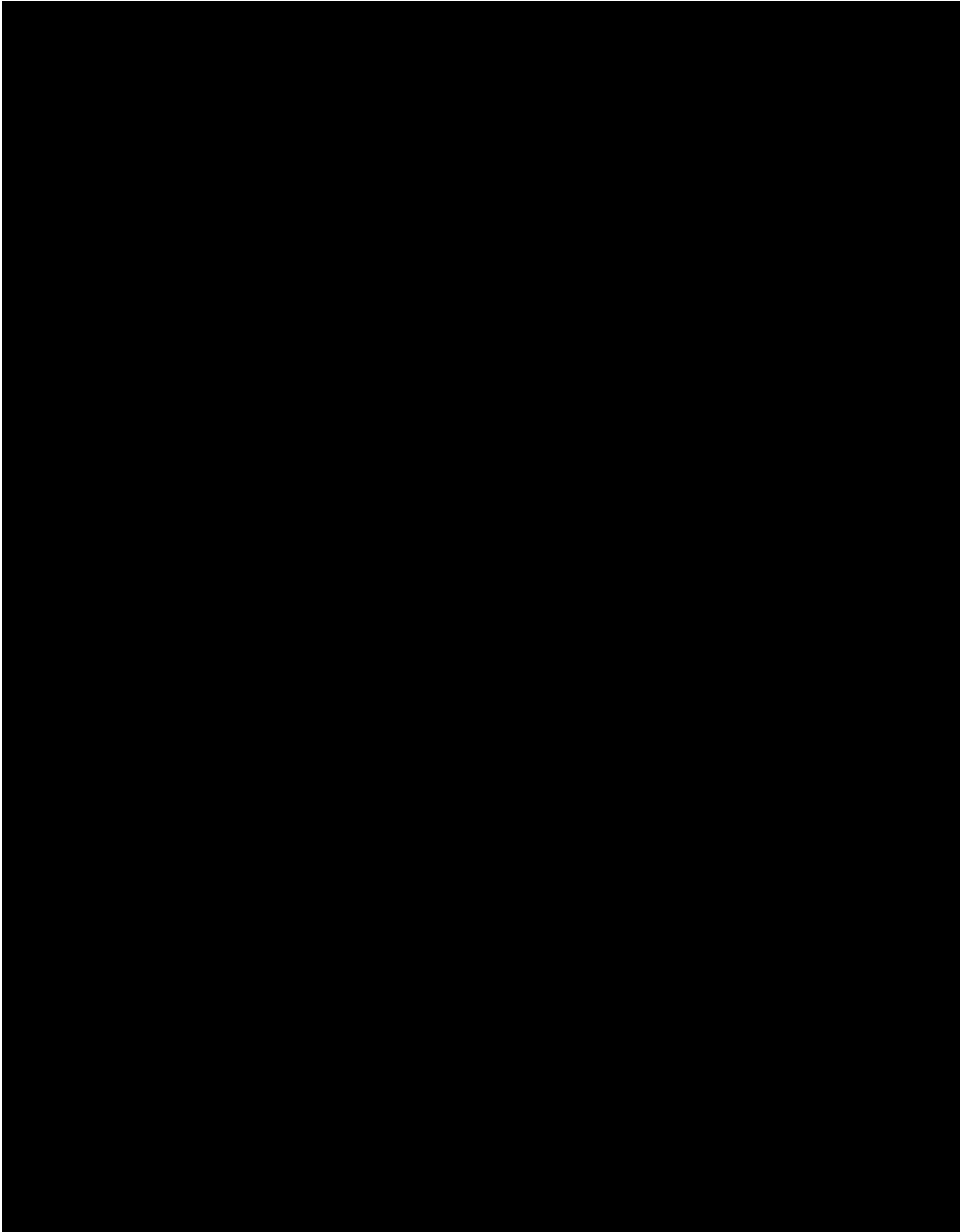


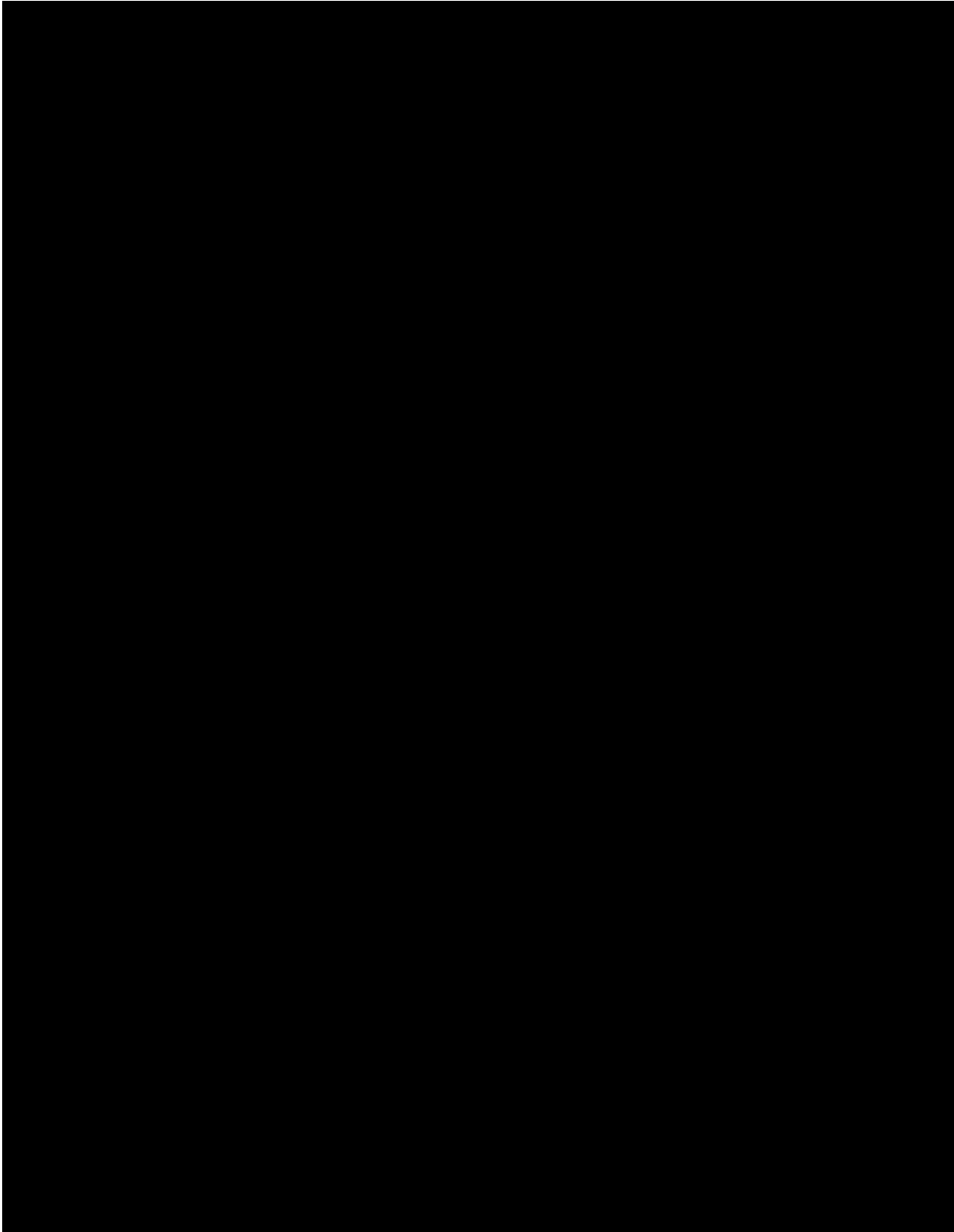


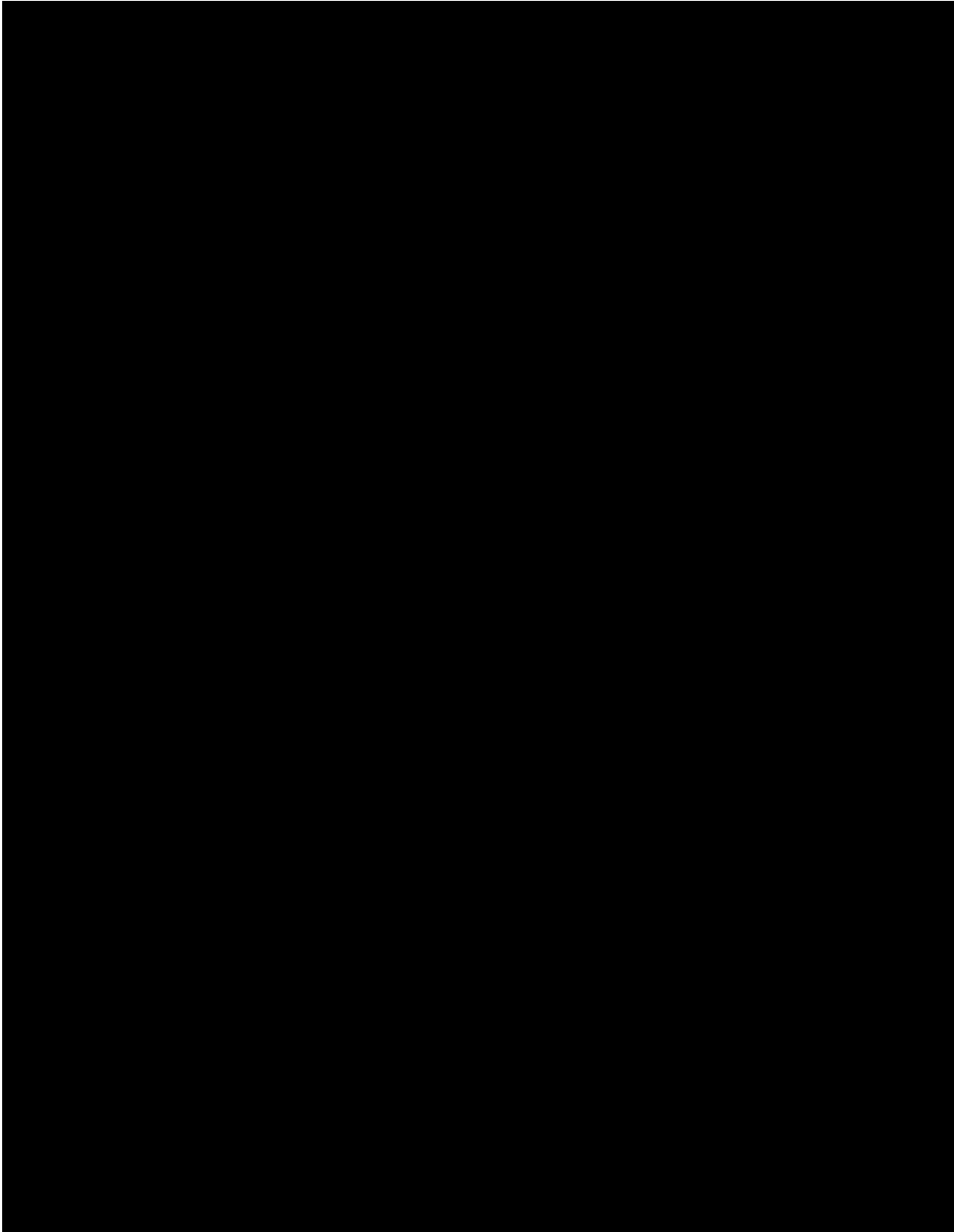


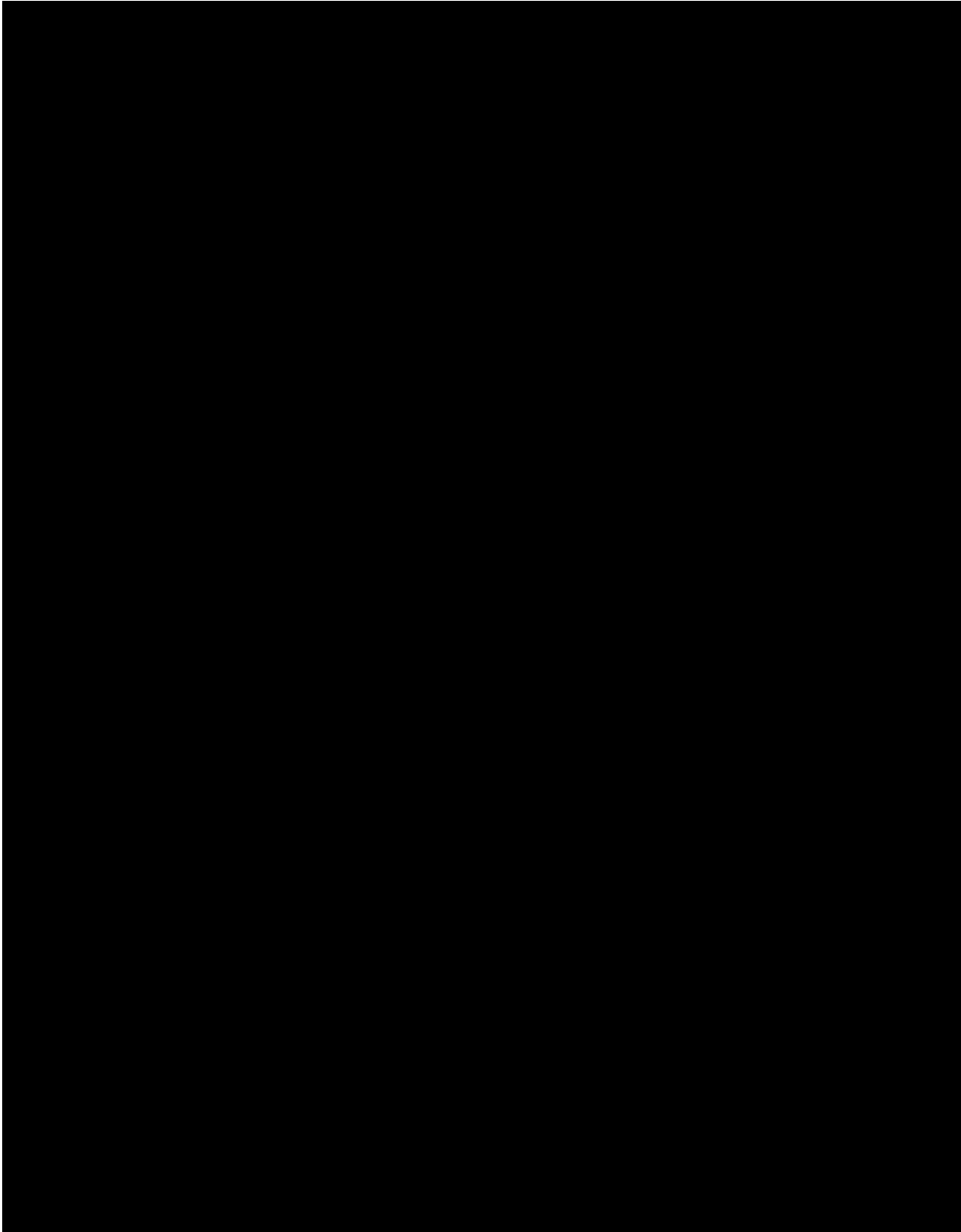


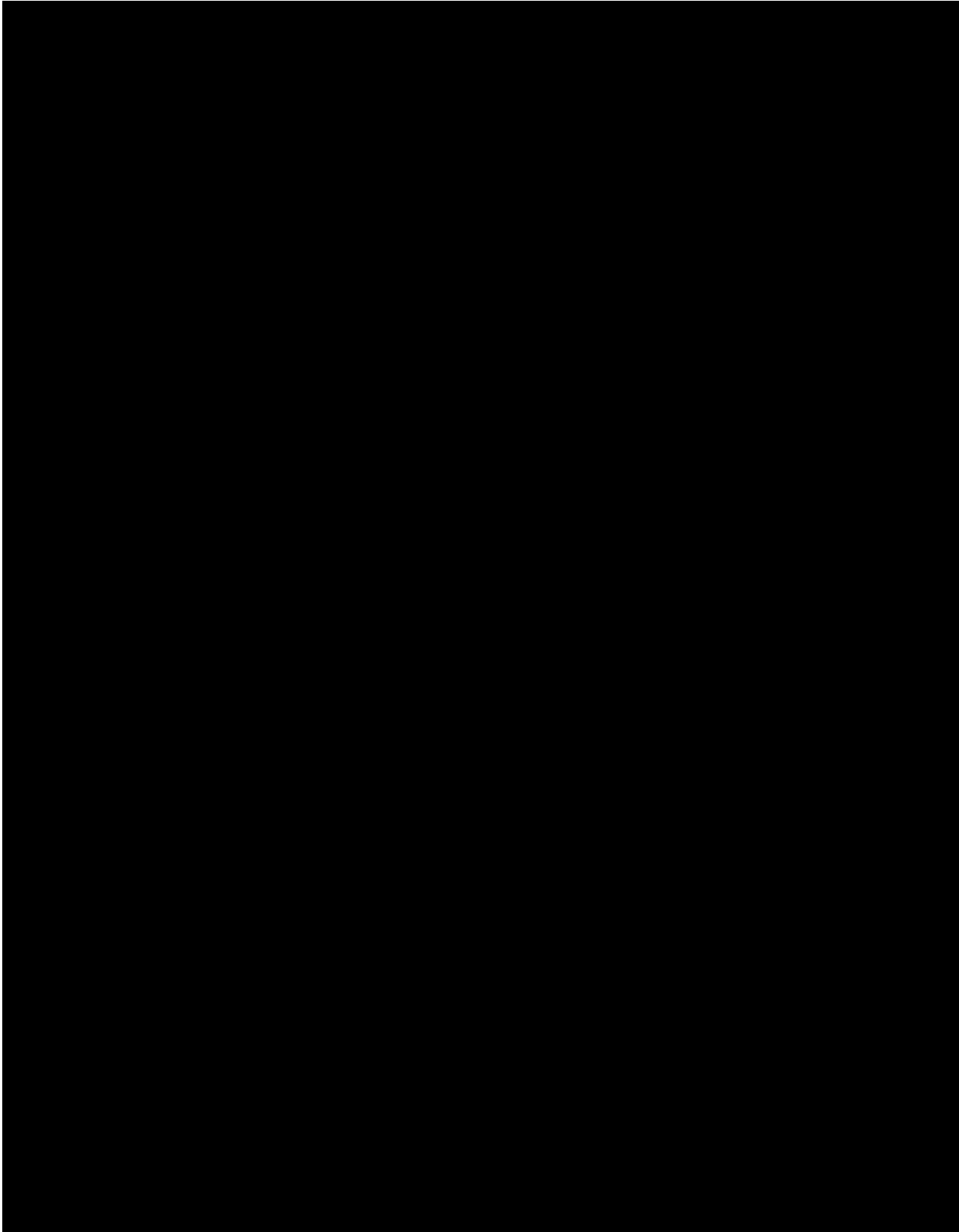




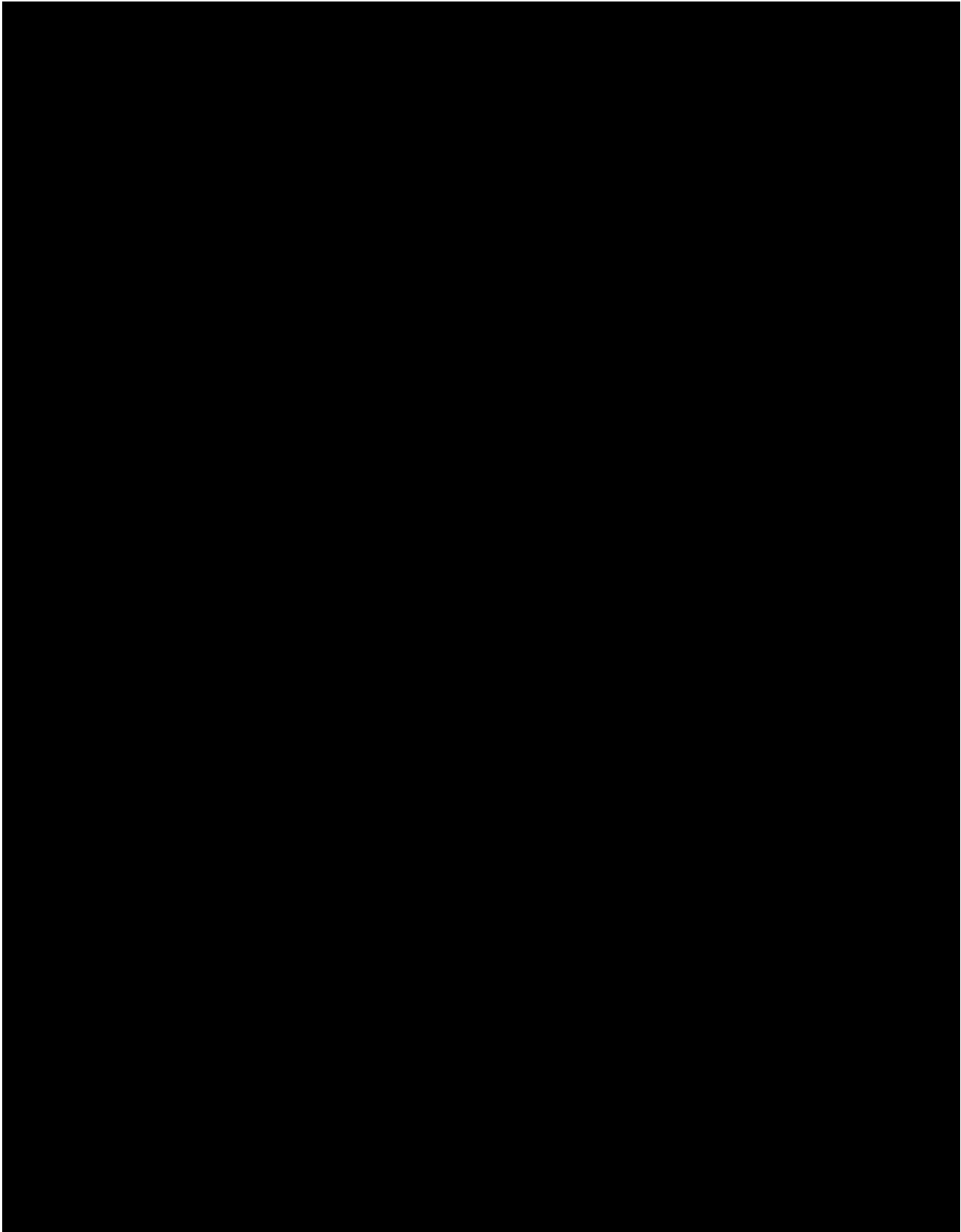


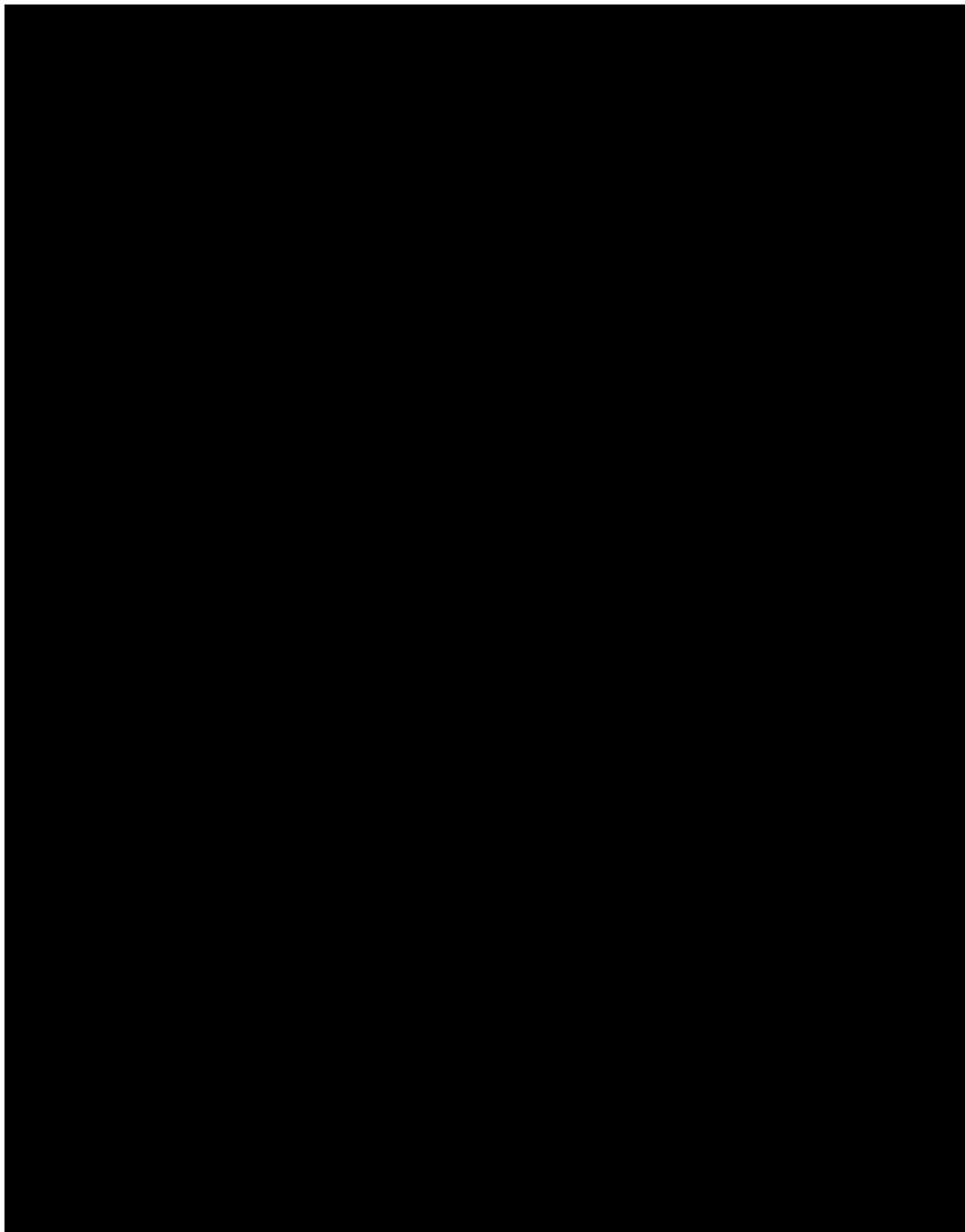


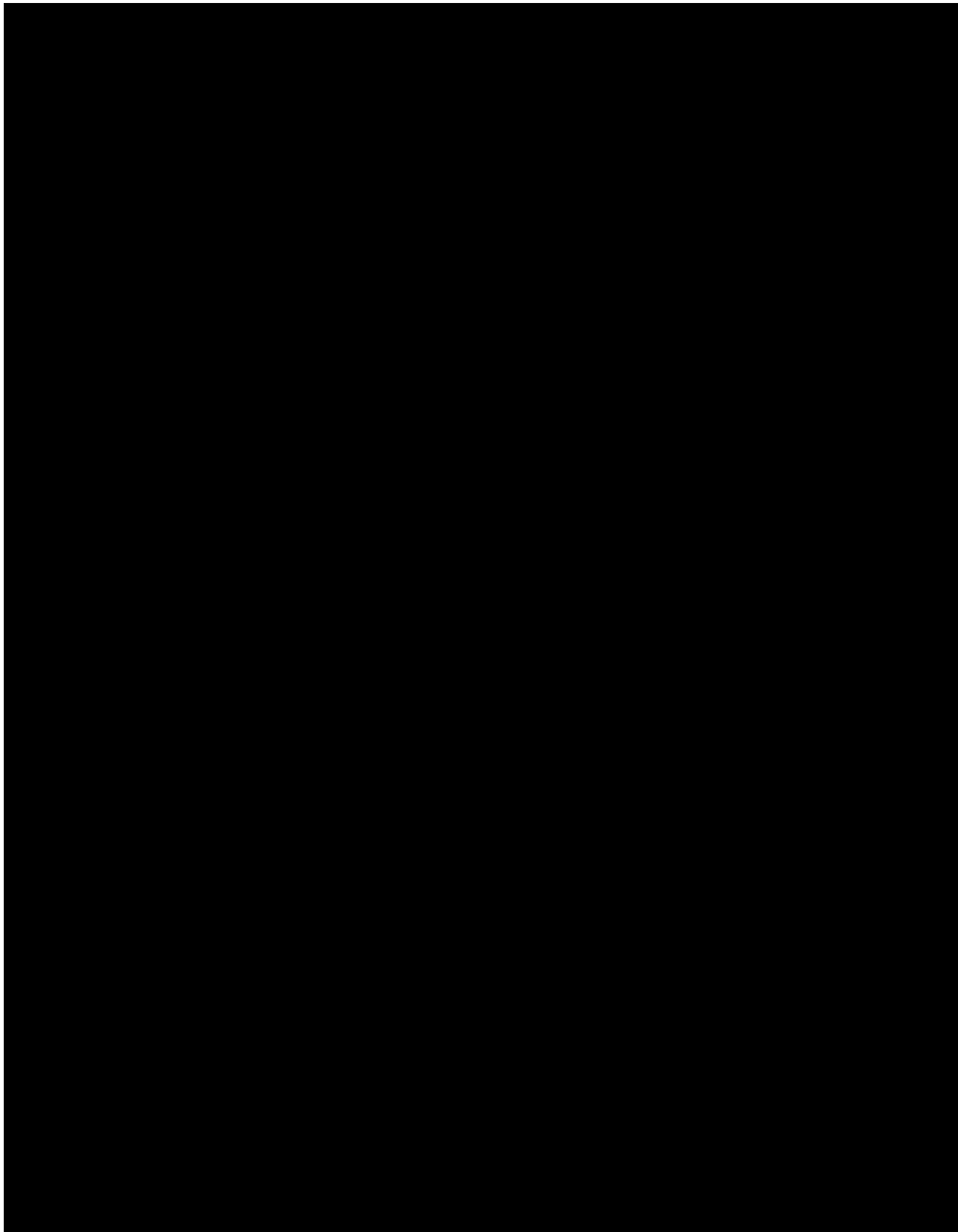


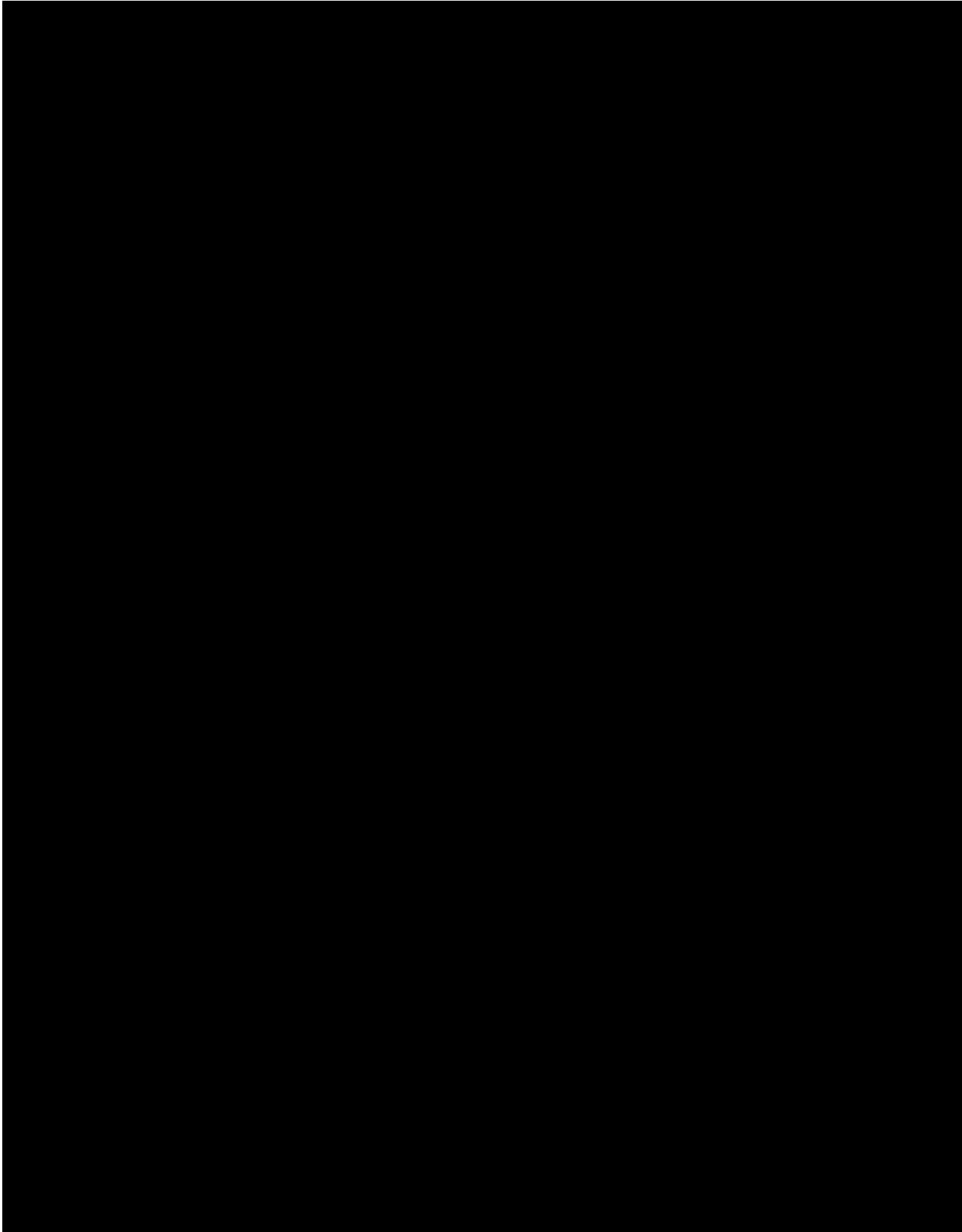


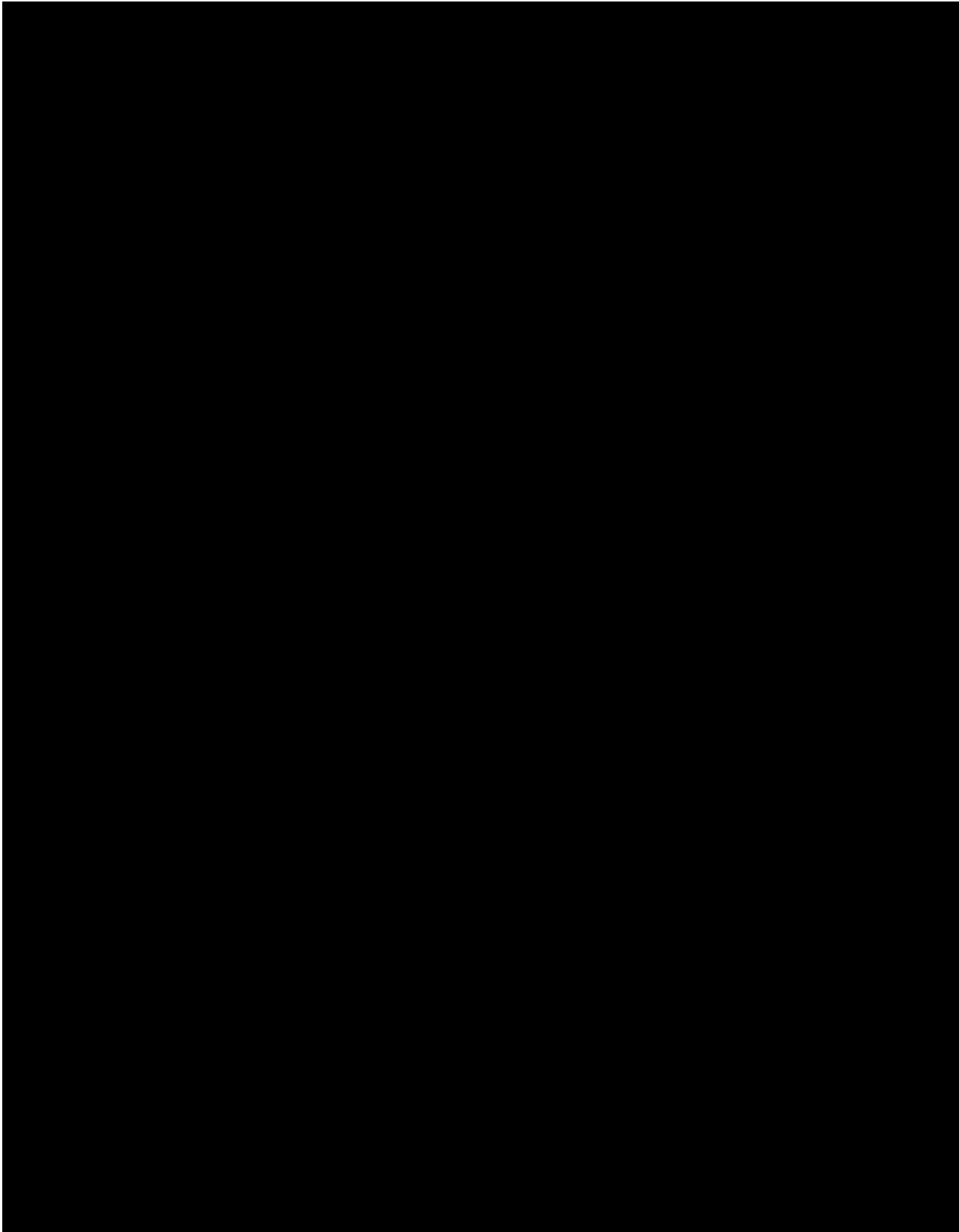


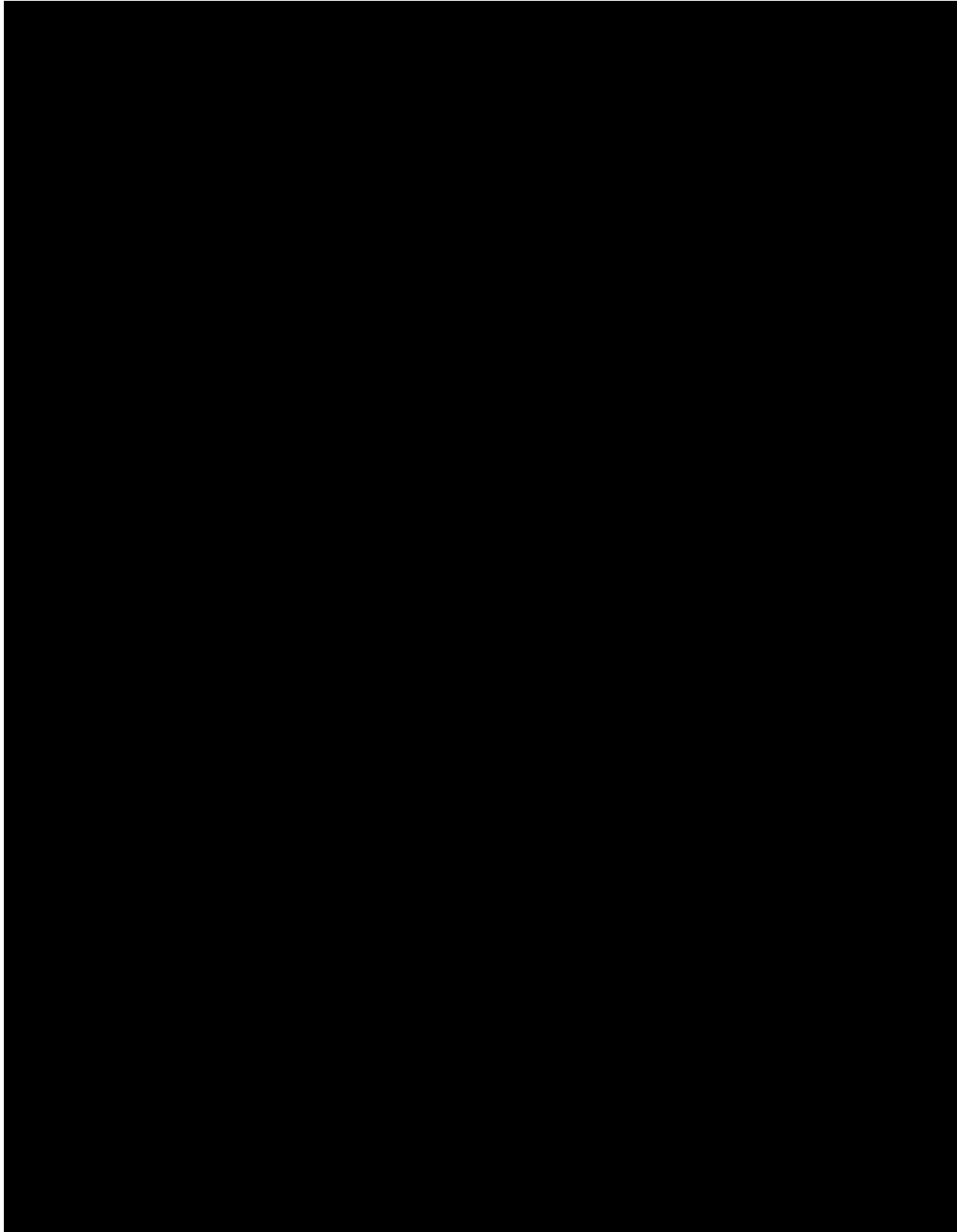


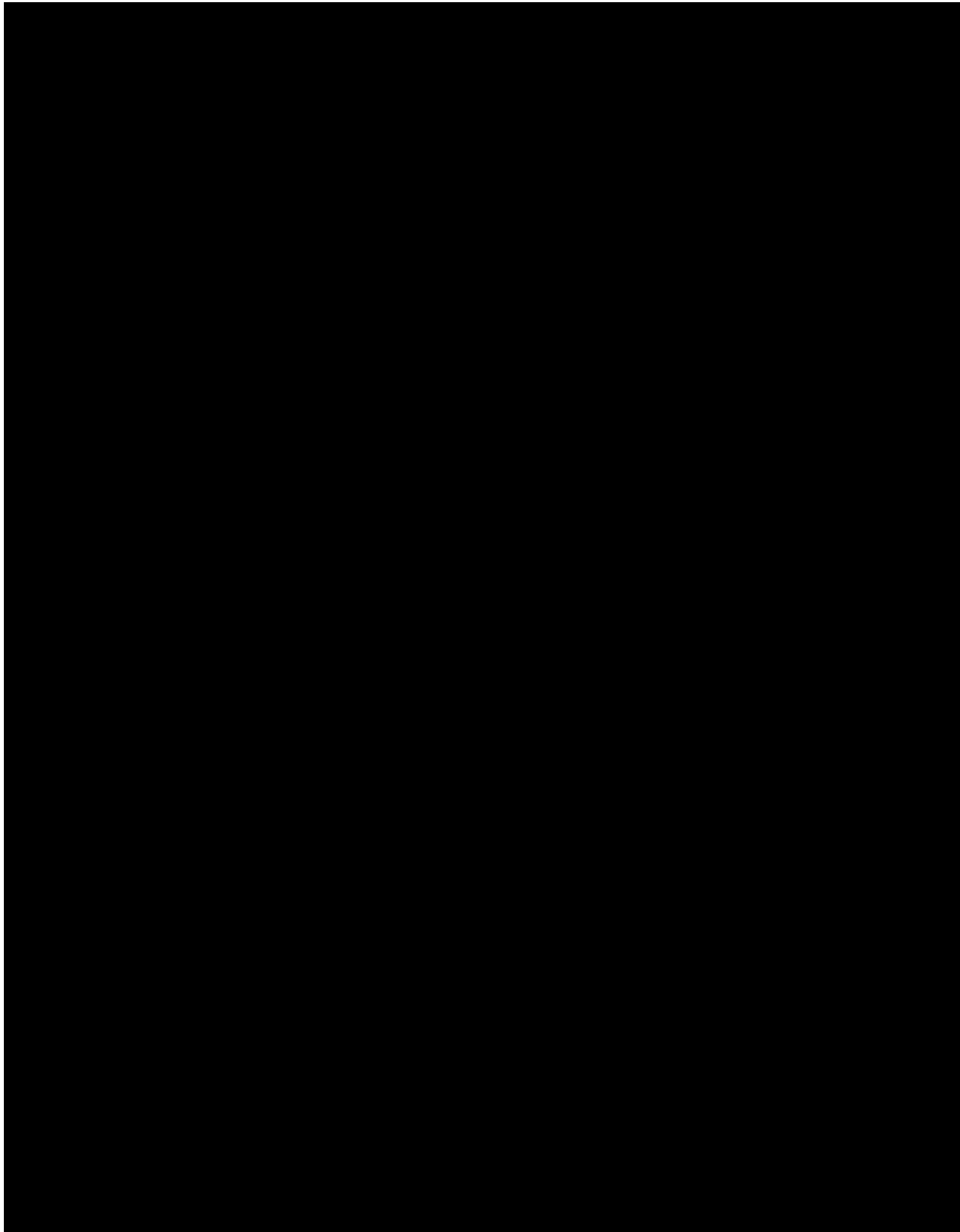


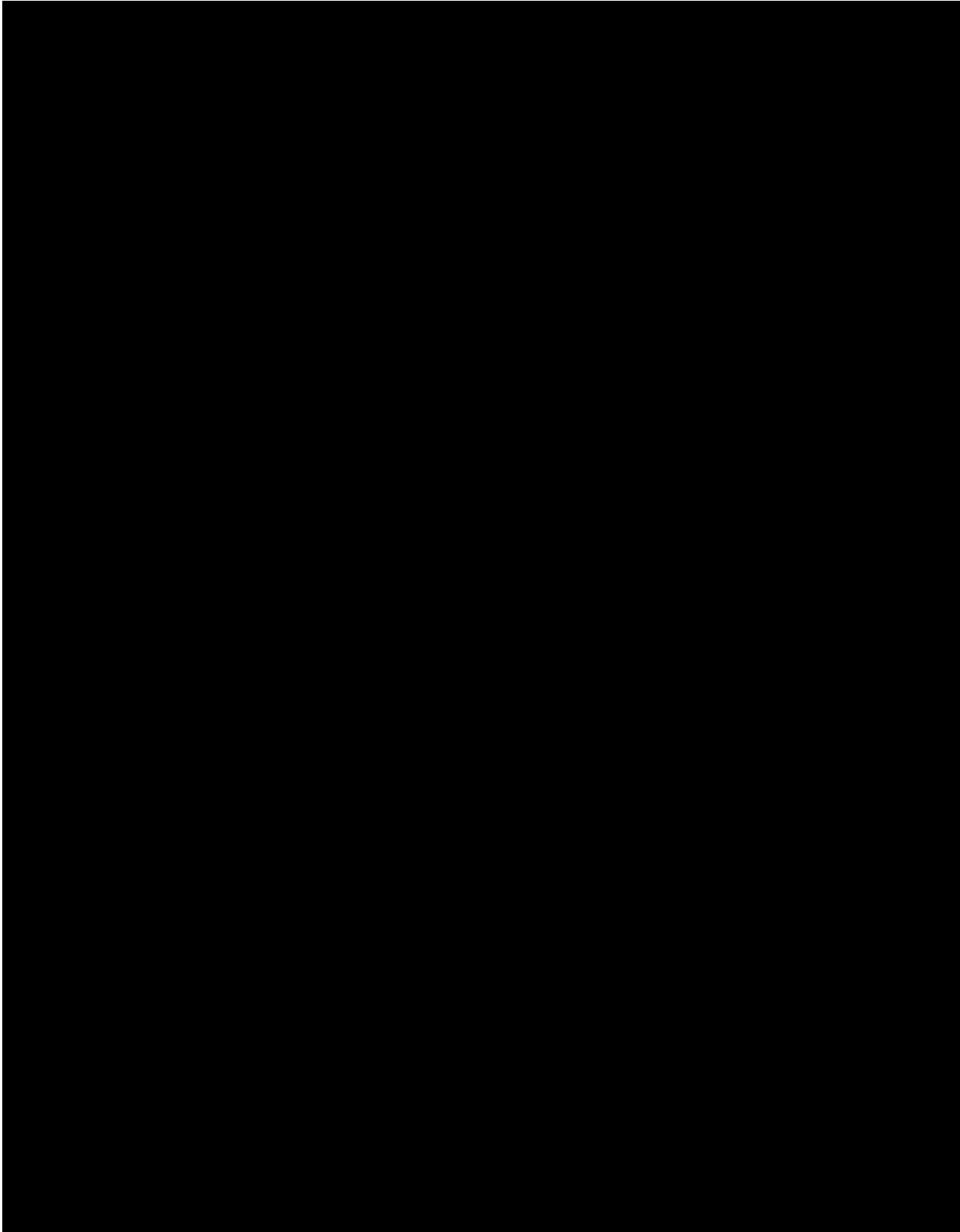




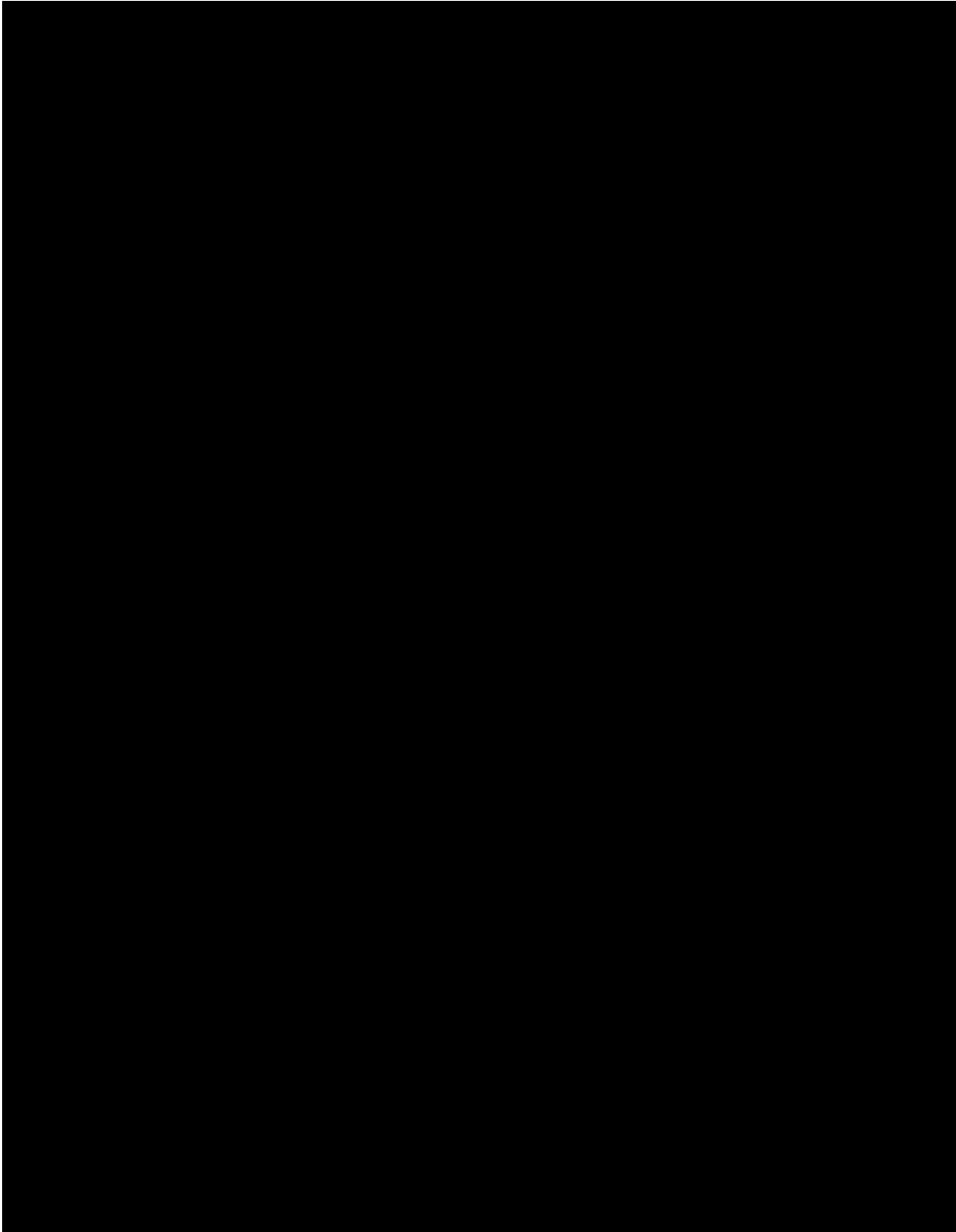








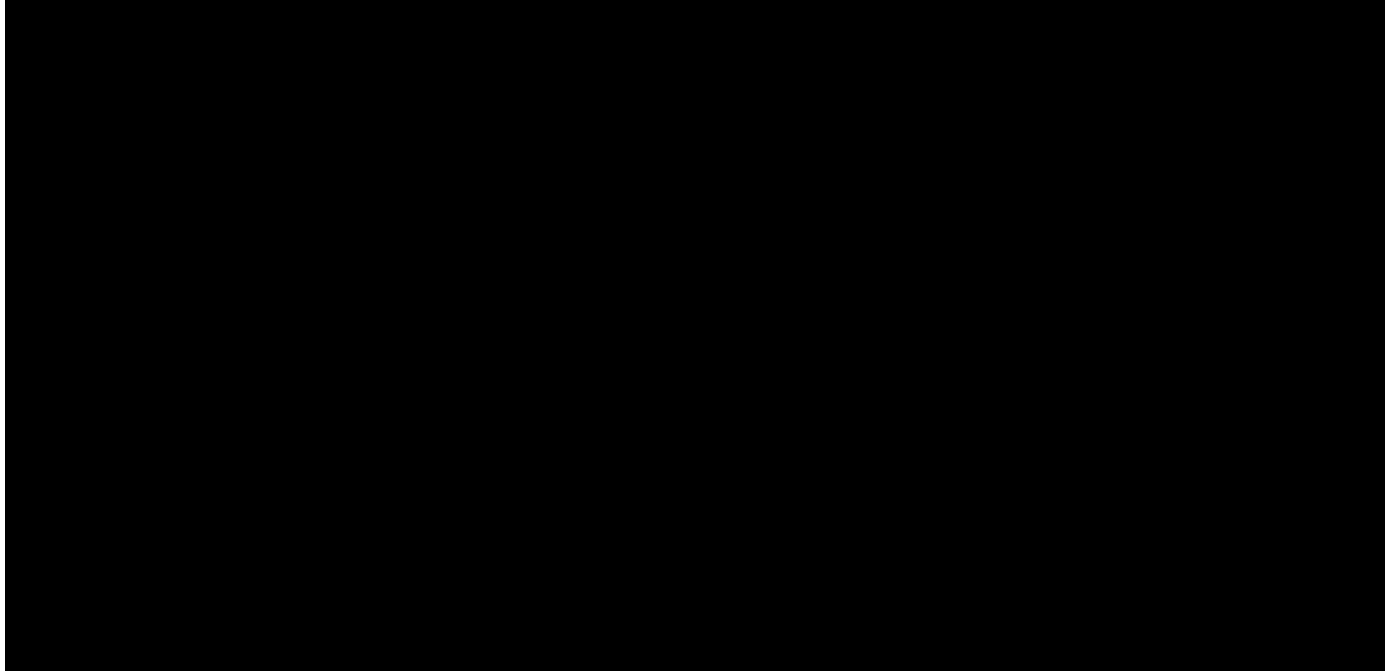




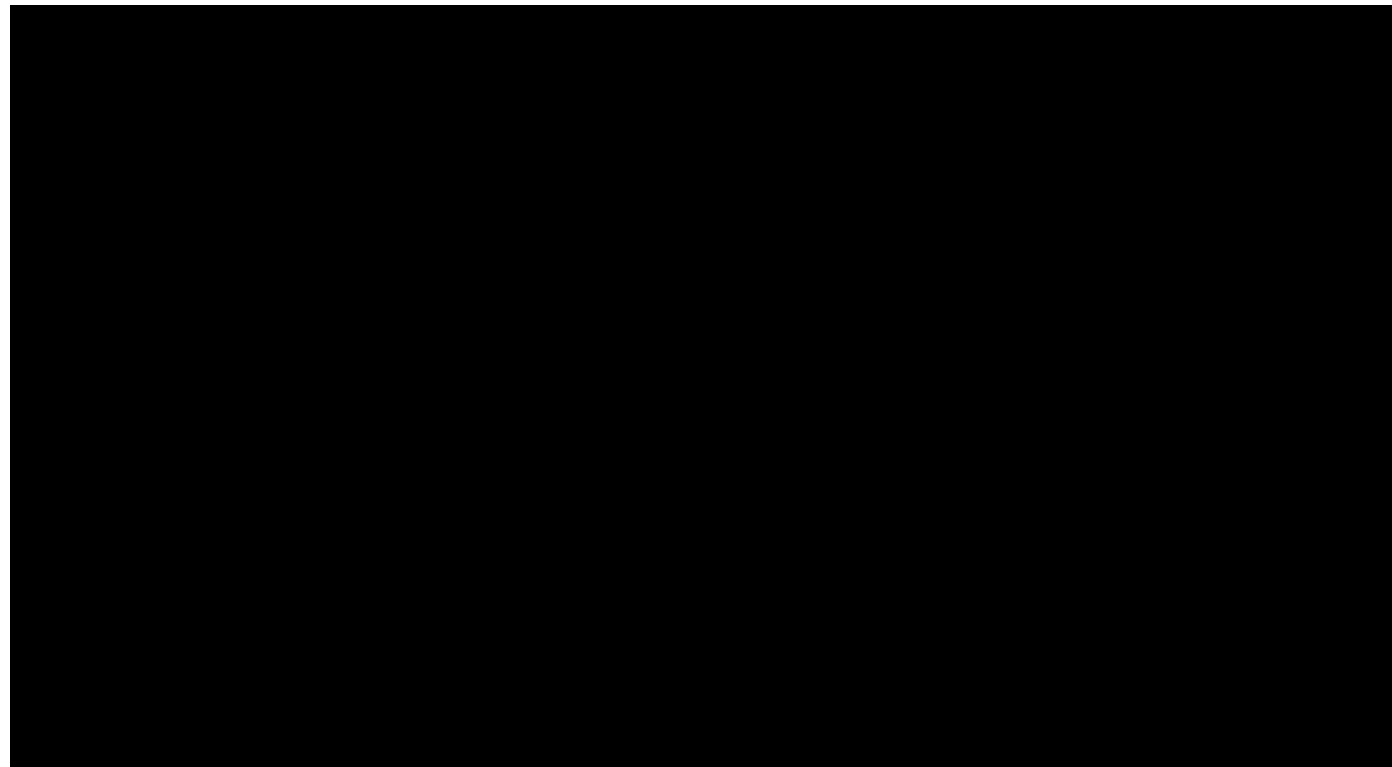


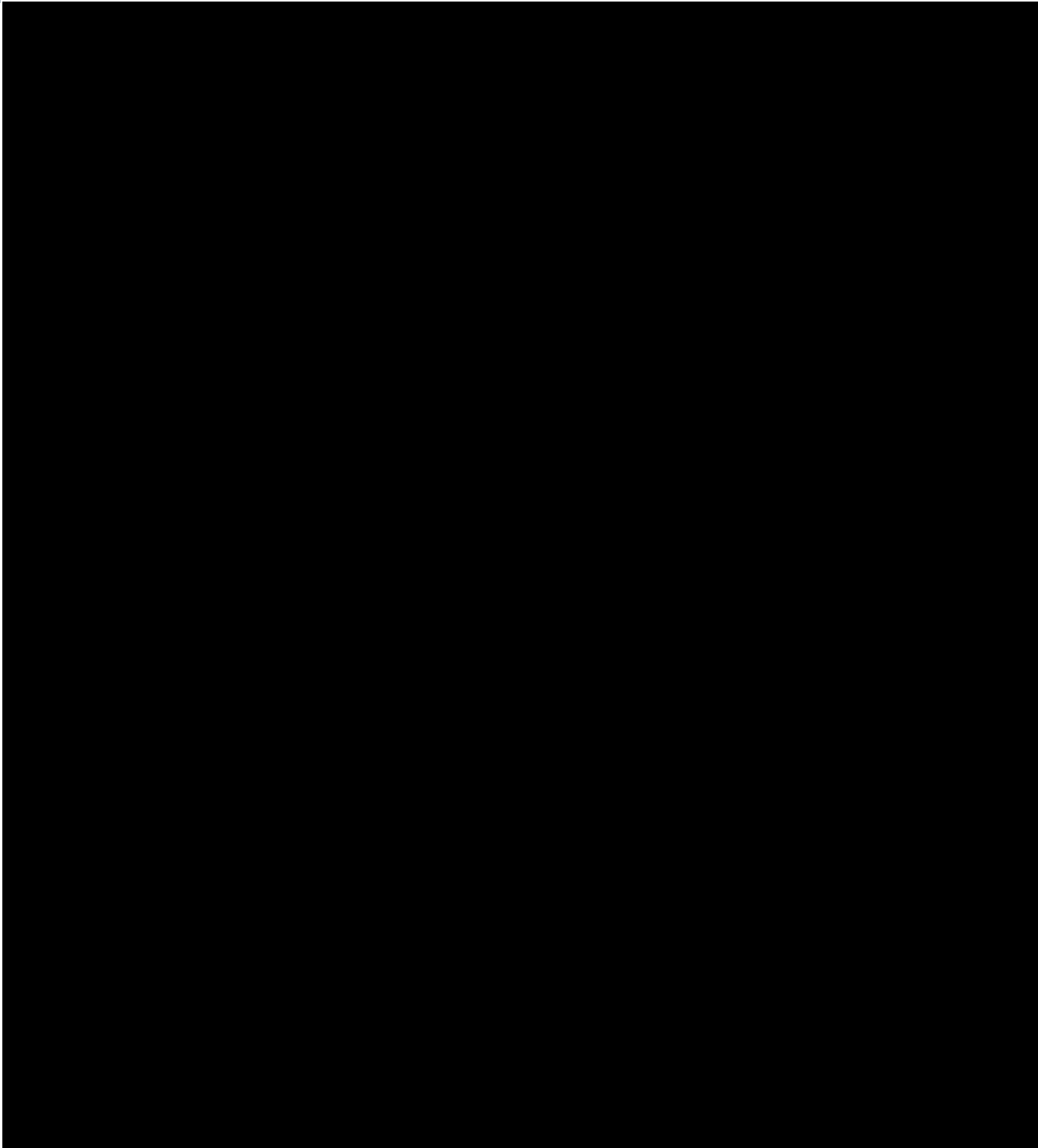
## The Science Disciplines

### Science Discipline Distribution

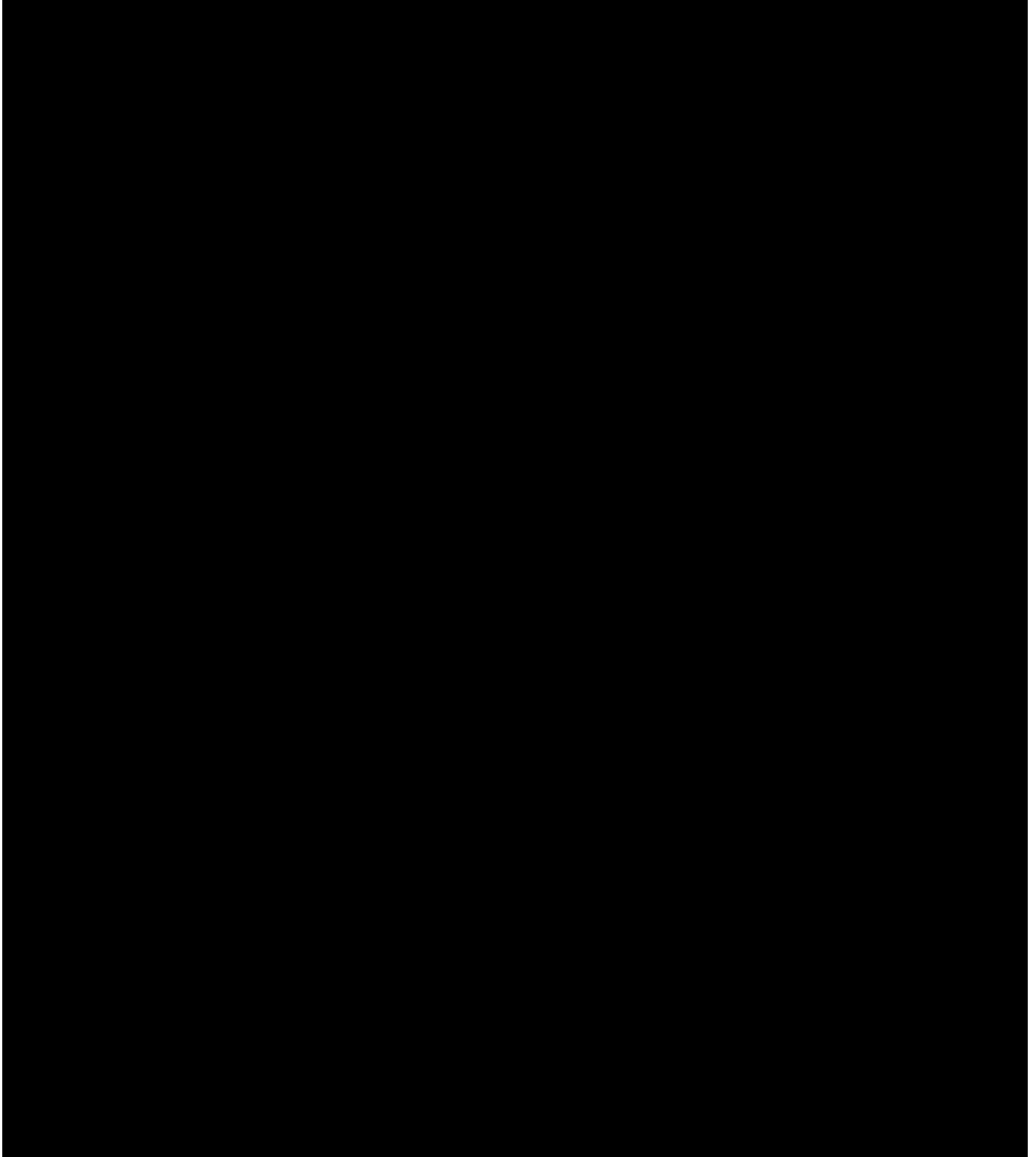


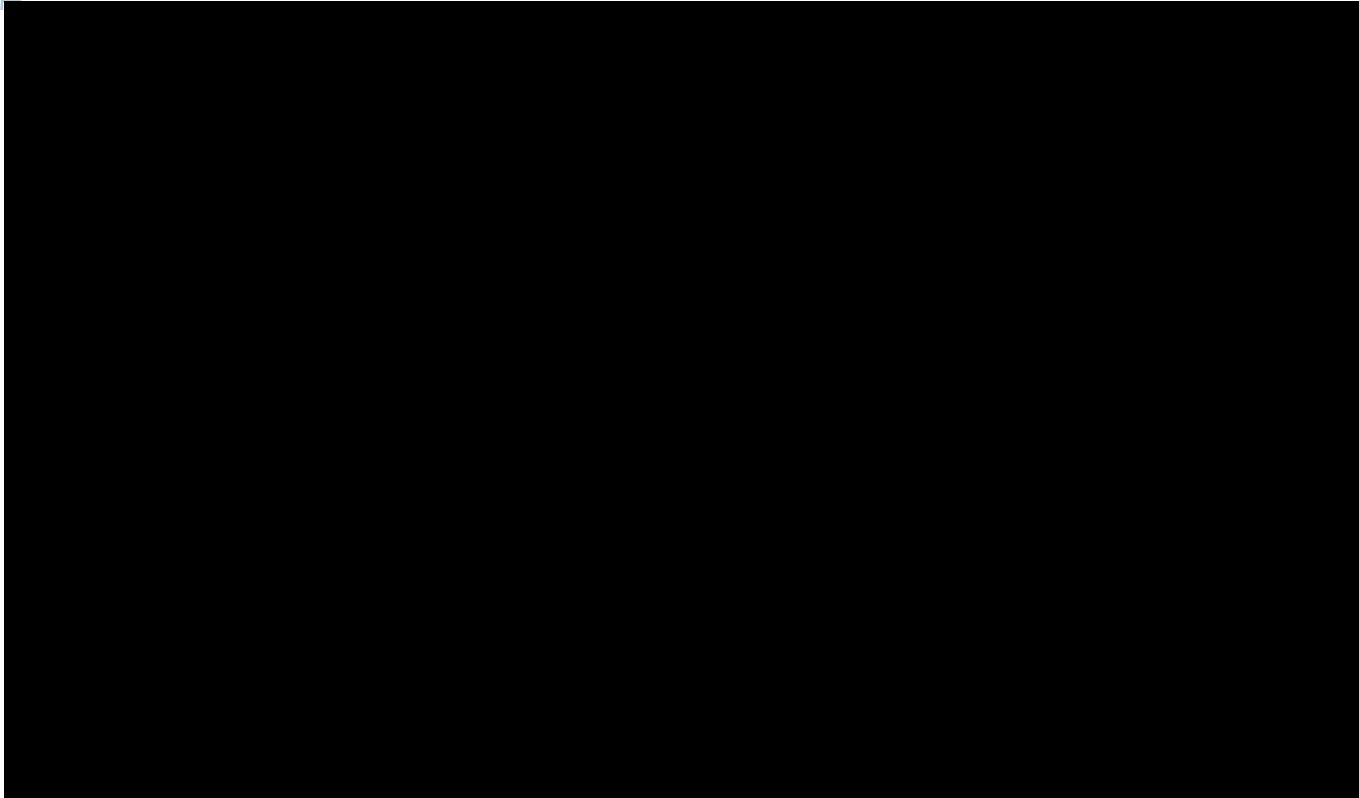
### Number of Items by Item Type





## Maximum Score Points by Item Type







# Appendix C. New Meridian Framework for Quality Review of NGSS Science Assessment Items

(Document begins on next page.)



# The New Meridian Framework for Quality Review of NGSS Science Assessment Items

By New Meridian  
December 15, 2020  
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## Introduction and Purpose

Developing high quality science assessments based the science standards has presented significant challenges to educators and test developers. Processes have not evolved quickly enough to meet the challenges of modern science assessment development and the field has not formed a consensus view of best practice. Some of the major challenges include how to approach a design that models the richness of the standards, how to design equitable and fair science assessment, and how to connect assessment claims to the major features of a quality science assessment item or task.

While there has been extensive prior work to support the development of science curriculum, instruction, and classroom assessment based on new science standards, there has yet to be a framework specifically geared toward the needs of developers of large-scale science assessment. New Meridian has sponsored the development of this framework to address those needs and further advance the field of science assessment. The authors have synthesized an approach for thinking about, analyzing, and evaluating item quality. This document lays out the critical elements of a quality science assessment item or task. These are structured into a process that can be used to evaluate and ensure that science items and tasks exhibit those critical qualities.

The authors hope that this work can be used broadly by states as they develop new science assessments to reflect Next Generation Science Standards (NGSS) and similar standards based on *A Framework for K-12 Science Standards*<sup>1</sup> and will support their pursuit of developing high-quality items and tasks designed specifically for large-scale assessments. These assessments will need to measure three-dimensional (3D) expectations—those that integrate Science and Engineering Practices (SEPs), Crosscutting Concepts (CCCs), and Disciplinary Core Ideas (DCIs)—in equitable and fair ways.

The criteria outlined in this framework identify the features of high-quality, three-dimensional science assessment design. States can apply these criteria to develop or review their large-scale assessments. The criteria apply to all assessments designed for multi-dimensional standards based on *A Framework for K-12 Science Education*.

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<sup>1</sup> National Research Council. 2012. *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13165>.





This Framework for Reviewing Three-Dimensional Science Assessment Items consists of three parts:

**Part 1: Critical foundations for developing high-quality Items and Tasks.** This section identifies the metadata and features of task design and implementation that establish the necessary foundation for high-quality, multidimensional items and tasks prior to any content or quality review.

**Part 2: Indicators of quality science assessment tasks: item- and task-level analysis.** This section focuses on the indicators and processes for reviewing items and tasks and outlines a two-part process: a task-level prescreen and a deeper descriptive task and item review.

**Part 3: Guidance for implementing reviews.** This section describes the procedures and processes New Meridian recommends to implement reviews according to the indicators identified in the framework.

## Terms and Definitions

This framework uses the following definitions for tasks, items, and scenarios:

**Tasks** refer to all scenario/stimuli and prompts/questions associated with a single coherent activity that is designed to monitor progress toward a specific target (e.g., performance expectation or bundle of performance expectations). Tasks can include single or multiple items/prompts, multiple parts or sections, and multiple formats.

**Items** refer to specific prompts or questions associated with a task—generally, the smallest unit that would be used to derive score points. One or more items usually combine with a scenario to form a task.

**Scenarios** refer to the phenomenon- or problem-based contexts used to engage students in the scientific thinking required by the task. This includes all stimuli, including text descriptions, data, models, arguments, etc. This contextual information may be presented at the beginning of a task as well as introduced at multiple times throughout the task.



## Designing for equity and inclusion.

This framework reflects the commitment to equitable science education for all learners that is central to *A Framework for K-12 Science Education*, as well as NGSS and similar standards. While the focus of this framework is on content quality and alignment to multi-dimensional standards, features of equitable assessments cannot be disentangled from quality measures. High-quality science assessments are intentionally designed to support diverse learners in demonstrating their proficiency.

This framework guides authors and reviewers by outlining items and task features in each section that support equity and access. Content development and review processes should also include a diverse representation of stakeholders who review disaggregated student data for:

- Relevance
- Comprehensibility
- Coherence through the student lens
- Appropriate and supportive language

Emphasis should be placed on “sense-making” using the multiple dimensions, rather than assessing vocabulary, rote knowledge, and other isolated features exhibited in traditional science assessments, which have disadvantaged students in the past.

The conversation among educators over how to ensure equitable science assessments, particularly those designed for large-scale use, evolves every day. We expect the features described here to establish a minimum threshold: the floor, not the ceiling. We look forward to updating and enhancing criteria for equitable assessments as design processes and expectations progress in the field.

## Part 1: Critical Foundations for Developing High-Quality Items and Tasks

Development of high-quality items and tasks builds upon the foundations of strong test design:

- I. **Purposeful design.** Test developers must clearly articulate how an assessment supports claims about student mastery of the domain based on evidence of mastery generated through student engagement with the tasks. Blueprints should thoughtfully outline how the assessment samples the domain and multiple dimensions. Reporting categories should reflect how the domain is organized and coherently organize the claims to support interpretation. At a minimum, this includes the following:
  - a. **Domain:** An overview of the standards, elements, competencies, knowledge, and/or skills being assessed, defined specifically enough to 1) allow differentiation from other likely interpretations by intended users, and 2) guide test development. While the exact documentation will vary from state to state, this might include contextualized item specifications, state-created development frameworks, and blueprints, as well as other documentation.
  - b. **Task-level claims**, including:
    - i. The specific knowledge and practice targeted by each task (i.e., core components or substantial parts of the Framework SEP, CCC, DCI elements included in the grade band that are intended to be assessed by each prompt within tasks, and the tasks as a whole)
    - ii. Documentation that shows how the knowledge and practice targeted by each task connects to a substantial part of a standard/performance expectation at grade-level, and what evidence of proficiency looks like
  - c. **Attention to multiple dimensions of equity and diversity:** Test developers should consider dimensions of equity and diversity throughout the test development process, including diverse representations of culture, language, ethnicity, gender, and disability. Test developers should attend to these dimensions throughout the test development process, including (a) the blueprint development process; (b) the task development and evaluation processes, including the development of task templates and evaluation rubrics; and (c) the content and format of contexts, phenomena, and problems used on assessments. Test developers should consider empirical evidence related to bias and sensitivity as they become available through field testing.



- d. **Stakeholder involvement and engagement:** Test developers should engage diverse stakeholders throughout the development process, including recruiting teacher involvement and diverse representation within the item writing and review processes.
- e. **Technology specifications:** Test developers should consider and document all technology required to use the items/tasks (e.g., Technology-Enhanced Item types; QTI format; use of simulations, videos, and photographic images; and technology needed for intended accessibility supports).
- f. **Pretesting.** Pretesting items and tasks with students generates critical data to support evaluation of quality, difficulty, accessibility, and fairness. States should collect and review pilot, field-test, and operational data on how items and tasks perform. This may include descriptive data from cognitive labs capturing students' reflections on what the item and task is measuring, and/or quantitative item statistics disaggregated by demographic categories to evaluate item and task performance.

## Part 2: Indicators of Quality Science Assessment Tasks: Item- and Task-level Analysis

At the heart of high-quality assessments are the items and tasks that comprise those assessments. The indicators described here were developed based on expert understanding of how to design assessments for the NGSS, a review of state summative assessment items, and previously developed and widely used documents intended to support the design and vetting of high-quality NGSS tasks<sup>1</sup>.

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<sup>1</sup> Foundational documents that provided a basis for the indicators here included [Science Alignment Criteria](#), the [Science Task Prescreen](#), and the [Science Task Screener](#) indicators and processes, developed by Achieve in collaboration with states and experts to exemplify the cor4 features of NGSS assessments from large-scale models to instructionally relevant tasks. While the criteria and guidance from these documents provides a basis for the criteria described in this current framework, all indicators included here were tested and modified for current large-scale assessment item and task review as appropriate.

Table 1 outlines the core features of high-quality items and tasks aligned to the *Framework*.

**Table 1: Core features of item and task review.**

Feature	Rationale for inclusion based on the NGSS and similar standards based on <i>A Framework for K-12 Science Education</i> .
<b>The quality of the phenomenon- or problem-based scenarios.</b>	Meeting the expectations of the NGSS and similar multidimensional standards based on the <i>Framework</i> requires that students demonstrate the degree to which they can use the three dimensions to make sense of phenomena and problems. In assessment, scenarios grounded in specific phenomena and problems provide the structure for students to make their facility with three-dimensional targets visible. The quality of the scenario plays a large role in determining how well tasks and items can elicit meaningful multi-dimensional thinking; as a result, this framework outlines a review process that attends substantially to the quality of scenarios grounded in phenomena and problems.
<b>The degree to which multi-dimensional targets are assessed.</b>	The NGSS and similar multi-dimensional standards require students to demonstrate the degree to which they understand and can use the three dimensions of science education—Disciplinary Core Ideas (DCIs), Science and Engineering Practices (SEPs), and Crosscutting Concepts (CCCs)—together to make sense of phenomena and problems. In assessment, meeting these standards requires that items and tasks elicit student understanding and performance relative to specific dimensions as well as their integrated use. This framework outlines a review process that attends to the three dimensions, separately and together.
<b>The degree to which sensemaking is required to respond to the task.</b>	In the NGSS and similar standards, sense-making <sup>2</sup> distinguishes meaningful, multi-dimensional performances from more isolated and superficial demonstrations of the three dimensions. Demonstrating the three dimensions as expected by the standards requires that they be used in service of sense-making; in other words, it is not sufficient to define scientific words or skills. Rather, science ideas and practices must be demonstrated as students are applying them to “figure out” aspects of phenomena and problems. This framework addresses sense-making, both in terms of how scenarios are set up to enable and require it, as well as whether the dimensions are engaged in service of it.

This framework describes a two-part process to conduct an efficient and comprehensive item and task review:

- **Part 1: Prescreen.** Conduct an initial **task-level prescreen** to evaluate for a minimum quality threshold.
- **Part 2: Descriptive Review.** For tasks that satisfy prescreen requirements, conduct an in-depth **item- and task-level descriptive review**.

<sup>2</sup> For a practical guide to sense-making in assessment tasks, please [see this resource](#), developed by Achieve as part of a collaborative project to support understanding high-quality science assessments



## Task-level Prescreen

Conduct an initial prescreen for basic criteria that indicate high-quality science tasks designed for multi-dimensional standards.

Table 2 presents the quality measures and specific indicators for the task-level prescreen process.

**Table 2: Task-level Prescreen Quality Measures and Indicators**

Quality Measure	Specific Indicators
<b>A phenomenon or problem drives the task.</b>	<ul style="list-style-type: none"> <li>a. A phenomenon or problem is present.</li> <li>b. The scenario, grounded in the phenomenon or problem, establishes a meaningful context for successfully responding to all items in the task.</li> <li>c. The scenario, grounded in the phenomenon or problem, is necessary to respond to the majority of items posed in the task successfully.</li> </ul>
<b>As a whole, the task requires sense-making.</b>	<ul style="list-style-type: none"> <li>a. Rote knowledge cannot be used to successfully respond to most of the questions in the task.</li> <li>b. The majority of the questions require some kind of reasoning to respond successfully.</li> </ul>
<b>Appropriate disciplinary core ideas (DCIs) are required to respond successfully to the task.</b>	<ul style="list-style-type: none"> <li>a. DCIs required are grade appropriate.</li> <li>b. The targeted DCIs are required (i.e., what is claimed is what is assessed).</li> </ul>
<b>Appropriate science and engineering practices (SEPs) are required to successfully respond to the task.</b>	<ul style="list-style-type: none"> <li>a. SEPs required are grade appropriate.</li> <li>b. The targeted SEPs are required (i.e., what is claimed is what is assessed).</li> </ul>
<b>Multiple dimensions must be used together to successfully respond to the task.</b>	<ul style="list-style-type: none"> <li>a. Dimensions are not assessed in isolation within individual items or tasks</li> <li>b. Over the course of the task, multiple dimensions are used together.</li> </ul>
<b>The task is comprehensible and coherent.</b>	<ul style="list-style-type: none"> <li>a. The task is clear and makes sense to the students intended to respond to the task.</li> </ul>

## Item- and Task-level Descriptive Review

Tasks that meet the requirements of the prescreen should be analyzed more deeply using a descriptive review at the item and task level. Quality and alignment indicators for the descriptive review fall into four categories:

1. **Scenario quality**
2. **Three-dimensional performance**
3. **Technical quality**
4. **Cognitive complexity**

Table 3 presents the quality measures and specific indicators used in the descriptive item- and task-level review.

**Table 3: Item- and Task-level Descriptive Review Quality Measures and Indicators**

Quality Measure	Specific Indicators
<b>1. Scenario quality.</b> Indicators in this category describe the features of the scenario provided to students.	<ol style="list-style-type: none"> <li>1. <b>Task scenario is sufficient, engaging, relevant, and accessible to a wide range of students. The scenario must:</b> <ol style="list-style-type: none"> <li>a. be observable and accessible to a wide range of students:               <ol style="list-style-type: none"> <li>i. Uses real-world observations.</li> <li>ii. Uses at least two modalities (e.g., text, images, video, data tables).</li> <li>iii. Employs real or well-crafted data.</li> </ol> </li> <li>b. present a puzzling/intriguing problem.</li> <li>c. use grade-appropriate SEPs, CCCs, DCIs.</li> <li>d. use grade-appropriate data.</li> <li>e. present a local, global, or universal context that is relevant and clear to students.</li> <li>f. be comprehensible to a wide range of students at grade-level.</li> <li>g. use as many words as needed, no more.</li> <li>h. include sufficiently rich content to drive and sustain performance through the task.</li> <li>i. use diverse representations of scientists and engineers, as appropriate.</li> <li>j. be built logically and coherently (when multiple components of a scenario are introduced throughout a task).</li> </ol> </li> <li>2. <b>Task scenarios must be grade-appropriate and:</b> <ol style="list-style-type: none"> <li>a. require grade-appropriate SEPs, DCIs, and CCCs to respond.</li> <li>b. not require information that is outside the bounds of the targeted dimensions outlined in the standards.</li> <li>c. use grade-appropriate vocabulary and syntax, based on accepted standards in science and English language arts.</li> </ol> </li> </ol>

<p><b>2. Multi-dimensional performance.</b> Indicators in this category determine the degree to which tasks and items require students to use the Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs) and Crosscutting Concepts (CCCs) in service of sense-making.</p>	<ol style="list-style-type: none"> <li><b>1. Reasoning with evidence, models, and scientific principles (i.e., sense-making).</b> A fundamental difference between multi-dimensional items and tasks and more traditional science assessments is that these new tasks and items require sense-making from the student to answer the questions being asked.             <ol style="list-style-type: none"> <li>a. Item level: individual items require students to engage in generating evidence, reason with evidence, or reason about the validity of claims related to a phenomenon or problem.</li> <li>b. Task-level: Assessment tasks require students to connect evidence (provided or student generated) to claims, ideas, or problems (e.g., explanations, models, arguments, scientific questions, definition of/solution to a problem) by using the SEPs, CCCs, and DCIs as a fundamental component of their reasoning.</li> </ol> </li> <li><b>2. Assessing each dimension, and multiple dimensions together.</b> For each dimension (DCIs, SEPs, CCCs), alignment indicators include the following:             <ol style="list-style-type: none"> <li>a. Which element of the dimension is required to respond to the item/task</li> <li>b. The grade-band at which the dimension is engaged</li> <li>c. Whether the dimension is engaged in service of sense making (in contrast to rote information)                 <p><i>It should be noted that more weight/emphasis should be placed on DCIs and SEPs, as CCCs prove challenging to assess in most large-scale contexts.</i></p> <ol style="list-style-type: none"> <li>i. <b>Item level:</b> Individual items require students to use each dimension at grade level in service of sense making; this can be evaluated for each dimension across the indicators described above.</li> <li>ii. <b>Task level:</b> Across a task, students are required to use at least two dimensions together to make sense of phenomena and/or problems.</li> </ol> </li> </ol> </li> </ol>
<p><b>3. Technical quality.</b> These indicators describe the technical quality of items. These indicators should <u>all be met for all items and tasks.</u></p>	<ol style="list-style-type: none"> <li><b>1. Accuracy</b> <ol style="list-style-type: none"> <li>a. Scientific accuracy</li> <li>b. Free from technical errors</li> </ol> </li> <li><b>2. Clarity:</b> Items and tasks are written and illustrated clearly so that they are easily understood by students.</li> <li><b>3. Equitable and free from bias and sensitivity concerns:</b> Items and tasks are accessible to all student groups, including economically disadvantaged students, students with limited English language proficiency, students with disabilities, students from all major racial and ethnic groups, female students, students in alternative education programs, and gifted/talented students.</li> <li><b>4. Appropriate level of mathematics and ELA/literacy:</b> Items and tasks do not require reading or mathematics beyond what is required by the SEP, CCC, and DCI as specified by the targeted elements, by the assessment boundaries described in the standards, or by a state's grade-level mathematics and ELA standards.</li> </ol>





<b>4. Cognitive complexity.</b> These indicators describe the level of sensemaking required to respond to tasks.	Tasks are evaluated according to a <a href="#">framework</a> designed specifically for NGSS assessments <sup>3</sup> , which focuses on determining the level of thinking required by large-scale assessments and builds on the multi-dimensional and progressive nature of NGSS tasks. This work, developed by Achieve Inc., is based on the <i>Task Analysis Guide in Science</i> <sup>3</sup> .
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<sup>3</sup> Achieve developed *A Framework to Evaluate Cognitive Complexity in Science Assessments* to support monitoring cognitive complexity measures in three-dimensional assessments. The Achieve framework draws from research on cognitive complexity and examples of student performance; task complexity in classroom assessment tasks; and the specific design and approach of large-scale assessments designed for NGSS and similar standards. The Achieve framework uses that measure, rather than other complexity frameworks, because it is designed to reflect the nuances and distinguishing features of 3D assessments.

<sup>3</sup> Tekkumru-Kisa, Miray & Stein, Mary & Schunn, Christian. (2015). A framework for analyzing cognitive demand and content-practices integration: Task analysis guide in science: TASK ANALYSIS GUIDE IN SCIENCE. *Journal of Research in Science Teaching*, 52. 10.1002/tea.21208.



## Part 3: Implementing Reviews – How New Meridian Operationalizes this Framework

### Reviewers: Recruitment and Panel Composition

States should conduct these reviews with a small panel of expert reviewers who are knowledgeable in how to apply the indicators described in Part 2 (Indicators of Quality Science Assessment Tasks: Item- and Task-level Analysis) to large-scale assessments. Reviewers should have grade-band specific domain expertise, deep familiarity with the NGSS and similar standards, familiarity with classroom implementation of the NGSS, and familiarity with large-scale summative assessment. The review panel should reflect appropriate diversity, including at a minimum racial, ethnic, gender, and geographical diversity. We recommend panels large enough to allow for three reviewers per item review block, ensuring that all items include individual and expert consensus review. The exact size of the review panel will depend on the number of states and tasks to be reviewed.

### Reviewers: Training and Calibration

Prior to engaging in any review processes, reviewers should undergo an intensive training and calibration process, spanning many different task development approaches. Reviewer training should include understanding the features of high-quality scenarios; the strategies for assessing each dimension (and the dimensions together) in service of sense making, and how to review scenarios and tasks for equity and fairness. Training should also include how to review the indicators described in this framework. Following the training, reviewers should review sets of diverse items for calibration purposes, particularly those with design features similar to items they may be reviewing in the upcoming cycles. Reviewers should meet at least twice a year to re-calibrate and extend their understanding of item development and implementation, as these processes are expected to evolve.

### Review Process

Once reviewers are recruited, trained, and calibrated, New Meridian recommends the following review process:

1. **Internal Screen.** Prior to content review, New Meridian staff screen the submitted information for the indicators described in Part 1 (Must-Have Features for Item and Task Submissions) and organize the information within a system to enable efficient review.
2. **Task Assignment.** Tasks are then assigned to a panel of at least three reviewers for individual and consensus review. Tasks should be assigned based on the expertise and diversity features noted above. New Meridian will assign a lead reviewer and/or separate facilitator who collates reviews and leads the writing process for the final report as needed.



3. **Individual to Consensus Reviews.** For both the prescreen and descriptive reviews, reviewers should follow an individual-to-collective review process: each reviewer should review the tasks independently and record their evidence, reasoning, and final judgements prior to any group discussions. During the group discussion, the facilitator/lead reviewer should conduct a discussion to ensure consensus on each indicator for each item or task.
  - a. **Prescreen.** Reviewers should first prescreen all assigned tasks to determine which will undergo the more in-depth descriptive review. This might involve New Meridian staff or the assigned review panel; best practices would suggest at least two reviewers connect on the prescreen and make decisions about tasks moving forward in the review process. Prescreen review should include documentation of how each task performed relative to each indicator, the evidence and reasoning used to make the judgement, and any overall holistic comments (particularly for tasks that are NOT moving onto the full review).
  - b. **Full descriptive review.** For tasks that move on to the in-depth review, reviewers should once again individually review each scenario, item, and task relative to the appropriate indicators prior to consensus conversations.
4. **Final report.** New Meridian will share the results of each descriptive task review to contributing states. New Meridian believes these reviews will inform and guide states in their future science item development and thus help elevate overall quality of largescale science assessments nationally. Science assessment content in the New Meridian Science Exchange Item Bank will be tagged with the item- and scenario-level review data to support subscribing states in their selection of tasks to meet their assessment needs.

### Additional Notes

Some states may require additional reviews prior to including items on their assessment—internal reviews, reviews by state teacher panels, etc. While these reviews are the state's responsibility, New Meridian will make all review and training materials publicly available and will support states in training reviewers if states wish to use this process.



## Appendix D. Item Writing Training Agenda

(Document begins on next page.)

## Agenda

### Day 1

9:00–10:30 (10–11:30 a.m. ET)	<a href="#">Introductions</a> <a href="#">This week's agenda</a> <a href="#">Norms</a> <a href="#">Logistics</a> <a href="#">After hour sign-ups</a> <a href="#">New Meridian Updates</a>	Group Room
10:30–11:00 (11:30–12:00 p.m. ET)	<a href="#">Unpacking Documents and Process</a> <a href="#">Team Working Agreement</a>	Group Room
11:00–12:30 (12:30–1:30 p.m. ET)	<a href="#">Team Unpacking</a> <a href="#">Jamboard unpacking</a>	Team Breakout
12:30–1:30 (1:30–2:30 p.m. ET)	Lunch	
1:30–3:00 (2:30–4:00 p.m. ET)	<a href="#">Team Unpacking</a> <a href="#">Jamboard Version</a>	Group Room
3:00–3:30 (4:00–4:30 p.m. ET)		Team Breakout
3:30–5:00 (4:30–6:00 p.m. ET)	<a href="#">Phenomena Brainstorm</a> Scenario Development	Group Room & Team Breakout

### Day 2

9:00–9:30 (10:00–10:30 a.m. ET)	Logistics <a href="#">SEP and CCC Unpacking</a>	Group Room
9:30–11:15 (10:30–12:15 p.m. ET)	Unpacking	Team Breakout
11:15–12:00 (12:15–1:00 p.m. ET)	<a href="#">Cluster Specifications</a> Story Line Development Sign up for <a href="#">Facilitator Check-in</a>	Group Room
12:00–1:00 (1:00–2:00 p.m. ET)	Lunch	
1:00–1:30 (2:00–2:30 p.m. ET)	<a href="#">Equity in Assessments</a>	
2:30–5:00 (2:30–6:00 p.m. ET)	Cluster Development Facilitator Check-ins	

### Day 3

9:00–9:30 (10:00–10:30 a.m. ET)	Peer Review Groups—after lunch <u>Item Types</u> <u>Cluster Templates</u>	
9:30–12:00 (10:30–1:00 p.m. ET)	<u>Cluster Development</u> Team 4 and 7 Facilitator Check-in	
12:00–1:00 (1:00 p.m.–2:00 p.m. ET)	Lunch	
1:00–1:30 (2:00–2:30 p.m. ET)	Peer Review Process	
1:30–3:00 (2:30–4:00 p.m. ET)	Peer Review	
3:00–5:00 (4:00–6:00 p.m. ET)	TAO training Review Peer Review Feedback <u>Cluster Development</u>	

### Day 4

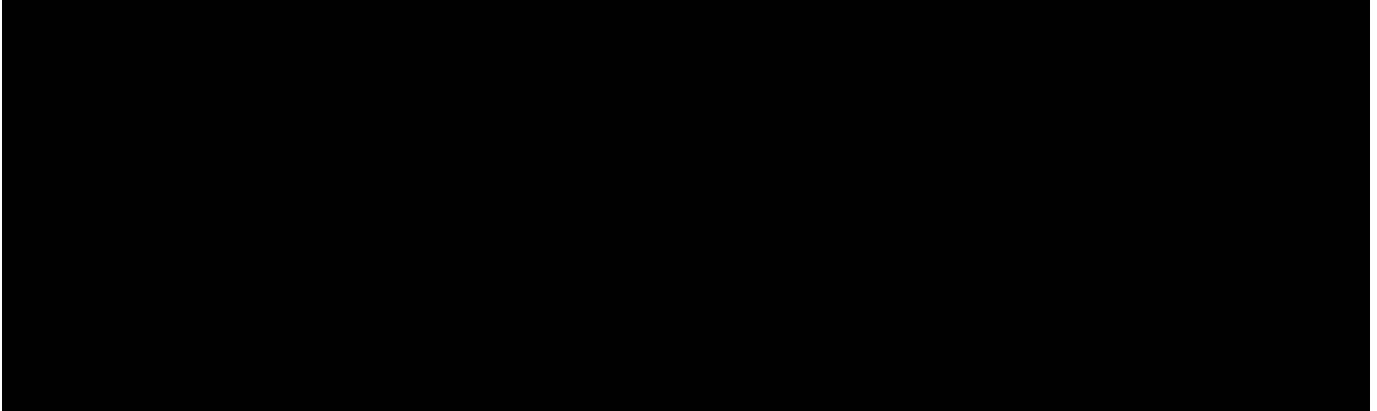
9:00–9:30 (10:00–10:30 a.m. ET)	Sign up for Facilitator Check-in	
9:30–12:00 (10:30 – 1:00 p.m. ET)	<u>Cluster Development</u>	
12:00–1:00 (1:00–2:00 p.m. ET)	Lunch	
1:00–1:30 (2:00–3:00 p.m. ET)	Content Review Process	
1:30–3:00 (2:30–4:00 p.m. ET)	Content Review	
3:00–5:00 (4:00–6:00 p.m. ET)	Review Content Review Feedback <u>Cluster Development</u>	

### Day 5

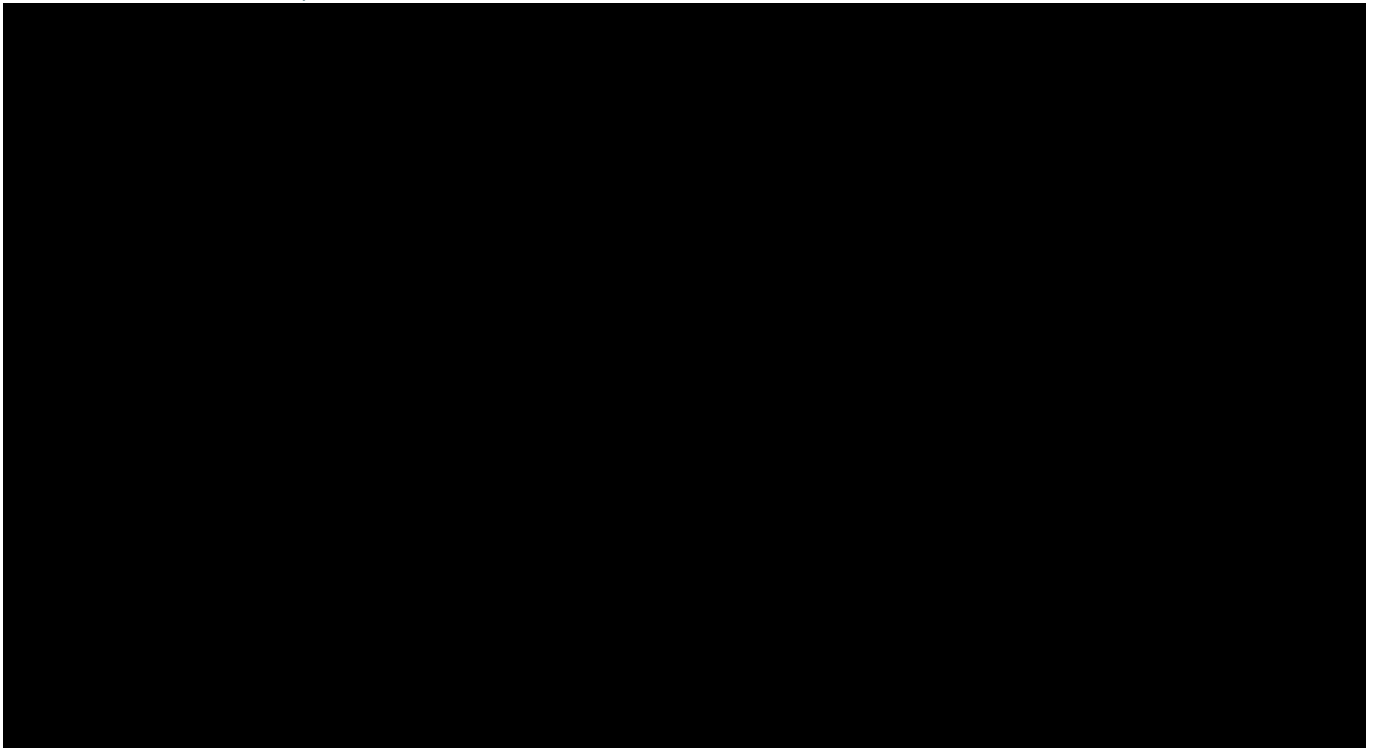
9:00–9:30 (10–10:30 a.m. ET)	Submission Process	
9:30–12:00 (10:30–1:00 p.m. ET)	<u>Cluster Development</u>	
12:00–1:00 (1:00–2:00 p.m. ET)	Lunch	
1:00–5:00 (2:00–6:00 p.m. ET)	<u>Cluster Development</u> Submit in TAO Complete Survey	

## Appendix E. Asset Development Plan

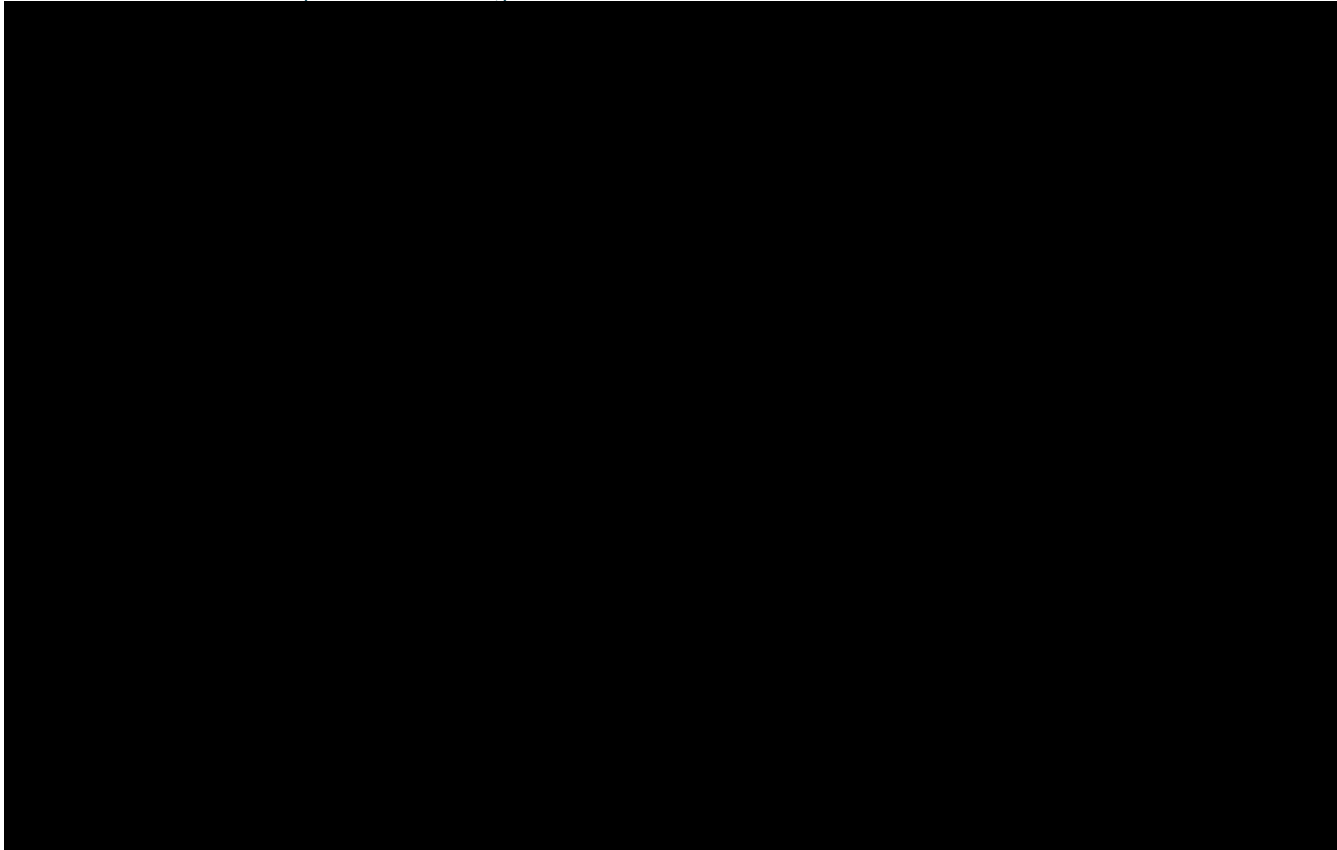
*Table 43. Asset Development Plan for Grade 5*



*Table 44. Asset Development Plan for Grade 8*



*Table 45. Asset Development Plan for High School*







## Appendix F. Administration Manuals

### Principal and Assessment Coordinator (PAC) Manual

(Document begins on next page.)



**PRINCIPAL AND  
ASSESSMENT  
COORDINATOR MANUAL**  
MAINE SCIENCE ASSESSMENT SPRING 2022

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**NOTE:** This manual may be downloaded from the link below and printed or photocopied as needed.

[https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience).

## Overview of the 2021–22 Maine Science Assessment

1. The Maine Science Assessment assesses all publicly funded Maine students in grades 5, 8, and 11 (third year of high school).
2. Students with significant cognitive disabilities who qualify for an alternate assessment to the Maine Science Assessment (MSAA-Science) will be administered this year, March 14 through April 29, 2022. This Maine Science Assessment does not need to be submitted for any student who was assessed through an alternate assessment.
3. All publicly funded students who participate in the Maine Science Assessment for grades 5, 8, and 11 (third year of high school) must have a state student identification number in Synergy State Edition. That number must be used by every student taking the science assessment.
  - A. Online Assessment Administration: to log into the ADAM assessment platform, students should be provided a session-specific Student Assessment Card (formerly, Test Ticket) to use during the login process. The Student Assessment Cards will contain the following student information:
    1. SSID
    2. First Name
    3. Last Name
  - B. Paper Assessment Administration: students must use the Student Assessment Booklet with their pre-printed PreID label placed on the back cover. Students needing Large Print or Braille will receive a Student Assessment Booklet for the required accommodation, and a standard-print Student Assessment Booklet into which the student (or scribe) can record all responses for scoring. Both Assessment Booklets should have the student-specific PreID label on them. The pre-printed PreID label contains the following student information:
    1. SSID
    2. First Name
    3. Last Name
    4. Grade
    5. School
    6. District
4. Schools must enter all student demographic data used for Maine Science Assessment reporting into Synergy State Edition. See **Important Dates** on page 3 of this manual for the due date. The only exceptions to this rule are the accommodation codes. For more information on accommodations, see the [Maine Science Assessment Accessibility Guide](#).
5. The Maine Science Assessment is designed to assess Maine DOE Regulation 131: The Maine Federal, State, and Local Accountability Standards.

The following statements are only applicable to the paper-based assessment administration:

6. Maine Science Assessment Booklets will be shipped by Strategic Measurement and Evaluation (SME) directly to the campus or school where the student(s) requiring paper/Large Print accommodations will be assessed. See **Important Dates** on page 3 of this manual for the ship by date.
7. Braille Assessment Booklets will be shipped from the Braille vendor directly to the campus or school where the student(s) requiring the Braille accommodation will be assessed. See **Important Dates** on page 3 of this manual for the ship by date.
8. School assessment coordinators will need to schedule a UPS pick-up to return all secure assessment materials on the first business day after completing all paper assessments. See **Important Dates** on page 3 of this manual for the “ship by no later than” date.



## Important Contact Information

### Maine Science Support Desk (New Meridian)

Support Desk Self-Service (Initiate an Inquiry, Resources, Chat\*)

<https://mescience.zendesk.com/>

*\*Chat will be available from 7:30 am – 4:00 pm during the science assessment window*

Toll-Free Number ..... 855-544-0842

Email Address for follow-up inquiries (please include the ticket #)

[MEScience@adamexam.com](mailto:MEScience@adamexam.com)

### Maine Department of Education (Policy Questions)

Nancy Godfrey, Assessment Coordinator ..... [Redacted]  
[Redacted]

Jodi Bossio-Smith, Alternate Assessment Coordinator ..... [Redacted]  
[Redacted]

Janette Kirk, Interim Director of Assessment ..... [Redacted]  
[Redacted]

Synergy Helpdesk ..... 207-624-6896  
[medms.helpdesk@maine.gov](mailto:medms.helpdesk@maine.gov)

## Additional Maine Science Assessment Administration Resources

Links to Training webinars and Q&A sessions for assessment coordinators and assessment administrators are available and can be found at <https://mescience.zendesk.com/> under Video Tutorials and Webinars.



## Important Dates

### Deadlines for ordering Paper-Based Assessment Booklets\*

#### Initial orders for

Paper, Large Print .....April 11, 2022

Braille ..... January 31, 2022

#### Additional orders for Paper and Large Print

Grades 5 & 8 Window.....April 12 – 22, 2022

High School Window ..... April 12 – May 6, 2022

### Maine Science Assessment Paper-Based Booklet Shipment Dates

Paper and Large Print .....April 15, 2022

#### Braille

Grades 5 & 8 Window..... April 29 – May 5, 2022

High School Window..... May 10 – 16, 2022

### Maine Science Assessment Administration Window

Grades 5 & 8 Window ..... May 2 – 27, 2022

High School Window ..... May 16 – June 10, 2022

Deadline for Updating Synergy Student Data for Reports ..... May 27, 2022

### Deadline to Ship to Return Paper Materials to SME<sup>€</sup>

Grades 5 & 8 Ship by Date..... May 31, 2022

High School Ship by Date ..... June 13, 2022

\* For students needing Student Assessment Booklets due to an IEP accommodation requiring they be assessed using Paper (standard font), Large Print, or Braille.

<sup>€</sup> SAUs may contact UPS to pick up paper assessment materials as soon as their science assessment administration for students using paper-based (including Large Print and Braille) accommodations is complete.



## Purpose of Document

This manual provides information about assessment coordination and administration procedures for the Maine Science Assessment, which includes a variety of item types including multiple choice, multiple select, multiple part, technology enhanced, and constructed response questions.

For details on the structure, formats, and content of this state-developed assessment, visit the Maine DOE's Maine Science Assessment page at [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience).

**Principals and designated assessment coordinators must read this manual thoroughly before the administration and be familiar with the Assessment Administrator Manual instructions** available online at

[https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience) or from the Resources area of the Maine Science Support Desk at <https://mescience.zendesk.com/>.

Before the administration, principals and assessment coordinators should have:

1. thoroughly reviewed the [Maine Comprehensive Assessment System Guidelines 2021-2022](#) and
2. become familiar with the [Maine Science Assessment Accessibility Guide](#).

Further questions or concerns about these documents and resources can be answered by calling the Maine Science Support Desk at 855-544-0842 or by email at [MEScience@adamexam.com](mailto:MEScience@adamexam.com).

## Overview of the Principal/Assessment Coordinator's Responsibilities

- A. Every school principal/assessment coordinator's informed cooperation is essential to ensure that the Spring 2022 Maine Science Assessment administration
  1. proceeds smoothly,
  2. assessment materials are correctly accounted for, and
  3. student responses are accurately analyzed.
- B. The instructions outlined in this manual and in the [Assessment Administrator Manuals](#) must be followed closely by each
  1. principal,
  2. assessment coordinator, and
  3. assessment administrator/proctor.
- C. As principal/assessment coordinator, your primary responsibilities are
  1. overall security and ethical administration of the assessment,
  2. scheduling logistics,
  3. materials handling, and
  4. training and supervision of all assessment administrators/proctors.



## Assessment Security and Ethics

The quality and usefulness of the assessment data generated by the Maine Science Assessment depend, in large part, on the uniformity of the assessment administration and the security of assessment materials. Valuable information about student achievement of content standards measuring the effectiveness of the [Maine Learning Results](#) will be seriously compromised if assessment security is not strictly implemented and maintained.

School principals are responsible for ensuring that the Maine Science Assessment administration takes place in accordance with these guidelines. Duplication of any portion of the Maine Science Assessment is strictly forbidden, including but not limited to audio recording, video recording, photographing, photocopying, and handwritten copying. No assessment, record of student work, or computer-generated responses may be retained, discarded, recycled, removed, or destroyed.

### Principal's Responsibilities

As principal, you are ultimately responsible for Maine Science Assessment materials' security while assessment materials are in your school building. It is critical that you or your designee

1. inform staff and students of these assessment security and ethical considerations,
2. ensure the ADAM lockdown browser is installed on all devices to be used for the assessment,
3. inventory the paper assessment materials, including Student Assessment Cards and Student Assessment Booklets as soon as your school receives them,
4. print and organize the Student Assessment Cards from ADAM for online administration
5. monitor the distribution and use of these materials,
6. secure devices and assessment materials after each assessment day/period, and
7. ensure the complete and error-free return of paper-based Booklets to the assessment contractor when the science assessment is completed.

The Maine Science Assessment for grades 5, 8, and 11 (or third-year high school students) is designed to provide information about student achievement.

1. The accuracy and value of this information are directly influenced by how students handle assessment materials and respond to assessment questions.
2. **Staff must be notified that using current assessment content or materials to familiarize students with test-taking strategies is a violation of assessment security and assessment procedures.**

As principal/assessment coordinator, you are ultimately responsible for ensuring that students are properly instructed in the use of assessment materials and are given the opportunity to do their best. You or your designee must ensure that

1. students have been informed
  - A. about the importance of the Maine Science Assessment before the assessment begins;
  - B. that their assessment results will be included in their permanent school records;
  - C. that a copy of the assessment results will be provided to their parent(s) or guardian(s); and

- E. that assessment results will be used by teachers to help improve academic instructional practices.
2. students are informed about assessment security and ethical considerations; i.e. ;
  - A. do not participate in any form of cheating;
  - B. only provide answers that are strictly their own;
  - C. do not consult notes, textbooks, or other teaching materials;
  - D. do not use calculators, cell phones, smartwatches, computer resources, or other digital or electronic devices;
  - E. do not share or discuss assessment content or questions with anyone.
  - F. do not consult with others about the assessment during the Maine Science Assessment administration window.
3. each student
  - A. receives a set of assessment materials for the appropriate grade and mode (online or paper),
  - B. uses only their assigned set of assessment materials, and
  - C. handles the materials and completes the assessment properly.
4. students are informed that they will have a specific amount of time to complete each session (see page 10).
5. students are informed that
  - A. they will be required to make up any assessment session missed due to absence from school,
  - B. they are encouraged to avoid being absent during the assessment administration, and
  - C. all makeup assessment sessions must be completed during the two-week science administration window.
6. students are informed that responses
  - A. identified in the scoring process indicating concern for student's health or personal safety may be confidentially referred to appropriate local SAU personnel.

If questions arise or any situation occurs that could cause any part of the science assessment administration to be compromised, principals/assessment coordinators or assessment administrators should contact Nancy Godfrey, Assessment Coordinator, at the Maine Department of Education at [REDACTED] OR [REDACTED].

### **Penalties**

Failure to comply with the administration and security requirements described in this document may result in one or more of the following penalties:

- a delay in reporting of student, school, or SAU results;
- invalidation of student, school, or SAU results; and/or
- an investigation by the Department of Education for possible certification action.

## Checklist for Assessment Administration Preparation

**NOTE:** This checklist is provided as a summary only. Refer to other sections for complete information.

### Prior to Administration

1. Read this [Principal and Assessment Coordinator Manual](#) and the appropriate [Assessment Administrator Manual\(s\)](#).
2. Read the [Maine Comprehensive Assessment System Guidelines](#)
3. Notify staff, students, and parents about the science assessment, and discourage absences.
4. Determine the science assessment schedule for your school. We recommend administering early in the assessment window to allow time for makeup session(s).
5. Schedule a training meeting for all staff who will administer the assessment —
  - a. Review essential information, including assessment security and ethics, and the assessment schedule.
  - b. Distribute and review procedures in the [Assessment Administrator Manual](#).
  - c. Ensure that any absent staff member is subsequently trained.
  - d. Additional administration manuals are available electronically at [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience)
6. Arrange for assessment of students who require accommodations and ensure that staff members who will administer this assessment have been trained and have access to the [Maine Science Accessibility Guide](#) and to **Appendix A**—Maine Science Accessibility Guide.
7. Ensure that students are rostered correctly in the ADAM platform and that Student Assessment Cards for all four sessions are printed.
8. Make sure there is a designated process for assessment coordinators, administrators, or proctors to secure all used scratch paper and Student Assessment Cards, and shred these after each administration session.
9. Ensure that all Synergy State Edition student information is complete and correct by May 27, 2022. No corrections to student data will be allowed after that date.

### Print and Inventory Student Assessment Cards and Rosters

Follow the instructions in the [ADAM Platform User Guide](#) for the ADAM administration platform. From the interface you can print Student Assessment Cards and Rosters for each session of the Maine Science Assessment administration. After printing, you should inventory and organize these printed materials for distribution to proctors for each session.

### **Allowable Materials**

It is essential to ensure that no students are either advantaged or disadvantaged during the assessment by their assessment environment. At the top of the page for each assessment session in the [Assessment Administrator Manual](#) is a *Materials Needed* statement that specifies what materials are needed/allowed for that assessment session. Any materials not specified in the manuals are prohibited during the Maine Science Assessment administration. **All science-related reference materials, including those on classroom walls or student desks, must be covered or removed.**

**Calculators are not needed/permitted during the science assessment.**

**Note:** Students for whom accommodations have been approved and documented may use other allowable materials, as required. See **Appendix A—Maine Science Accessibility Guide** beginning on page 17.

### **During the Administration**

1. Maintain assessment security in all settings and locations.
2. Ensure that all approved accommodations are provided correctly to students as appropriate.
3. Secure the assessment materials between assessment administration sessions.
4. Ensure that used scratch paper and Student Assessment Cards are securely shredded after administration sessions.
5. Monitor/observe assessment administrations in your school and be available to answer questions, as necessary.
6. Maintain a list of absent students to ensure makeup session(s) occur.
7. Maintain a list of students moving in and out of your school to ensure the assessment is conducted according to Maine Science Assessment policies.
8. Observe and document the destruction of any student paper-based Assessment Booklets that are contaminated with hazardous biological matter once approval has been granted (see page 23, *Monitoring Assessment Administration* for further details) or refer to the *Checklist for Concluding Assessment Administration* on page 14 for when the paper-based assessment is complete.

## Preparing for Assessment Administration— Student-Related Information

### Determine How Students Will Participate

It is expected that all students will take part in the Maine Science Assessment, either through standard administration, administration with supports and/or accommodation(s), or the Alternate Science Assessment (MSAA). As a principal, you must ensure that this occurs.

1. Supports/accommodations are available to all students based on individual needs regardless of disability status.
2. The student's educational team must make decisions regarding supports/accommodations on an individual basis.
3. Supports/accommodations must be consistent with those used during the student's regular classroom instruction, including test-taking.
4. The **Appendix A—Maine Science Accessibility Guide** is available beginning on page **17** and found as a single document at [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience).
5. Compile a list of all students who require supports/accommodations, along with the specific support/accommodation each student requires.
6. In the ADAM platform, on the far left go to Rostering, Users and find the Name of each student that will require one or more accommodations/supports during the Maine Science Assessment. Use the Edit button under Actions to open the student's profile and check the box(es) for any **Accommodations** that the student requires.
  - a. To enable Text-to-Speech, the box must be checked **at least 30 minutes prior to the start of the administration**, to allow the change to flow through the system and turn on the accommodation for that student.
  - b. For all other accommodations, boxes must be checked **at least 30 minutes prior to the administration** for the accommodation codes to be reflected in the Proctor dashboard. You can then reprint Rosters or Student Assessment Cards to reflect the changes as needed.
  - c. Students that require Paper (including Large Print or Braille) will have this accommodation checked by default.
    - i. You may uncheck these accommodations if this requirement has changed.
    - ii. Checking these boxes will not generate an order for any form of Paper. To initiate a Paper order, you must go through the [Request for Paper-Based Science Assessment](#) process. See page 3 for paper order deadlines.
  - d. For additional information, see the [ADAM Platform User Guide](#)
7. Designate enough trained school personnel to provide the supports/accommodations recommended for each student.

Only students who have been approved for special considerations by the Maine DOE due to specific circumstances may be exempted from participation in the Maine Science Assessment. Please see the [Maine Comprehensive Assessment System Guidelines](#) for guidance on these and other participation issues such as students who move during the assessment window.

## Preparing for Assessment Administration— Schedule/Environment

### Scheduling and Standard Administration Requirements

Following the requirements described below, develop an assessment schedule for your school prior to the start of each grade level administration window. The tables below show the total number of administration sessions and the time required for each grade level. An additional 5–10 minutes should be reserved for material distribution and instructions for the assessment prior to each assessment session. If you schedule two (or more) assessment sessions consecutively, it is recommended that a break of at least 10 minutes be scheduled between assessment sessions. Schools should schedule each grade-level assessment at a convenient time within the four-week window. Within a grade, each assessment session should be administered simultaneously to all students in your school. For example, all grade 5 students in a particular school will take Science Session 1 at the same time. Schools with students in a hybrid or remote setting may need to schedule sessions on a rolling basis to account for the non-standard school schedule. Once an assessment session has been started, it must be completed on the same day. Concurrent assessment administration allows the assessment environment to be standardized and minimizes potential assessment security problems. The questionnaire is scheduled last because some questions ask students to describe the Maine Science Assessment they have just experienced.

All assessment sessions should be scheduled in the order below, and all students within a school should be assessed simultaneously within a grade. The only exceptions to these rules are for schools with hybrid or remote students, makeup session(s), and students with certain accommodations. All session(s) must be completed within the administration window for Grades 5 & 8 by end of day on May 27, 2022, and for High School by end of day on June 10, 2022. Calculators are not needed/permitted during the science assessment.

### Assessment Session Order and Time Allowances:

Session	Total Time
Material Distribution and Instructions	10–15 minutes
Session 1	60 minutes
Session 2	60 minutes
Session 3	60 minutes
Student Questionnaire	15–20 minutes
<b>TOTAL</b> (not including distribution/instructions)	<b>200 minutes</b>

Classrooms experiencing a unique assessment administration situation that affects the assessment time should contact the Maine DOE at (207) 530-1273.

## **Assessment Environment**

Assessment sessions (when possible) should be administered in a classroom setting. Auditoriums, cafeterias, libraries, hallways, study halls, and other non-classroom settings may be uncomfortable, noisy, and distracting to the student and are therefore not ideal assessment settings. You should ensure that assessments are administered in rooms with adequate lighting, ventilation, space, and furniture to enable students to work comfortably and without disruption. Science-related content materials on walls or desks must be covered or removed during the assessment window.

Designate enough classroom spaces in your schedule to allow for

1. all students in a grade to be assessed at the same time with sufficient personal assessment space per student for adequate monitoring and proctoring,
2. separate classroom space for makeup sessions if necessary, and
3. accommodations to be provided for students who have been approved to receive them.

## **Makeup Session(s)**

It is crucial that every student complete every Maine Science Assessment session, including makeup sessions, for Grades 5 & 8 by May 27, 2022, and for High School by June 10, 2022. It is recommended that assessment coordinators maintain a list of absentees/assessment sessions missed during each assessment session. Plan times into your schedule for makeup assessment sessions to be administered by trained school personnel.

## Preparing for Assessment Administration — Personnel

### Designate Assessment Administrators/Proctors

Designate enough trained assessment administrators/proctors to ensure that

1. each assessment session can be administered simultaneously to all students being assessed at a grade level,
2. students can be assessed in a classroom setting that provides sufficient assessment space per student to eliminate the possibility of cheating,
3. students who need them are correctly provided with appropriate supports/accommodations, and
4. makeup sessions will be supervised.

**NOTE:** When scheduling assessment administrators/proctors for students who will receive a read-aloud accommodation using a Human Reader or ASL interpreter, a reader trained in assessment administration may read the same grade level science assessment session to multiple students simultaneously.

### Train Assessment Administrators/Proctors

Schedule a training meeting with all school staff who will be administering the Maine Science Assessment, including educational technicians, as necessary. Prior to the training meeting, distribute a copy of the appropriate [Assessment Administrator Manual](#) to each designated assessment administrator/proctor and notify him or her that they must read the manual thoroughly prior to the meeting. If additional copies are required, the manual and instructions may be downloaded, printed, and duplicated from [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/GeneralScience](https://www.maine.gov/doe/Testing_Accountability/MECAS/GeneralScience) or the Resources area of the Maine Science Support Desk at <https://mescience.zendesk.com/>. During the meeting, show and discuss the applicable ADAM Online Administration Rostering & Accessibility and Proctoring training webinars, available at [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/GeneralScience](https://www.maine.gov/doe/Testing_Accountability/MECAS/GeneralScience), or direct assessment administrators and proctors to view the webinar at their convenience.

Meet with all designated assessment administrators/proctors to

1. review assessment security and ethical considerations and the staff's need to follow [Assessment Administrator Manual](#) instructions and scripts.
2. provide student assignments and discuss any accommodations that will be provided to students.
3. notify the assessment administrators/proctors of the assessment schedule for your school, including the makeup schedule and assignments.
4. inform all assessment administrators/proctors about assessment material tracking procedures and documents.
5. explain the requirement to distribute Student Assessment Booklets and Student Assessment Cards to the correct students.
6. provide paper assessment administrators/proctors with Number 2 pencils.
7. explain that each student using a paper booklet must legibly write his or her name and school name on the front cover of the booklet.
8. explain that any coding of online student accommodations information to allow for the use of Text-to-Speech should have occurred in the ADAM platform **BEFORE** the administration and should be reflected on the roster and Student Assessment Card.
9. explain that any coding of additional accommodation and support demographics will be completed by the assessment coordinator **AFTER** the assessment is completed.
10. answer questions regarding assessment administration procedures.





## Conducting Assessment Administration

### Distributing/Monitoring Assessment Materials

Distribute Rosters, Student Assessment Cards, and, if applicable, Student Assessment Booklets to the assessment administrators/proctors for the students taking the science assessment. Provide headphones for students approved to use the Text-to-Speech Accessibility Feature.

If applicable, coordinators will need to provide one paper-based Student Assessment Booklet to assessment administrators/proctors administering to an individual or small group of online students requiring the Human Signer accommodation. This booklet should be provided immediately prior to a session.

Monitor correct use of tracking documents and ensure compliance with assessment security guidelines. Investigate immediately any discrepancy in the use of tracking documents or in the information they contain.

### Monitoring Assessment Administration

It is recommended that you observe and/or maintain close daily contact with all assessment administrators/proctors during the assessment window. This is to answer any questions or address any issues that may arise.

### Handling Irregularities

Circumstances over which you have no control (fire drills or power failures, for example) may interrupt the assessment. Interruptions should not reduce the total amount of time students are given to complete the interrupted session. When normal conditions are restored, resume the assessment.

Call Nancy Godfrey, Assessment Coordinator, at the Maine DOE [REDACTED] immediately if any situation occurs that could cause the assessment administration to be compromised.

## Checklist for Concluding Assessment Administration

**NOTE:** This checklist is provided as a summary only. Refer to the applicable sections for complete information.

### After Assessment Administration

- Collect and inventory all assessment materials from each assessment administrator/proctor
- Shred all Student Assessment Cards and rosters containing test codes, student SSID numbers, and any scrap paper utilized by students.
- Confirm that no paper has been taped, pasted, stapled, or otherwise attached to the paper Student Assessment Booklets.
- Complete or verify the accommodations provided to students in ADAM.
- Follow the instructions on page 16 to distribute the information for appropriate staff to complete the online Principal/Assessment Coordinator, Teacher (Grades 5 & 8), and Department Chair (High School) Questionnaires.



## Concluding Assessment Administration

### Collecting All Student Assessment Materials

Collect and inventory all secure assessment materials upon completion of the assessment administration. Ensure that all assessment materials have been returned by each assessment administrator/proctor and regional program, including Student Assessment Cards, Student Assessment Booklets, and Assessment Administrator Manuals.

### Completing Information for Student Reporting

All students must be enrolled or exited from your school accurately in Synergy State Edition by May 27, 2022, to ensure accurate Maine Science Assessment reporting. No individual student coding corrections for Maine Science Assessment reports will be made or accepted by the Maine DOE after that date.

### Accessibility: Accommodations & Supports – ADAM platform

In the ADAM platform, return to Rostering, Users to verify that the correct accommodations are checked for each student who received one or more of the accommodations/supports during the Maine Science Assessment administration. For additional information, see the [ADAM Platform User Guide](#)

## Online Principal/Assessment Coordinator Questionnaire

Go to the link below to complete the Principal/Assessment Coordinator Questionnaire. The questions are provided in **Appendix E—Principal/Assessment Coordinator Questionnaire Questions** page 29–31 for reference, but please submit the questionnaire online by the respective final day of the assessment, but no later than June 10.

[Principal/Assessment Coordinator Questionnaire](#)

## Online Teacher Questionnaire (Grades 5 & 8)

Please instruct your teachers to complete the Teacher Questionnaire for grade 5 and/or grade 8 online using the link below. The questions are also included in **Appendix F—Teacher (Grades 5 & 8) Questionnaire Questions** page 32–33 for reference, but please submit all questionnaires online by the respective final day of the assessment, but no later than May 27. You may copy Appendix F from this manual as a handout if needed.

[Teacher Questionnaire](#)

## Online High School Department Chair Questionnaire

**This questionnaire is the only requirement for those assessing high school students .** Please instruct your Science Department Chairs to complete the online questionnaire by using the link below. The questions are also included in **Appendix G—Science Department Chair Questionnaire Questions (High School)** page 34–36 for reference, but please submit all questionnaires online by the final day of the assessment, no later than June 10. You may copy Appendix G of this manual as a handout if needed.







[High School Department Chair Questionnaire](#)

## Appendix A — Maine Science Accessibility Guide

### Universal Tools – Designated Supports/Features – Accommodations

#### I. Universal Tools for all Students

##### Embedded Universal Tools

Tool	Tool Icon	Description
<b>Provisions within online assessment platform to all students automatically</b>		
<b>Review</b>		Review page shows flagged items for review and items not attempted.
<b>Accessibility</b>		Accessibility options of Color Scheme / Font Size / Zoom enlargement ( <a href="#">Accessibility Guide</a> , ADAM Accessibility Tools section pages 7-9).
<b>Flag or Bookmark</b>		Ability to flag or bookmark an item to return to for review.
<b>Line Reader</b>		The line reader tool helps focus on reading one line of text at a time.
<b>Response Masking</b>		Ability to hide/cover an answer choice – not available on all item types such as technology enhanced.
<b>Provision within online platform that must be assigned to individual student by DAC/ITC/SAC</b>		
<b>Text-to-Speech (TTS)</b>		Text is read aloud to the student via (embedded) TTS technology. TTS should be consistent with the student's normal routine during classroom instruction. Headphones/earbuds are necessary unless tested individually in a separate setting.  ( <a href="#">Accessibility Guide</a> , Text to Speech (TTS) Support section pages 10-11)

##### Non-Embedded Universal Tools Provisions outside of the online assessment platform

Tool	Description
<b>Scrap/Scratch Paper</b>	The student uses scratch paper, an individual erasable whiteboard or an assistive technology device to make notes or record responses. All scratch paper must be collected and securely destroyed at the end of each test to maintain test security.

## II. Designated Supports/Features for Some Students

Supports and features outlined below may provide increased accessibility within the assessment. Utilization and implementation of supports and features is determined on an individual basis by an educational team such as part of a multi-tiered system of supports (MTSS), Response to Intervention (RTI), Individual Language Acquisition Plan (ILAP), and/or Student Assistance Team. Supports must be consistent with the student's normal routine during classroom instruction. Provision of supports does not alter the construct of any test item.

### Non-Embedded Designated Supports Provisions outside of the online assessment platform

Tool	Description
<b>Breaks</b>	Multiple or frequent breaks may be required by students whose attention span, distractibility, physical and/or medical condition require shorter working periods.
<b>Extended Time</b>	Extended time is time beyond recommended/average of 60 minutes per session(s) 1, 2, and 3.
<b>Preferential Seating</b>	Students may have predetermined seating locations to reduce distractions for themselves or others, or to increase physical access to special equipment.
<b>Individual/Separate Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Small Group Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Movement</b>	This opportunity may be used in a setting other than the classroom for a student who cannot focus when seated for sustained periods of time.
<b>Alternate Aids/Supports</b>	The test may be presented through their regular communication system to a student who uses alternative or assistive technology on a daily basis. The test may be presented using visual aids such as visual magnification devices, reduction of visual print by blocking or other techniques, acetate shields; or auditory devices such as special acoustics, amplification, noise buffers, whisper phones, or calming music.
<b>Distraction Reduction</b>	Noise buffers, place markers, carrels, etc. may be used to minimize distractions for the student. This support does NOT include assistive devices such as templates, graphic organizers, or other devices intended specifically to help students organize thinking or develop a strategy for a specific question.
<b>Directions Clarification</b>	After directions have been read, the test administrator may ask the student to explain what he/she has been asked to do. If directions have been misunderstood by the student, the <u>directions</u> may be paraphrased or demonstrated. Test items MUST NOT be paraphrased or explained.
<b>Bilingual Word Glossary for ELLs</b>	A bilingual/dual language word-to-word glossary is provided to students who are English Learners as a language support as per ILAP.

### III. Accommodations Requiring IEP/504 Documentation

Accommodations are changes in procedures or materials that do not alter what the test measures and are used to increase equitable access during the assessment for students with documentation of the need on an Individualized Education Program/Plan (IEP) or 504 Plan.

#### Non-Embedded Accommodations Provisions outside of the online assessment platform based on IEP or 504 Plan

Tool	Description
<b>Read Aloud/Human Reader OR American Sign Language</b>	Text is read aloud or translated via sign language interpreter to student by Test Administrator human reader as documented in the IEP/504 plan.
<b>Braille</b>	Both contracted and un-contracted Braille (English Braille, American Edition or Unified English Braille) are available. Students who require a Braille assessment will be sent a transcribed paper-based assessment.
<b>Scribe</b>	The student may dictate answers to a human scribe in an individual setting. Human scribe records verbatim what a student dictates and must give the student an opportunity to review scribed text. Scribed text must be entered into the online testing platform - no paper submissions accepted.
<b>Paper Based + Large Print</b>	For students with an IEP/504 plan that requires assessments to be paper-based and not administered online. <a href="#">Request for Paper-Based Science Assessment</a>

## Appendix B—Supplemental Instructions for Paper-Based Assessment Admin

**Note: All Administrators and Coordinators should also be familiar with the information, instructions, and checklists in pp. 1-16 of this manual.**

### Preparing for Paper-Based Assessment Administration

#### Supplemental Checklist for Paper-Based Assessment Administration Preparation

**NOTE:** This checklist is provided as a summary only. Refer to other sections for complete information.

1. Use the Packing List/Return Shipment List to inventory Student Assessment Booklets. Call the New Meridian Maine Science Support Desk at (855) 544-0842 to report or resolve any discrepancies prior to the assessment.
2. Save Student Assessment Booklet shipping boxes and UPS Return Shipping Labels for return mailing.
3. When organizing materials for the assessment administrators/proctors who will administer the science assessment to students with paper-based accommodations, be sure to:
  - a. set aside standard-print Student Assessment Booklets for students with this paper accommodation, and
  - b. check separate paper (including Large Print) and Braille shipments to pair a student's standard-print booklet with their Large Print or Braille booklet using the PreID labels on the back cover.
4. For administrators/proctors that will be administrating as a scribe, human reader, or human ASL signer, you will need to contact the New Meridian Maine Science Support Desk to order an additional booklet. It is important to emphasize that student responses **must be captured in the Student Assessment Booklet with the student's PreID label on the back cover.** We recommend the student's name be written on the front cover of both booklets.
5. Prepare assessment material tracking documents or use the sample document in **Appendix C—Sample Tracking Form**, as necessary.
6. Make sure there is a designated process for assessment coordinators, administrators, or proctors to secure Student Assessment Booklets and shred all used scratch paper after each administration session.

#### Inventory Student Assessment Booklets

If you have followed the instructions in **Appendix A—Maine Science Accessibility Guide** to order Paper, Large Print, or Braille booklets, you should instruct your school staff (custodians, support staff, and others) to notify you **immediately** upon receipt of your shipment. Assessment materials will be shipped from the print vendor, Strategic Measurement and Evaluation (SME), and should be easily identified by the fluorescent "Attention" and "Save this Box" stickers on the box(es). If you have ordered Braille materials, you will receive shipments from the Braille vendor, the American Printing House for the Blind (APH), and SME.

If you have not received your initial order of paper assessment materials by noon on April 15, 2022, **call the Maine Science Support Desk at (855) 544-0842 or initiate a help request at <https://mescience.zendesk.com/>.**

Inventory the assessment materials upon receipt to ensure you have the booklets you



ordered for students with paper accommodations. If you need additional materials for students with paper accommodations, please submit an additional [Request for Paper-Based Science Assessment](#) on the Maine DOE website.

Additional paper Student Assessment Booklets in support of Read Aloud/Human Reader or American Sign Language (ASL) may be ordered by contacting the Maine Science Support Desk at (855) 544-0842, or initiate a help request at <https://mescience.zendesk.com/>.

The paper assessment materials listed below are packed in cartons by school. Save the cartons and UPS Return Service Labels for return shipping.

Paper Administrative Materials	
Maine Science Assessment Item	Notes
Instruction Letter	Enclosure with key information to help you navigate your shipment.
Packing List/Return Shipment List	These documents are used by SME to fill the shipping order and will appear in every assessment material box. You should check this slip against the materials in your box as well as against your orders placed for students with paper accommodations. <b>Remember: orders for Braille and Large Print booklets will automatically initiate an order for a standard-print booklet for use by a proctor or scribe. Braille orders will ship separately from APH.</b>
UPS Return Service Labels	Affix <b>one</b> label to each assessment material box when returning assessment materials. Additional labels should be discarded. It is recommended to keep a copy of the UPS return label for tracking of return shipments. <b>Note:</b> Braille materials should be returned to SME with the other secure paper assessment materials.

Secure Assessment Materials – As Ordered	
Large Print Booklet sets	The Large Print booklet sets include a Large Print booklet, a standard Student Assessment Booklet for the assessment administrator/proctor’s reference, and special administration instructions. If necessary, an assessment administrator/proctor <b>should transcribe the student’s answers into the standard Student Assessment Booklet.</b>
Braille Booklet sets	The Braille booklet sets include a Braille booklet, a standard Student Assessment Booklet for the assessment administrator/proctor’s reference, and special administration instructions. An assessment administrator/proctor <b>should transcribe the student’s answers into the standard Student Assessment Booklet with the student’s PreID label affixed, or include a printout of the student’s responses with the booklet.</b>
Standard Student Assessment Booklets	Standard Student Assessment Booklets are assigned to specific students and will come with a PreID label affixed to the back cover.

### **Prepare Tracking Documents**

You are responsible for the security of assessment materials and for developing a system for tracking assessment materials while they are on school premises. You must be able to

1. verify that assessment materials are being distributed accurately and in accordance with assessment security and ethics requirements,
2. identify the location of materials at any given time during the assessment administration, and
3. locate any misplaced materials.

A sample School Assessment Materials Tracking Form is included as **Appendix C— Sample Tracking Form** of this manual. You may modify this document or create your own. Tracking documents should be attached to any and all containers used to distribute assessment materials during assessment administration. Tracking documents should be stored securely with assessment materials when not in use.

Each individual authorized by you to be involved in the handling and security of assessment materials as they are moved within your school should be an education professional employed by the SAU and thoroughly familiar with principal/assessment coordinator and assessment administrator/proctor responsibilities. This individual must be present whenever assessment materials are being transported in the school building.

Investigate immediately any irregularity in the use of tracking documents or in the information they contain. Any loss of assessment materials should be immediately reported to the Maine Science Support Desk.

You should retain the tracking documents at the conclusion of the assessment. It is recommended that you store the tracking documents in a secure location after the Maine Science Assessment administration's conclusion for future reference regarding assessment materials and their distribution.

### **Conducting Paper-Based Assessment Administration**

#### **Distributing/Monitoring Assessment Materials**

Provide standard paper, Large Print and Braille assessment materials to the assessment administrators/ proctors, as applicable. The Large Print and Braille Booklets should be distributed with the standard Student Assessment Booklet with the designated student's PreID label affixed to the back cover for the assessment administrator/proctor's reference and the capture of student's responses.

Monitor correct use of tracking documents and ensure compliance with assessment security guidelines. Investigate immediately any irregularity in the use of tracking documents or in the information they contain.

Coordinators will need to provide one Student Assessment Booklet to assessment administrators/proctors administering to an individual or small group of students requiring Human Reader/Signer accommodation. This booklet should be provided immediately prior to a session.

### Monitoring Assessment Administration

If a student should become ill during the assessment, resulting in the assessment materials becoming contaminated with hazardous biological matter such as blood or vomit,

1. please transcribe any answered questions onto securely held paper, unless you have an extra assessment booklet intended for use by a human reader/signer. You may use this booklet by writing the student's first name, last name, and SSID in large print on the front and back of the booklet,
2. the principal may destroy all contaminated material(s), and
3. report the irregularity to the Maine Science Support Desk (855) 544-0842 for guidance and to order an additional booklet.

Call Nancy Godfrey, Assessment Coordinator, at the Maine DOE [REDACTED] immediately if any situation occurs that could cause assessment administration to be compromised.

### Store and Return Assessment Materials

Designate a **secure** location to store all assessment materials before distribution and when they are not being used. Only the principal or assessment coordinator should have access to this secure storage location.

Under no circumstance should anyone have access to assessment materials other than trained school personnel designated by you to be directly involved with assessment distribution or administration and students enrolled in grades 5, 8, and 11 (third year of high school) during actual assessment administration. **You are responsible for protecting assessment materials** from being used to prepare students for the assessment and/or from being viewed by unauthorized individuals at your school until their return shipment to SME.

Save the original assessment material box(es) and UPS Return Service Label(s) to return Assessment Booklets. Each assessment material box carries a pre-printed bar code label identifying assessment materials for your school by grade level. Do not remove, destroy, or deface this label!; the label's information will expedite tracking of returned assessment materials.

### Common Paper-Based Assessment Administration Errors

Below is a list of common paper-based assessment errors and how to handle each. If you have an error that you are unsure how to handle, please contact Nancy Godfrey, Assessment Coordinator at the Maine DOE [REDACTED] or [REDACTED] or contact the Maine Science Support Desk (855-544-0842 or <https://mescience.zendesk.com/>).

1. If a student answers a constructed response question in the incorrect area of the Student Assessment Booklet, cross out the printed question/item number and write in the correct question/item number the student answered. You do not need to write a letter of explanation or place in a special envelope.
2. The student must write his or her constructed response inside the provided space in the Assessment Booklet. However, if the student mistakenly writes outside the provided area, please notify the Maine Science Support Desk (855-544-0842 or <https://mescience.zendesk.com/>) and provide information on the student, grade, session, and item number(s) to request special processing.
3. If a student returns to a previous session and answers or edits previous assessment items, OR if a student continues to a subsequent session that is scheduled for a later date/time, stop the student immediately and notify Nancy

Godfrey, Assessment Coordinator at the Maine DOE [REDACTED] or [REDACTED] immediately.

4. If a student mistakenly uses a pen in an Assessment Booklet, contact the Maine Science Support Desk (855-544-0842 or <https://mescience.zendesk.com/>) and provide information on the student, grade, session, and item number(s) to request special processing.
5. If you are missing assessment booklets ordered for a student requiring a paper, Large Print, or Braille accommodation, contact the Maine Science Support Desk (855-544-0842 or <https://mescience.zendesk.com/>). No extra/overage paper materials will be included in shipments for the Spring 2022 Maine Science Assessment.

## Concluding Paper-Based Assessment Administration

### Supplemental Checklist for Concluding Assessment Administration

**NOTE:** This checklist is provided as a summary only. Refer to the applicable sections for complete information.

- Collect and inventory all assessment materials from each assessment administrator/proctor and any regional programs that received materials from your school.
- Shred all used scrap paper and rosters containing student SSID numbers.
- Confirm that no paper has been taped, pasted, stapled, or otherwise attached to any Student Assessment Booklet.
- Complete or verify the accommodations provided to students in ADAM.
- Note: **Do not return** Student Assessment Booklets that have been contaminated with hazardous biological matter such as blood or vomit. For additional questions, contact the Maine Science Support Desk at (855) 544-0842 or <https://mescience.zendesk.com/> for guidance.
- Pack Student Assessment Booklets in the appropriate shipping boxes for return to SME following the instructions on page 25. All secure materials must be returned to SME.

### Collecting All Student Assessment Materials

Collect and inventory all secure assessment materials upon completion of the assessment administration. Ensure that all secure assessment materials, including standard font, Large Print, and Braille assessment booklets, have been returned by each assessment administrator/proctor and regional program. Only assessment booklets that have been contaminated by hazardous biological matter may be destroyed by the principal once approval has been requested and granted.

Ensure that each Student Assessment Booklet is in good condition, free of stray marks and eraser bits; erasures have been made completely; and that there are no rubber bands, paper clips, staples, and extraneous paper inserted. Do not staple, glue, tape, or in any way affix paper printouts of student responses into the Student Answer Booklet for Braille students who took the assessment with an electronic Braille device.

Label each word-processed page with the following:

- student's name
- state student ID number
- school name
- assessment session number
- question number

Staple all these pages together, place them anywhere in the Student Assessment Booklet, and then return as per the instructions for return shipments.

#### **Accessibility: Accommodations & Supports – ADAM platform**

In the ADAM platform, return to Rostering, Users to verify that the correct accommodations are checked for each student who received one or more of the accommodations/supports during their Maine Science Assessment paper-based administration. For additional information, see the [ADAM Platform User Guide](#)

#### **Preparing and Packing Assessment Materials for Return**

After collecting all assessment materials, please follow the instructions below, before packing any materials.

1. Inventory your paper materials using the *Packing List/Return Shipment List* from your paper shipment(s), see **Appendix D—Sample Packing List/Return Shipment List**. Include any Braille materials shipped from APH in your return shipment list.
2. Do not use rubber bands, staples, or paper or binder clips when repackaging materials.
3. Separate Assessment Booklets with student or scribed responses and group together, by grade. These are the only materials that will be scored. Place any Braille, Large Print, or unused standard font assessment booklets in the bottom of the box.
4. **Do not return** assessment materials that have been contaminated with hazardous biological matter such as blood or vomit. Refer to page **23** for more information. If a booklet is wet due to nonbiological matter, please let the booklet dry before packaging it for return.
5. Large materials may be folded to fit in the assessment materials box.
6. It is recommended to keep a copy of the completed *Packing List/Return Shipment List* and *UPS Return Shipment Label* for potential future tracking.

Please use the original assessment material boxes for return shipment of materials. The bar code label identifying your school on the assessment material box should be intact and unobscured. If the bar code label is missing, write your school name and return address on the carton. Remove, cross out, or tape over any old UPS address labels.

Please pack the assessment material for each grade for return shipment to Strategic Measurement and Evaluation, Inc. (SME) as follows:

<b>Top of Box</b>
Completed Packing List/Return Shipment List
Polybags containing Assessment Booklets to be scored (one per grade)
Unused Student Assessment Booklets including Large Print and Braille Booklets and standard-print Booklets used to assist the administration
<b>Bottom of Box</b>

Materials that DO NOT need to be returned to SME and should be discarded:

- *Principal/Assessment Coordinator Manual*
- *Assessment Administrator Manuals*
- Extra cartons
- Extra UPS Return Service Labels

Pack materials in each box with proper cushioning material to ensure that contents do not move when you shake the box, and that the box will not be crushed during shipping. You may use bubble wrap or other packing material. Reseal each assessment material box using heavy-duty packing tape and adhere one UPS Return Service Label (provided) to each assessment material box(es).

If your campus does not have a regular UPS pick-up, you can contact UPS at (888) 743-5877 or use [Schedule a Pick-Up](#). You can also contact the Maine Science Support Desk at (855) 544-0842 or <https://mescience.zendesk.com/> for assistance. **You will need the information on your pre-printed UPS return label(s) for assistance with scheduling a pick-up.**



## Appendix D—Sample Packing List/Return Shipment List for Paper-Based Admin

### Science – Test Booklets



#### Packing List / Return Shipment List

District:		
School:		

This packing list identifies the number of Science assessment booklets sent to your school for the 2022 Maine Science Assessment based on information provided by the district. Note: the assessment booklets are scannable. There are no separate answer documents for the science assessment.

**Note:** For Large Print and Braille materials, a blank standard-print copy of the assessment booklet is included for the Scribe. Braille materials will arrive in a separate shipment.

Type/Barcode Range	NUMBER of Booklets Shipped	USED Booklets Returned	UNUSED Booklets Returned	TOTAL Booklets Returned	SME USE ONLY COUNT-IN		SME USE ONLY BOX #
					1	2	
Science Grade 5:	1						
Science Grade 8:	1						
Science High School:	1						

**MAINE SCIENCE ASSESSMENT MATERIALS ARE SECURE AND ALL ASSESSMENT BOOKLETS MUST BE RETURNED.**

Refer to the *Spring 2022 Science Principal and Assessment Coordinator Manual* for detailed packing instructions.

- Return shipments should include all assessment booklet copies including scribe copies, large print, and braille.
- Package assessment booklets by grade in large polybags, using one polybag per grade level.
- Report missing materials immediately.

If you have any questions, please contact the Science Support Desk at (855) 544-0842.

SME USE ONLY	Picked: _____	Checked: _____	Labels: _____	Count 1: _____	Count 2: _____
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## Appendix E—Principal/Assessment Coordinator Questionnaire Questions

### [Link to the Principal/Assessment Coordinator Questionnaire](#)

*To begin the questionnaire, you will be asked to provide your name, email address, school district, and school.*

Principal/Assessment Coordinator Questionnaire Questions	
<b>PRINCIPALS/ASSESSMENT COORDINATORS:</b> <ul style="list-style-type: none"> <li>• For grade 5, please answer those questions designated as <b>Grade 5 or Grades 5 &amp; 8</b>.</li> <li>• For grade 8, please answer those questions designated as <b>Grade 8 or Grades 5 &amp; 8</b>.</li> <li>• For third year of high school, please answer only those questions designated as <b>Grade 11</b>.</li> </ul>	
Question	Possible
(Grades 5 & 8) Choose the response to the prompt that best describes how your school/district integrates research-based information on student preconceptions in science into teacher professional development.	A. Every science PD session B. Occasionally C. We don't use it. D. We don't know about this. E. We don't offer science PD.
(Grades 5 & 8) Check all that you use regularly to support science curriculum development.	Maine Learning Results (2007)
	New MLRs/Next Generation Science Standards (2019)
	Science Standards developed by MCCL (2015)
	A Framework for K–12 Science Education
	Commercially produced science kits
	Science textbooks
	Maine DOE MOOSE Modules
Internet resources/apps	
(Grade 5) How well do you believe your school's science program prepared your students for 5th grade science sessions on the Maine Science Assessment?	A. Students were well prepared. B. Students were somewhat well prepared. C. Students were not well prepared. D. My school does not include 5th grade.
(Grade 8) How well do you believe your school's science program prepared your students for 8th grade science sessions on the Maine Science Assessment?	A. Students were well prepared. B. Students were somewhat well prepared. C. Students were not well prepared. D. My school does not include 8th grade.
(Grades 5) How much time is scheduled for science in your district's K–2 classrooms?	A. None B. 30 minutes or less weekly C. 20–30 minutes daily D. More than 30 minutes daily E. It is integrated with other disciplines

Principal/Assessment Coordinator Questionnaire Questions	
<b>PRINCIPALS/ASSESSMENT COORDINATORS:</b> <ul style="list-style-type: none"> <li>• For grade 5, please answer questions those questions designated as Grade 5 or Grades 5 &amp; 8.</li> <li>• For grade 8, please answer those questions designated as Grade 8 or Grades 5 &amp; 8.</li> <li>• For third year of high school, please answer only those questions designated as Grade 11.</li> </ul>	
Question	Possible
(Grades 5) How much time is scheduled for science in your district's 3–5 classrooms?	A. None B. 30 minutes or less weekly C. 20–30 minutes daily D. More than 30 minutes daily E. Is it integrated with other disciplines
(Grade 5) Choose the response to the prompt that best describes how often your school/district incorporates research that shows that the absence of science and social studies instruction is detrimental to literacy skills acquisition.	A. Every science PD session B. Occasionally C. We don't use it. D. We don't know about this.
(Grade 11) Choose the response to the prompt that best describes how often your school/district incorporates research that shows that the absence of science and social studies instruction is detrimental to literacy skills acquisition.	A. Every science PD session B. Occasionally C. We don't use it. D. We don't know about this.
(Grade 11) Check all that you use regularly. "We use the following materials to support science curriculum development."	Old Maine Learning Results (2007)
	New MLRs/Next Generation Science Standards (NGSS) (2019)
	Science Standards developed by MCCL (2015)
	A Framework for K–12 Science Education
	Commercially produced science kits
	Science textbooks
	Maine DOE MOOSE Modules
Internet resources/apps	
(Grade 11) How well do you believe your school's science program prepared your students for the Maine Science Assessment high school sessions?	A. Students were well prepared. B. Students were somewhat well prepared. C. Students were not well prepared.
(Grade 11) How many years of science courses are students at your school required to take?	A. 2 B. 3 C. 4 D. Other
(Grade 11) What percentage of students at your school graduate with two years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%

Principal/Assessment Coordinator Questionnaire Questions	
<b>PRINCIPALS/ASSESSMENT COORDINATORS:</b> <ul style="list-style-type: none"> <li>• For grade 5, please answer questions those questions designated as Grade 5 or Grades 5 &amp; 8.</li> <li>• For grade 8, please answer those questions designated as Grade 8 or Grades 5 &amp; 8.</li> <li>• For third year of high school, please answer only those questions designated as Grade 11.</li> </ul>	
Question	Possible
(Grade 11) What percentage of students at your school graduate with three years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
(Grade 11) What percentage of students at your school graduate with four years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
(Grade 11) What percentage of students at your school graduate with MORE THAN four years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%

## Appendix F—Teacher (Grades 5 & 8) Questionnaire Questions

### [Link to the Teacher Questionnaire](#)

*To begin the questionnaire, you will be asked to provide the name of your school district.*

Teacher (Grades 5 & 8) Questionnaire Questions	
TEACHERS: For grade 5, please <b>SKIP</b> question 4. For grade 8, <b>SKIP</b> questions 4, 10-11.	
Question	Possible Answers
Choose the best response. "I use research-based information on student preconceptions in science to understand what my students know."	<ul style="list-style-type: none"> <li>A. Every unit</li> <li>B. Occasionally</li> <li>C. I don't use it.</li> <li>D. I don't know about this research.</li> </ul>
Check all that you use regularly to support science curriculum development.	<ul style="list-style-type: none"> <li>MLRs/Next Generation Science Standards (NGSS) (2019)</li> <li>Science Standards developed by MCCL (2015)</li> <li>A Framework for K–12 Science Education (NRC 2012)</li> <li>Ready, Set, Science! (2008)</li> <li>Science materials/kits</li> <li>Internet resources/apps</li> <li>Maine MOOSE modules</li> </ul>
(Grade 5) What best describes your elementary school science program?	<ul style="list-style-type: none"> <li>A. A curriculum developed from research-based, inquiry-approach materials/kits</li> <li>B. A curriculum developed from research-based, inquiry-approach materials/kits in which strategies for reading, writing, and talking about science are integrated into instruction</li> <li>C. A curriculum developed by local teachers</li> <li>D. A textbook series or collection of textbooks</li> <li>E. We have no elementary science curriculum.</li> </ul>
(Grade 8) What best describes your middle school science program?	<ul style="list-style-type: none"> <li>A. A curriculum developed from research-based, inquiry-approach materials/kits</li> <li>B. A curriculum developed from research-based, inquiry-approach materials/kits in which strategies for reading, writing, and talking about science are integrated into instruction</li> <li>C. A curriculum developed by local teachers</li> <li>D. A textbook series or collection of textbooks</li> <li>E. Open Sci Ed units</li> </ul>
How familiar are you with Maine's Science & Engineering Learning Results, also known as "Next Generation Science Standards" (NGSS)?	<ul style="list-style-type: none"> <li>A. Very familiar</li> <li>B. Somewhat familiar</li> <li>C. Not familiar</li> </ul>

Teacher (Grades 5 & 8) Questionnaire Questions	
TEACHERS: For grade 5, please SKIP question 4. For grade 8, SKIP questions 4, 10-11.	
Question	Possible Answers
When planning lessons and units, how often do you try to blend scientific practices and scientific themes with content?	A. Daily B. Almost Always C. Occasionally D. Seldom E. Never
How confident are you in your science knowledge for teaching science in your classroom?	A. Very confident B. Somewhat confident C. Not at all
How often do you use science simulations or apps on tablets or laptops?	A. Regularly B. Occasionally C. Never
(Grade 5) How well do you believe your science program prepared your students for 5th grade science sessions on the Maine Science Assessment?	A. Students were well prepared. B. Students were somewhat well prepared. C. Students were not well prepared. D. Extremely well
Choose all that apply. "Science professional development I participate in..."	<input type="checkbox"/> Is required by the school.
	<input type="checkbox"/> Is not required by the school.
	<input type="checkbox"/> Is directly related to the content I teach students.
	<input type="checkbox"/> Is not directly related to the content I teach.
	<input type="checkbox"/> Includes instructional strategies for teaching science effectively.
	<input type="checkbox"/> I do not participate in science professional development.
(Grade 5) How many times do you go outside for lessons during the school day?	A. A few times a week B. A few times a month C. Once a month D. Never or almost never
(Grade 5) How much time is scheduled for science in your district's 3-5 classroom?	A. None B. 30 minutes or less weekly C. 20–30 minutes daily D. More than 30 minutes daily E. It is integrated with other disciplines.

## Appendix G—Science Department Chair Questionnaire Questions (High School)

### [Link to the Science Department Chair Questionnaire](#)

*To begin the questionnaire, you will be asked to provide the name of your school district.*

Science Department Chair Questionnaire Questions	
Question	Possible Answers
Choose the best response. "I use research-based information on student preconceptions in science to understand what my students know."	<ul style="list-style-type: none"> <li>A. Every unit</li> <li>B. Occasionally</li> <li>C. I don't use it.</li> <li>D. I don't know about this research</li> </ul>
Check all that you use regularly. "We use the following materials to support science curriculum development."	___ New MLRs/Next Generation Science Standards (NGSS) (2019)
	___ Maine Learning Results (2007)
	___ Science Standards developed by MCCL (2015)
	___ A Framework for K–12 Science Education
	___ Commercially produced science kits
	___ Science textbooks
	___ Maine DOE MOOSE Modules
___ Internet resources/apps	
What best describes your high school science program?	<ul style="list-style-type: none"> <li>A. A curriculum developed from research-based, inquiry-approach materials/kits</li> <li>B. A curriculum developed from research-based, inquiry-approach materials/kits in which strategies for reading, writing, and talking about science are integrated into instruction</li> <li>C. A curriculum developed by local teachers</li> <li>D. A textbook series or collection of textbooks</li> </ul>
How often do you utilize science and engineering practices in science class?	<ul style="list-style-type: none"> <li>A. A few times a week</li> <li>B. A few times a month</li> <li>C. Almost never</li> <li>D. What are science and engineering practices?</li> </ul>
How familiar are you with Maine's Science & Engineering Learning Results, also known as "Next Generation Science Standards" (NGSS)?	<ul style="list-style-type: none"> <li>A. Very familiar</li> <li>B. Somewhat familiar</li> <li>C. Not familiar</li> </ul>
When planning lessons and units, how often do you try to blend science practices and crosscutting concepts with content?	<ul style="list-style-type: none"> <li>A. Always</li> <li>B. Almost Always</li> <li>C. Occasionally</li> <li>D. Seldom</li> <li>E. Never</li> </ul>
How often do you use science simulations or apps on tablets or laptops?	<ul style="list-style-type: none"> <li>A. Regularly</li> <li>B. Occasionally</li> <li>C. Never</li> </ul>

Science Department Chair Questionnaire Questions	
Question	Possible Answers
How well do you believe your science program prepared your students for the Maine Science Assessment?	A. Students were well prepared. B. Students were somewhat well prepared. C. Students were not well prepared.
Choose all that apply. "Science professional development I participate in..."	A. Is required by the school. B. Is not required by the school. C. Is directly related to the content I teach students. D. Is not directly related to the content I teach. E. Includes instructional strategies for teaching science effectively. F. I do not participate in science professional development.
How many years of science courses are students at your school required to take?	A. 2 B. 3 C. 4 D. Other
What percentage of students at your school graduate with two years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
What percentage of students at your school graduate with three years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
What percentage of students at your school graduate with four years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
What percentage of students at your school graduate with MORE THAN four years of science courses?	A. 0–20% B. 21–40% C. 41–60% D. 61–80% E. 81–100%
Rate the following statement as it relates to instruction in your classroom. Providing opportunities for students to design experiments is	A. Not important B. Somewhat important C. Very important
Rate the following statement as it relates to instruction in your classroom. Covering fewer topics at a greater depth is	A. Not important B. Somewhat important C. Very important

<b>Science Department Chair Questionnaire Questions</b>	
<b>Question</b>	<b>Possible Answers</b>
Rate the following statement as it relates to instruction in your classroom. Helping students move through most chapters in their textbook is	A. Not important B. Somewhat important C. Very important
Rate the following statement as it relates to instruction in your classroom. Incorporating climate science into all courses is	A. Not important B. Somewhat important C. Very important
Rate the following statement as it relates to instruction in your classroom. Guiding students to evaluate whether resources are reliable or not is	A. Not important B. Somewhat important C. Very important
Rate the following statement as it relates to instruction in your classroom. Introducing students to potential science career pathways is	A. Not important B. Somewhat important C. Very important





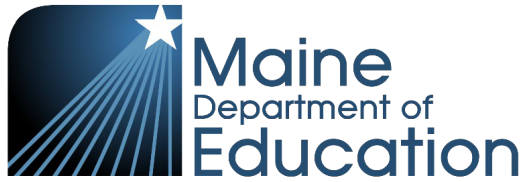
New Meridian

# Maine Science Assessment



## Assessment Administration Manuals (AAM)–Grade 5

(Document begins on next page.)



**Assessment  
Administration  
Manual**

**Spring 2022**

**SCIENCE**

**GRADE**

**5**

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**NOTE:** This manual may be downloaded from the link below and printed or photocopied as needed. [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience).

**Assessment administration questions should be directed to the principal/assessment coordinator at your school.**

## Assessment Security and Ethics

The quality and usefulness of the assessment data generated by the Maine Science Assessment depend, in large part, on the uniformity of the assessment administration and the security of assessment materials. Valuable information about student achievement of content standards measuring the effectiveness of [Maine's Learning Results](#) will be seriously compromised if assessment security is not strictly implemented and maintained. For this reason, all guidelines included in this manual must be followed.

### Assessment Administrator/Proctor Responsibilities

1. Assessment Administrators/Proctors must follow the instructions provided in this manual, including reading the scripts as they are written and following time allowances as they are stated.
2. Do not use the contents of the Maine Science Assessment booklets to prepare your students for the assessment. Doing so is a violation of assessment security and procedures.
3. Duplication of any portion of the Maine Science Assessment is strictly forbidden, including but not limited to audio recording, video recording, photographing, photocopying, and handwritten copying. No assessment or any record of student work or computer-generated responses may be retained, discarded, recycled, removed, or destroyed.
4. Assessment Administrators/Proctors must count the materials received from the assessment coordinator and return the same quantity to the assessment coordinator each day or secure the assessment materials as instructed by the assessment coordinator.
5. Assessment Administrators/Proctors must inform students of the rules and procedures they must follow.
6. Assessment Administrators/Proctors are responsible for providing a standardized assessment environment in which no coaching or prompting occurs.

The Maine Science Assessment is designed to provide information about student achievement. The accuracy and value of this information are directly influenced by how students handle assessment materials and respond to assessment questions. Assessment Administrators/Proctors are responsible for ensuring that students are properly instructed in the use of assessment materials and are given the opportunity to do their best.

### Additional Assessment Administrator/Proctor Responsibilities to Students

1. Ensure that students have been informed about the importance of the Maine Science Assessment before the assessment begins. Communicate to students that their assessment results will be included in their permanent school records, a copy of the assessment results will be provided to their parent(s) or guardian(s), and assessment results will be used by teachers to help improve academic performance.
2. Monitor to make sure students do not participate in any form of cheating, e.g.,
  - only provide answers that are strictly their own,
  - do not consult notes, textbooks, or other instructional materials,
  - do not use calculators, cell phones, or other electronic devices,
  - do not share assessment questions with other students, and
  - do not consult other students, staff, or anyone else accessible to them during assessment administration.

3. Make certain that each student receives a set of assessment materials (Student Assessment Cards or Booklets) for the appropriate grade, uses only that assigned set of assessment materials, and handles and completes the materials properly.
4. Inform students that they will have a specific amount of time to complete each session; and that they will be required to make up any assessment session(s) missed due to absence from school. Encourage students to avoid absences during the assessment period.
5. Advise students that responses identified in the scoring process indicating that the student's physical/emotional health or personal safety may be in jeopardy may be referred to appropriate local school district personnel. All referrals are confidential, and any decisions connected with these referrals are under the jurisdiction of the local school administrative unit (SAU).

Assessment Administrators should contact Nancy Godfrey, Assessment Coordinator, at the Maine Department of Education at [REDACTED], or [REDACTED] if questions arise, or if any situation occurs that could cause any part of the science assessment administration to be compromised.

### **Penalties**

Failure to comply with the administration and security requirements described in this document may result in one or more of the following penalties:

- delay in reporting of student, school, or SAU results;
- invalidation of student, school, or SAU results; and/or
- investigation by the Department of Education for possible certification action.

## Checklist for Online Assessment Administration

### Prior to the Assessment

- \_\_\_ Read this *Assessment Administration Manual*.
- \_\_\_ Meet with the assessment coordinator to plan the assessment schedule, review procedures, and receive the list of students to whom you will be administering the assessment, including information about any approved supports and/or accommodations (See pages 33–35).
- \_\_\_ Obtain sufficient writing implements (pens or sharpened pencils) and scratch paper for student use.
- \_\_\_ Explain the Assessment Security and Ethics considerations in this manual to the students.
- \_\_\_ Be sure that all students have a comfortable and adequate workspace, including those whose accommodations require special seating.
- \_\_\_ Cover or remove any instructional science materials from your classroom.

### Immediately Before the Assessment

- \_\_\_ Obtain secure Student Assessment Cards (formerly Test Tickets) for each session from the assessment coordinator.
- \_\_\_ Check your Cards against your student roster. You should have one card per session for each student. Return any mismatched Cards to the assessment coordinator.
- \_\_\_ Make sure each device is powered on, logged into the ADAM secure lockdown browser, and open to the ADAM “Welcome” screen.
- \_\_\_ Post an “ASSESSING—PLEASE DO NOT DISTURB” sign on the classroom door.
- \_\_\_ Ensure that digital and electronic devices, including cell phones and calculators, are unavailable to students.

### During Each Assessment Session

- \_\_\_ Distribute Student Assessment Cards to assigned students.
- \_\_\_ Follow directions, assessment administrator/proctor scripts, and time allowances in this manual for administering student assessment sessions and the questionnaire, including any makeup sessions you are assigned to administer.
- \_\_\_ Give students as much time as needed—within guidelines—to complete the sessions.
- \_\_\_ Collect all assessment materials (Student Assessment Cards and scratch paper) from each student at the end of each assessment period and return the materials to the assessment coordinator or secure the assessment materials as instructed by your assessment coordinator.
- \_\_\_ Notify the assessment coordinator of all students needing makeup sessions at the end of each assessment day.

**After completing the administration, refer to the Checklist for Concluding the Maine Science Assessment Administration on page 32**

## Checklist for Paper Assessment Administration

### Prior to the Assessment

- Read this *Assessment Administration Manual*.
- Meet with the assessment coordinator to plan the assessment schedule, review procedures, and receive the list of students to whom you will be administering the assessment, including information about any approved supports and/or accommodations (See pages 33–35).
- Obtain sufficient sharpened Number 2 pencils and scratch paper for student use.
- Explain the Assessment Security and Ethics considerations in this manual to the students.
- Be sure that all students have a comfortable and adequate workspace, including those whose accommodations require special seating.
- Cover or remove any instructional science materials from your classroom.

### Immediately Before the Assessment

- Obtain secure Student Assessment Booklets from the assessment coordinator.
- Check the label on the back of each Booklet against the roster of paper testers. Return any mismatched materials to the assessment coordinator.
- Post an “ASSESSING—PLEASE DO NOT DISTURB” sign on the classroom door.
- Ensure that digital and electronic devices, including cell phones and calculators, are unavailable to students.

### During Each Assessment Session

- Distribute Student Assessment Booklets to assigned students.
- Follow directions, assessment administrator/proctor scripts, and time allowances in this manual for administering student assessment sessions and the questionnaire, including any makeup sessions you are assigned to administer.
- Monitor students’ handling of assessment materials to keep the booklets in good condition.
- Give students as much time as needed—within guidelines—to complete the sessions.
- Collect all assessment materials (Booklets and scratch paper) from each student at the end of each assessment period and return the materials to the assessment coordinator or secure the assessment materials as instructed by your assessment coordinator.
- Notify the assessment coordinator of all students needing makeup sessions at the end of each assessment day.

**After completing the administration, refer to the Checklist for Concluding the Maine Science Assessment Administration on page 32.**



## Preparation for the Assessment

It is expected that all students will take part in the Maine Science Assessment either through standard online administration, online administration with accommodation(s), paper administration with accommodation(s), or alternate assessment.

Familiarize yourself with all administration procedures prior to the assessment window. Attend the training scheduled by your school principal/assessment coordinator to discuss the assessment schedule (including plans for delivery of approved accommodations and makeup sessions), review assessment procedures, and receive information on how assessment materials will be distributed and tracked in your school between and during assessment sessions.

### Assessment Schedule

Total assessment time is approximately three hours, made up of three separate assessment sessions. An additional amount of time is needed for distribution/identification time and a student questionnaire.

Except for makeup sessions or sessions for students requiring certain accommodations, the assessment sessions should be administered concurrently to all students in a grade and follow the order listed below. The assessment coordinator in your school will arrange an assessment schedule. It is recommended that a 10-minute break be provided to students between assessment sessions.

### Assessment Session Order and Time Allowances

Session	Total Time
Material Distribution and Instructions	10–15 minutes
Session 1	60 minutes
Session 2	60 minutes
Session 3	60 minutes
Student Questionnaire	15–20 minutes
<b>TOTAL</b> (not including distribution/instructions)	<b>200 minutes</b>

### Student Assessment Materials

In addition to this manual, you will receive a set of student assessment materials for the group of students you will be assessing. These materials include Student Assessment Cards for online testers and Student Assessment Booklets for paper testers.

➡ **NOTE:** During each assessment session, students should always be working with their own original assessment materials, which are those distributed to them at the beginning of the assessment.

The paper-based Booklets have been designed for machine scoring and should be handled carefully. The booklets should be free of extraneous marks and loose eraser bits, and they should never be folded, clipped, stapled, banded, taped, or torn.

## Preparing Students for the Assessment

The Maine Science Assessment consists of a variety of items, including multiple-choice, multiple select, multiple part, technology enhanced, and constructed response questions, so it is appropriate to familiarize students with these types of questions. An online tutorial to help familiarize students with the ADAM assessment platform and tools, and an online practice assessment for science content samples can be found on the Maine Department of Education website at: [https://www.maine.gov/doe/Testing\\_Accountability/MECAS/Generalscience](https://www.maine.gov/doe/Testing_Accountability/MECAS/Generalscience).

➡ NOTE: Using current assessment materials to familiarize students with assessment-taking strategies is a violation of assessment security and assessment procedures.

Students should be made aware of the need to plan concise, complete answers to constructed response questions to fit in the allowed space. For paper assessments, only responses written on the lines provided in the Student Assessment Booklets will be scored. For online assessments, responses must fit within the space provided.

Notify students of the assessment in advance and request that they bring writing implements to every online assessment session (two sharpened Number 2 pencils for paper assessment sessions), along with clean scratch paper and a book to read in case they finish a session of the assessment early.

Students should also be informed that calculators, cell phones, smart watches, watch alarms, handheld computers, and other digital and electronic devices are **not** permitted during the Maine Science Assessment.

## Assessing Students Who Require Accommodations

It is important that those assessment administrators/proctors who administer the assessment with accommodations:

- know which students have been approved by a team to participate in the Maine Science Assessment using allowable accommodations,
- have a copy of the allowable supports and/or accommodations that clarify what is permissible for each student (See the Supports & Accommodations Table on pages 33–35),
- explain to students which accommodation(s) they may use, and
- have been trained to administer the assessment according to the administration procedures in this manual.

## Final Administration Preparation

Just before the assessment, please:

- arrange the assessment materials (Student Assessment Cards or Booklets) for each session so that you will be able to distribute them to students rapidly,
- cover or remove any instructional science materials from your classroom,
- post an “ASSESSING—PLEASE DO NOT DISTURB” sign on the classroom door, and
- verify that you have the proper Student Assessment Cards and/or Student Assessment Booklets for each student on your assessment roster.

## Scripts

Assessment administration sessions in this document provide the actual scripts (**words printed in boldface, excluding the session information**) to be read aloud as printed to students during assessment administration. General directions for assessment administration (not to be read aloud) are printed in regular text and in brackets within the scripts. It is important that directions be read as scripted to ensure uniformity of assessment administration.

## Assessment Administration Interruptions

Circumstances over which you have no control (fire drills or power failures, for example) may interrupt the assessment. If such an interruption does occur during any assessment session, please focus on student safety first. If time and circumstances allow, follow the instructions below for the population of students in your room:

- For students taking an online assessment, do the following:
  - Pause the assessment for the students in your proctor group.
    - If you do not have a device with the proctor screen available, or the situation is not safe for you to take the time to do so, please contact your School (or District) Assessment Coordinator to request your proctor group be paused.
  - Instruct students to stack their Student Assessment Card on top of their scratch paper, turn the stack upside down, and place their pen/pencil on top of the stack so that they do not lose any papers before the session resumes.
- For students taking a paper assessment, do the following:
  - Instruct students to insert their scratch paper into their Student Assessment Booklets at their current location, close their booklet, and turn it upside down so their preprinted label is facing up when the session resumes.

When normal conditions are restored, resume the assessment. Interruptions should not reduce the total amount of time students are given to complete the interrupted session.

**For Online Administration Instructions, proceed to the next page.**

**For Paper Administration Instructions, turn to page 20.**



# Online Administration: Science Session 1

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## Including Materials Distribution & Identification Time

## Online Administration: Science Session 1

### Materials Distribution/Identification Time

**Time Allowed: 10–15 minutes**

Materials needed: Student Assessment Cards, clean scratch paper, and writing implements. Students that have the Text-to-Speech tool enabled should also have headphones/earbuds unless testing individually in a separate setting.

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Distribute writing implements and scratch paper to students who need them. Next, give the correct Student Assessment Card to each student. Each student must receive his or her own Student Assessment Card.

2. Say to the students:

The Maine Educational Assessment for Science is designed to find out what you know about science. The results will also help us understand how well our school is teaching you. All fifth-grade students in the state of Maine are taking this assessment.

Look at the Student Assessment Card in front of you. Check to be sure it shows your first name, last name, and SSID. Raise your hand if you have the wrong card. [Pause]

Your card should say Session 1 on the bottom, right corner. Raise your hand if you have a different Session number on your card. [Pause]

3. Say to the students:

Now enter the Test Code into the field on the Welcome screen and then click “Next.” Be sure to enter it exactly as it shows on your card. [Pause to help any students having difficulty] Now enter your SSID into the correct field on the login screen and then click “Next.” Be sure to enter each one exactly as it shows on your card and then click “Next.” [Pause to help any students having difficulty] Now, review the Confirm screen, it should say Test: Grade 5 Science Session 1 and your full name. If this is correct, click “Next” and wait for me before going on.

You should now see a screen that says, “Maine Department of Education.” Follow along as I read the General Directions out loud. You are about to take a science assessment. You should do your best work and try to answer ALL questions.

There are different types of questions throughout the assessment. Multiple-choice questions do not include any additional instructions after the question. You should mark only one answer for a multiple-choice question. Other types of questions include instructions that describe how to answer those questions.

Some questions are constructed response. These questions require you to write your own answer in the space provided. You can earn points for partly correct answers to these questions, so you should try to answer them as best as you can. To receive full credit, refer to the questions carefully to help guide you in writing complete answers.

Many of the questions are grouped in sets that include a common background. Sometimes the background information is repeated with the next question if there are additional questions that are part of that set. You do not need to reread the background information each time, but it is there for you if you need it.

## Online Administration: Science Session 1

### Session 1

**Time Allowed: 60 minutes**

4. Say to the students:

You are now going to take the first of three science sessions. As you begin answering questions, remember to click the circle for the answer(s) you choose for multiple-choice and multiple select questions. If you make a mistake, you can click on the choice again to remove your selection. If you want to come back to a question, check the Flag option at the top of the screen. If you need scratch paper, raise your hand and I will bring you some. Remember, only the questions you answer online will be scored.

You will answer questions for this session beginning on the next screen. If you get stuck on a word in the assessment, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] You will not be able to work past the end of Session 1.

You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.

When you reach the end of Session 1, there will be a review screen to help you remember if you have answered all the questions before you finish. You can check the “Flagged” and “Unattempted” boxes at the top of the screen to help you find questions to review. You will not be able to go back into the questions once you click “finish.” When you are sure you are ready, click on “Finish,” and then “Yes.” You may then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]

Click the “Start” button at the bottom of the screen. Read the background information on the left side of the screen and begin answering the questions on the right side. You may begin now.

From time to time during the session, circulate and check that students are working in the correct space. When students reach the final screen, you may quietly remind them to check the “Flagged” and “Unattempted” boxes to know what items to go back and review.

5. After 45 minutes, say to the students:

You have 15 minutes left to complete this session. Remember to review your answers to make sure you have answered all the questions before you click “Finish.” Don’t forget the “Flagged” and “Unattempted” boxes at the top of the screen, checking those will help you find questions to review. You will not be able to go back into the questions once you submit your work. When you are sure you are finished, submit Session 1 by clicking “Finish” and then “Yes.” You may then sit quietly or read a book.

6. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

This completes Session 1. Please use the “Next” button to get to the end of the session, click “Finish” and then “Yes” to log out of the Science Assessment.

## Online Administration: Science Session 1

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7. If you plan to continue the assessment after a short break:

- Collect all used scratch paper from students and set it aside for shredding.
- Follow the instructions for the next session, starting with the distribution of the Session 2 Student Assessment Cards.

If you do not plan to continue the assessment at this time:

- Collect and label the used and unused Student Assessment Cards for return to the assessment coordinator.
- Collect all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.



## Online Administration: Science Session 2

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## Online Administration: Science Session 2

### Session 2

**Time Allowed: 60 minutes**

Materials needed: Student Assessment Cards, clean scratch paper, and writing implements. Students that have the Text-to-Speech tool enabled should also have headphones/earbuds unless testing individually in a separate setting.

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the Student Assessment Cards. Each student must receive his or her own Student Assessment Card.

Say to the students:

**Before you begin, please check to see that you have your Session 2 Student Assessment Card.**

2. Distribute clean scratch paper and writing implements to students who need them.

Say to the students:

**You are now going to take the second of three science sessions. Please enter the Test Code into the field on the Welcome screen and then click “Next.” Remember to enter it exactly as it shows on your card. Now enter your SSID into the correct field on the login screen and then click “Next.” [Pause to help any students having difficulty]**

**Now, review the Confirm screen, it should say Test: Grade 5 Science Session 2 and your full name. If this is correct, click “Next” and wait for me before going on. Remember, if you get stuck on a word in the assessment, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] You will not be able to work past the end of Session 2.**

**You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.**

**When you reach the end of Session 2, there will be a review screen to help you remember if you have answered all the questions before you finish. You can check the “Flagged” and “Unattempted” boxes at the top of the screen to help you find questions to review. You will not be able to go back into the questions once you click “finish.” When you are sure you are ready, click on “Finish,” and then “Yes.” You may then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]**

**Click the “Start” button at the bottom of the screen. Read the background information on the left side of the screen and begin answering the questions on the right side. You may begin now.**

From time to time during the session, circulate and check that students are working in the correct space. When students reach the final screen, you may quietly remind them to check the “Flagged” and “Unattempted” boxes to know what items to go back and review.

## Online Administration: Science Session 2

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3. After 45 minutes, say to the students:

You have 15 minutes left to complete this session. Remember to review your answers to make sure you have answered all the questions before you click “Finish.” Don’t forget the “Flagged” and “Unattempted” boxes at the top of the screen, checking those will help you find questions to review. You will not be able to go back into the questions once you submit your work. When you are sure you are finished, submit Session 2 by clicking “Finish” and then “Yes.” You may then sit quietly or read a book.

4. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

This completes Session 2. Please use the “Next” button to get to the end of the session, click “Finish” and then “Yes” to log out of the Science Assessment.

5. If you plan to continue the assessment after a short break:

- Collect all used scratch paper from students and set it aside for shredding.
- Follow the instructions for the next session, starting with the distribution of the Session 3 Student Assessment Cards.

If you do not plan to continue the assessment at this time:

- Collect and label the used and unused Student Assessment Cards for return to the assessment coordinator.
- Collect all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.



## Online Administration: Science Session 3

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## Online Administration: Science Session 3

### Session 3

**Time Allowed: 60 minutes**

Materials needed: Student Assessment Cards, clean scratch paper, and writing implements. Students that have the Text-to-Speech tool enabled should also have headphones/earbuds unless testing individually in a separate setting.

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the Student Assessment Cards. Each student must receive his or her own Student Assessment Card.

Say to the students:

**Before you begin, please check to see that you have your Session 3 Student Assessment Card.**

2. Distribute clean scratch paper and writing implements to students who need them.

Say to the students:

**You are now going to take the third of three science sessions. Please enter the Test Code into the field on the Welcome screen and then click “Next.” Remember to enter it exactly as it shows on your card. Now enter your SSID into the correct field on the login screen and then click “Next.” [Pause to help any students having difficulty]**

**Now, review the Confirm screen, it should say Test: Grade 5 Science Session 3 and your full name. If this is correct, click “Next” and wait for me before going on. Remember, if you get stuck on a word in the assessment, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] You will not be able to work past the end of Session 3.**

**You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.**

**When you reach the end of Session 3, there will be a review screen to help you remember if you have answered all the questions before you finish. You can check the “Flagged” and “Unattempted” boxes at the top of the screen to help you find questions to review. You will not be able to go back into the questions once you click “finish.” When you are sure you are ready, click on “Finish,” and then “Yes.” You may then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]**

**Click the “Start” button at the bottom of the screen. Read the background information on the left side of the screen and begin answering the questions on the right side. You may begin now.**

From time to time during the session, circulate and check that students are working in the correct space. When students reach the final screen, you may quietly remind them to check the “Flagged” and “Unattempted” boxes to know what items to go back and review.

## Online Administration: Science Session 3

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3. After 45 minutes, say to the students:

You have 15 minutes left to complete this session. Remember to review your answers to make sure you have answered all the questions before you click “Finish.” Don’t forget the “Flagged” and “Unattempted” boxes at the top of the screen, checking those will help you find questions to review. You will not be able to go back into the questions once you submit your work. When you are sure you are finished, submit Session 3 by clicking “Finish” and then “Yes.” You may then sit quietly or read a book.

4. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

This completes Session 3. Please use the “Next” button to get to the end of the session, click “Finish” and then “Yes” to log out of the Science Assessment.

5. If you plan to continue with the Student Questionnaire Session 4 after a short break:

- Collect all used scratch paper from students and set it aside for shredding.
- Follow the instructions for Session 4, starting with the distribution of the Session 4 Student Assessment Cards.

If you do not plan to continue with the Student Questionnaire Session 4 at this time:

- Collect and label the used and unused Student Assessment Cards for return to the assessment coordinator.
- Collect all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.



# Online Administration: Science Session 4

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## Student Questionnaire

## Online Administration: Science Session 4

### Student Questionnaire

**Time Allowed: Approximately 15–20 minutes**

Materials needed: Student Assessment Cards. Students that have the Text-to-Speech tool enabled should also have headphones/earbuds unless testing individually in a separate setting.

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the Student Assessment Cards. Each student must receive his or her own Student Assessment Card.

Say to the students:

Before you begin, please check to see that you have your Session 4 Student Assessment Card.

2. Say to the students:

You are now going to take the student questionnaire. These questions will ask you about different things related to school. There are no right or wrong answers, so mark the answers that are true for you. If you want help with reading or understanding a question, raise your hand.

Please enter the Test Code into the field on the Welcome screen and then click “Next.” Remember to enter it exactly as it shows on your card. Now enter your SSID into the correct field on the login screen and then click “Next.” [Pause to help any students having difficulty]

Now, review the Confirm screen, it should say Test: Grade 5 Science Session 4 and your name. You will have about 15–20 minutes to answer the questions for this session. If you are not finished at that time, you may have more time to complete the questions.

When you reach the end of Session 4, there will be a review screen to help you remember if you have answered all of the questions before you finish. When you are sure you are ready, click on “Finish,” and then “Yes.” You may then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions right now? [Answer any procedural questions students have.]

Click the “Start” button at the bottom of the screen. Read the information at the top of the screen and begin answering the questions now.

Circulate and check that students are working in the correct place.

3. After 15 minutes, say to the students:

Please raise your hand if you have not finished answering the questions. [If students raise their hands, allow them a reasonable amount of time to complete the session.]

4. When all students have finished, say to the students:

This completes Session 4. Please click “Finish” and then “Yes” to log out of the Science Assessment.

Collect the Student Assessment Cards. Keep all materials secure and follow the Checklist for Concluding the Maine Science Assessment Administration on page 32.



# **Paper Administration: Science Session 1**

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## **Including Materials Distribution & Identification Time**





## Paper Administration: Science Session 1

### Materials Distribution/Identification Time

**Time Allowed: 10–15 minutes**

Materials needed: Student Assessment Booklets, clean scratch paper, and sharpened Number 2 pencils only

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Distribute sharpened Number 2 pencils and scratch paper to students who need them. Next, give the correct booklet to each student.

2. Say to the students:

The Maine Educational Assessment for Science is designed to find out what you know about science. The results will also help us understand how well our school is teaching you. All fifth-grade students in the state of Maine are taking this assessment.

Place the Student Assessment Booklet in front of you so that you are looking at the back cover. Check that the Booklet in front of you has a sticker with your name and SSID on it. Raise your hand if you have the wrong book. [Pause]

3. Say to the students:

Now turn the Booklet over so that you are looking at the front cover. On the line provided, print your first and last name. [Pause until students are finished.]

4. Say to the students:

Now open your Booklet to the inside of the front cover and follow along with me as I read the General Directions.

You are about to take a science assessment along with a questionnaire that asks about your schoolwork. The science assessment has three sessions, and the questions are located in this Booklet. You will answer the questions in this booklet. You should do your best work and try to answer ALL questions.

There are different types of questions throughout the assessment. Multiple-choice questions do not include any additional instructions after the question. You should mark only one answer for a multiple-choice question. Other types of questions include instructions that describe how to answer those questions.

Some questions are constructed response. These questions require you to write your own answer on the lines provided. You can earn points for partly correct answers to these questions, so you should try to answer them as best as you can. To receive full credit, read the questions carefully to help guide you in writing complete answers.

Many of the questions are grouped in sets that include a common background. At the beginning of each set, there are instructions that let you know which questions belong to that set. Sometimes the background information is repeated on the next page if there are additional questions that are part of that set. You do not need to reread the background each time, but it is there for you if you need it.

## Paper Administration: Science Session 1

### Session 1

**Time Allowed: 60 minutes**

5. Say to the students:

You are now going to take the first of three science sessions. As you begin answering questions, remember to fill in the circles for multiple-choice and multiple select questions by making a dark mark that completely fills the circle. For other items, you will need to plan your answers to fit in the space provided. Answers outside of this space may not be scored. If you make a mistake on any answer, erase it cleanly and carefully. If you need scratch paper, raise your hand and I will bring you some. Remember, only the answers in your Student Assessment Booklet will be scored.

You will answer questions for this session beginning on the next page. If you get stuck on a word in the Booklet, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] Do not work past the stop sign on page 11.

You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.

When you have finished this part of the assessment, you may go back and check your work in this session only, or you may insert any scratch paper into your Booklet, close your Booklet, and then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]

Turn to the next page in your Booklet, read the background information on the left side of the page and begin answering the questions that follow. You may begin now.

6. From time to time during the session, circulate and check that students are working in the correct space.
7. After 45 minutes, say to the students:

You have 15 minutes left to complete this session. Remember that when you have completed the questions up to the stop sign on page 11 of your Booklet, you may go back and check your work in this session. Once you are finished, insert any scratch paper you used into your Booklet and close it. You may then sit quietly or read a book.

8. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

This completes Session 1. If you have not already done so, please insert your scratch paper into your Booklet and close it.

## Paper Administration: Science Session 1

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9. If you plan to continue the assessment after a short break:

- Pick up all used scratch paper from students and stack for return to your assessment coordinator.
- Follow the instructions for Session 2, beginning with Step 2.

If you do not plan to continue the assessment at this time:

- Collect the Student Assessment Booklets for return to the assessment coordinator.
- Separate out all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.
- Count and return all Assessment Booklets, including reader and transcriber copies, to the assessment coordinator or secure the assessment as instructed by your assessment coordinator.



## Paper Administration: Science Session 2

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## Paper Administration: Science Session 2

### Session 2

**Time Allowed: 60 minutes**

Materials needed: Student Assessment Booklets, clean scratch paper, and sharpened Number 2 pencils only.

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the Student Assessment Booklets. Each student must receive his or her own Booklet.

Say to the students:

**Before you begin, please check to see that your name is written on the front cover of your Student Assessment Booklet.**

2. Distribute clean scratch paper and sharpened Number 2 pencils to students who need them.

Say to the students:

**You are now going to take the second of three science sessions. Please open your Booklet to page 13, where you should see a large stop sign and the words Session 2. You will answer the questions for this session beginning on the next page. Remember, if you get stuck on a word in the Booklet, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] Do not work past the stop sign on page 27 of your Booklet.**

**You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.**

**When you have finished this part of the assessment, you may go back and check your work in this session only, or you may insert any scratch paper into your Booklet, close your Booklet, and then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]**

**Turn to Science Session 2 on page 14 in your Booklet. Read the information at the top of the page and begin answering the questions. You may begin now.**

From time to time during the session, circulate and check that students are working in the correct space.

3. After 45 minutes, say to the students:

**You have 15 minutes left to complete this session. Remember that when you have completed the questions up to the stop sign on page 27 of your Booklet, you may go back and check your work in this session. Once you are finished, insert any scratch paper you used into your Booklet and close it. You may then sit quietly or read a book.**

## Paper Administration: Science Session 2

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4. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

**This completes Session 2. If you have not already done so, please insert your scratch paper into your Booklet and close it.**

5. If you plan to continue the assessment after a short break:

- Pick up all used scratch paper from students and stack for return to your assessment coordinator.
- Follow the instructions for Session 3, beginning with Step 2.

If you do not plan to continue the assessment at this time:

- Collect the Student Assessment Booklets for return to the assessment coordinator.
- Separate out all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.
- Count and return all Assessment Booklets, including reader and transcriber copies, to the assessment coordinator or secure the assessment as instructed by your assessment coordinator.



## Paper Administration: Science Session 3

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## Paper Administration: Science Session 3

### Session 3

**Time Allowed: 60 minutes**

Materials needed: Student Assessment Booklets, clean scratch paper, and sharpened Number 2 pencils only

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the booklets. Each student must receive his or her own booklet.

Say to the students:

Before you begin, please check to see that your name is written on the front cover of your Student Assessment Booklet.

2. Distribute clean scratch paper and sharpened Number 2 pencils to students who need them.

Say to the students:

You are now going to take the last of three science sessions. Please open your Booklet to page 29, where you should see a large stop sign and the words **Session 3**. You will answer the questions for this session beginning on the next page. Remember, if you get stuck on a word in the Booklet, I can read the word to you. If you want help reading a word, raise your hand. [During the assessment session, pronounce a word to students who ask for assistance. Do not define the word or help the students in any other way.] Do not work past the stop sign on page 43 of your Booklet.

You will have 60 minutes to answer the questions in this session. I will remind you when you have 15 minutes left.

When you have finished this part of the assessment, you may go back and check your work in this session only, or you may insert any scratch paper into your Booklet, close your Booklet, and then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions? [Answer any procedural questions students have.]

Turn to **Science Session 3** on page 31 in your Booklet. Read the information at the top of the page and begin answering the questions. You may begin now.

From time to time during the session, circulate and check that students are working in the correct space.

3. After 45 minutes, say to the students:

You have 15 minutes left to complete this session. Remember that when you have completed the questions up to the stop sign on page 43 of your Booklet, you may go back and check your work in this session. Once you are finished, insert any scratch paper you used into your Booklet and close it. You may then sit quietly or read a book.



## Paper Administration: Science Session 3

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4. If all students in the assessment room have completed their session and it is before the allotted 60-minutes, or at the end of the 60 minutes, say to the students:

**This completes Session 3. If you have not already done so, please insert your scratch paper into your Booklet and close it.**

5. If you plan to continue with the Student Questionnaire Session 4 after a short break:

- Pick up all used scratch paper from students and stack for return to your assessment coordinator.
- Follow the instructions for Session 4, beginning with Step 2.

If you do not plan to continue with the Student Questionnaire Session 4 at this time, collect the Student Assessment Booklets with any scratch paper inserted:

- Collect the Booklets for return to the assessment coordinator.
- Separate out all used scratch paper for shredding, making sure that no scratch paper leaves the room with students or remains loose in the classroom.
- Count and return all Assessment Booklets, including reader and transcriber copies, to the assessment coordinator or secure the assessment as instructed by your assessment coordinator.



**Paper Administration: Science Session 4**  
.....  
**Student Questionnaire**



## Paper Administration: Science Session 4

### Student Questionnaire

**Time Allowed: Approximately 15–20 minutes**

Materials needed: Student Assessment Booklets and sharpened Number 2 pencils only

NOTE: Students may keep a book under their desks to read in case they finish early.

1. Pass out the Student Assessment Booklets. Each student must receive his or her own Booklet.

Say to the students:

Before you begin, check to see that your name is written on the front cover of your Student Assessment Booklet.

2. Distribute sharpened Number 2 pencils to students who need them.

Say to the students:

You are now going to take the student questionnaire. These questions will ask you about different things related to school. There are no right or wrong answers, so mark the answers that are true for you. If you want help with reading or understanding a question, raise your hand.

Please open your Booklet to page 45 where you will see a stop sign and the words Session 4. You will have about 15–20 minutes to answer the questions for this session. If you are not finished at that time, you may have more time to complete the questions.

When you have finished answering the questions in this session, close your booklet, and then sit quietly or read a book. You may not work on any other session of the assessment. Do you have any questions right now? [Answer any questions students have.]

Turn to Student Questionnaire Session 4 on page 46 in your Booklet. Read the information at the top of the page and begin answering the questions now.

Circulate and check that students are working in the correct place.

3. After 15 minutes, say to the students:

Please raise your hand if you have not finished answering the questions. [If students raise their hands, allow them a reasonable amount of time to complete the session.]

4. When all students have finished, say to the students:

This completes Session 4. Please close your Booklet.

Collect the Booklets. Keep all materials secure and follow the Checklist for Concluding the Maine Science Assessment Administration on page 32.



## **Checklist for Concluding the Maine Science Assessment Administration**

### **Concluding Online Assessment Administrations**

- Return all Student Assessment Cards to the assessment coordinator and notify him or her of any students who require makeup session(s) and the assessment sessions they have missed.
- Ensure all used scratch paper is shredded or placed in a secure location for shredding.

### **Concluding Paper Assessment Administrations**

- Count the sets of Student Assessment Booklets to make sure you have all the booklets you were given by the assessment coordinator.
- Separate Booklets and any remaining scratch paper. Ensure that each student's name is written legibly on the Booklets' front cover as you do so.
- Check the condition of the Booklets. Notify your assessment coordinator if any booklets are torn or damaged.
- Make sure scribed or transcribed responses are recorded in the booklet with the student's PreID label on the back cover.
- Return all Booklets to the assessment coordinator.
- Provide the assessment coordinator with a list of any students who require makeup session(s) and the assessment session(s) they have missed.
- Ensure all used scratch paper is shredded or placed in a secure location for shredding.






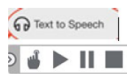
**Thank you for your assistance in the administration of the Maine Science Assessment.**

## Maine Science Assessment Accessibility Guide

### Universal Tools – Designated Supports/Features – Accommodations

#### I. Universal Tools for all Students

##### Embedded Universal Tools

Tool	Tool Icon	Description
<b>Provisions within online assessment platform to all students automatically</b>		
<b>Review</b>		Review page shows flagged items for review and items not attempted.
<b>Accessibility</b>		Accessibility options of Color Scheme / Font Size / Zoom enlargement.
<b>Flag or Bookmark</b>		Ability to flag or bookmark an item to return to for review.
<b>Line Reader</b>		The line reader tool helps focus on reading one line of text at a time.
<b>Response Masking</b>		Ability to hide/cover an answer choice – not available on all item types such as technology enhanced.
<b>Provision within online platform that must be assigned to individual student by DAC/ITC/SAC</b>		
<b>Text-to-Speech (TTS)</b>		Text is read aloud to the student via (embedded) TTS technology. TTS should be consistent with the student's normal routine during classroom instruction. Headphones/earbuds are necessary unless tested individually in a separate setting.

##### Non-Embedded Universal Tools Provisions outside of the online assessment platform

Tool	Description
<b>Scrap/Scratch Paper</b>	The student uses scratch paper, an individual erasable whiteboard or an assistive technology device to make notes or record responses. All scratch paper must be collected and securely destroyed at the end of each test to maintain test security.

## II. Designated Supports/Features for Some Students

Supports and features outlined below may provide increased accessibility within the assessment. Utilization and implementation of supports and features is determined on an individual basis by an educational team such as part of a multi-tiered system of supports (MTSS), Response to Intervention (RTI), Individual Language Acquisition Plan (ILAP), and/or Student Assistance Team. Supports must be consistent with the student's normal routine during classroom instruction. Provision of supports does not alter the construct of any test item.

### Non-Embedded Designated Supports Provisions outside of the online assessment platform

Tool	Description
<b>Breaks</b>	Multiple or frequent breaks may be required by students whose attention span, distractibility, physical and/or medical condition require shorter working periods.
<b>Extended Time</b>	Extended time is time beyond recommended/average of 60 minutes per session(s) 1, 2, and 3.
<b>Preferential Seating</b>	Students may have predetermined seating locations to reduce distractions for themselves or others, or to increase physical access to special equipment.
<b>Individual/Separate Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Small Group Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Movement</b>	This opportunity may be used in a setting other than the classroom for a student who cannot focus when seated for sustained periods of time.
<b>Alternate Aids/Supports</b>	The test may be presented through their regular communication system to a student who uses alternative or assistive technology on a daily basis. The test may be presented using visual aids such as visual magnification devices, reduction of visual print by blocking or other techniques, acetate shields; or auditory devices such as special acoustics, amplification, noise buffers, whisper phones, or calming music.
<b>Distraction Reduction</b>	Noise buffers, place markers, carrels, etc. may be used to minimize distractions for the student. This support does NOT include assistive devices such as templates, graphic organizers, or other devices intended specifically to help students organize thinking or develop a strategy for a specific question.
<b>Directions Clarification</b>	After directions have been read, the test administrator may ask the student to explain what he/she has been asked to do. If directions have been misunderstood by the student, the <u>directions</u> may be paraphrased or demonstrated. Test items MUST NOT be paraphrased or explained.
<b>Bilingual Word Glossary for ELLs</b>	A bilingual/dual language word-to-word glossary is provided to students who are English Learners as a language support as per ILAP.

### III. Accommodations Requiring IEP/504 Documentation

Accommodations are changes in procedures or materials that do not alter what the test measures and are used to increase equitable access during the assessment for students with documentation of the need on an Individualized Education Program/Plan (IEP) or 504 Plan.

#### Non-Embedded Accommodations Provisions outside of the online assessment platform based on IEP or 504 Plan

Tool	Description
<b>Read Aloud/Human Reader</b> <b>OR</b> <b>American Sign Language</b>	Text is read aloud or translated via sign language interpreter to student by Test Administrator human reader as documented in the IEP/504 plan.
<b>Braille</b>	Both contracted and un-contracted Braille (English Braille, American Edition or Unified English Braille) are available. Students who require a Braille assessment will be sent a transcribed paper-based assessment.
<b>Scribe</b>	The student may dictate answers to a human scribe in an individual setting. Human scribe records verbatim what a student dictates and must give the student an opportunity to review scribed text. Scribed text must be entered into the online testing platform - no paper submissions accepted.
<b>Paper Based</b> <b>+</b> <b>Large Print</b>	For students with an IEP/504 plan that requires assessments to be paper-based and not administered online. <a href="#">Request for Paper-Based Science Assessment</a>







## Proctor User Guide

(Document begins on next page.)



# PROCTOR USER GUIDE

MAINE SCIENCE ASSESSMENT

SPRING 2022

**ADAM**  
Assessment Delivery and Management

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## Introduction

This Proctor User Guide provides necessary information for those school and district personnel who are proctoring assessment sessions to prepare for the Spring 2022 Maine Science Assessment.

The online administration of the Maine Science Assessment will be delivered by the Maine Department of Education (Maine DOE) using the Assessment Delivery and Management (ADAM) platform. This guide details:

1. how to log in to the system as a Proctor
2. how to access and manage assessment session dashboards
3. how to confirm which students are in your assessment Proctoring Group and
4. how to start, pause, and end an assessment session

This document is part of a suite of guides and manuals available through Maine DOE for the Spring 2022 Maine Science Assessment, including:

- [ADAM Platform User Guide](#)
- [Assessment Administration Manuals](#), one each for grades [5](#), [8](#), and [high school](#)
- [Device, System, and Lockdown Browser Installation Guide](#)
- [Online Accessibility Tools User Guide](#)
- [Principal and Assessment Coordinator Manual](#)
- [Proctor User Guide \(THIS DOCUMENT\)](#)
- [Quick Guide – Starting your Maine Science Assessment](#)

If questions arise, or if any situation occurs that could cause any part of the science assessment administration to be compromised, Assessment Administrators should contact **Nancy Godfrey, Assessment Coordinator at the Maine Department of Education** at [REDACTED] or [REDACTED].

If after reading this guide, you still need assistance, Contact the Maine Science Support Desk at: <https://mescience.zendesk.com>.

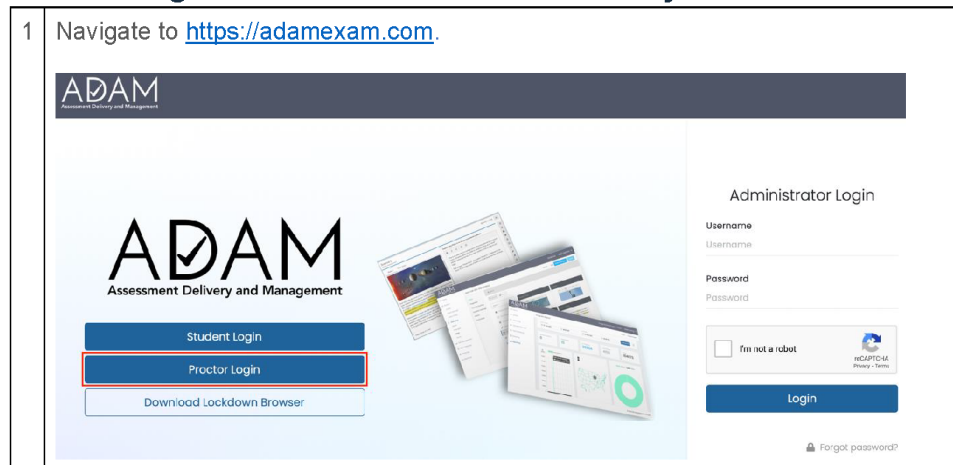
## Proctoring Overview

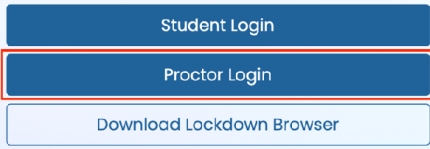
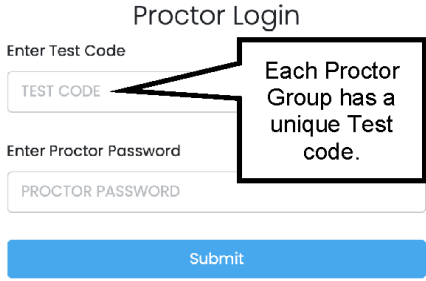
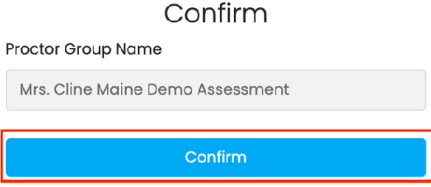
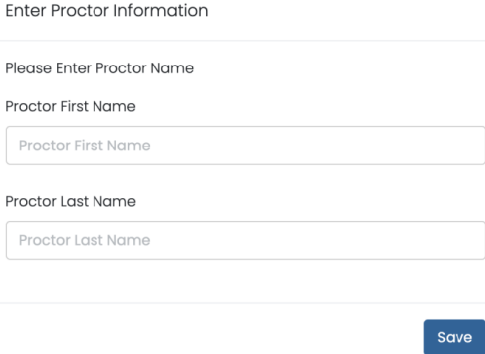
In the Maine Science Assessment context, a Proctor is any authorized person who manages a group of students participating in the assessment. Also, Proctors will have additional responsibilities which are not directly managed through ADAM. See the *Maine Science Assessment Administrator's Manual (AAM)* for additional information. The following activities and capabilities in the ADAM system are included in the role of a Proctor.

1. Log in to the ADAM Assessment System with the Proctor Code received from your school/district assessment coordinator or other administrator.
2. View your Proctor Dashboard
3. Manage your Proctor Group(s)
  - a. View the students in your Proctor Group(s)
  - b. Find the Test Code(s) for each session
  - c. Check for students' assigned supports/accessibility accommodations
  - d. Print out Assessment Cards
4. Proctor your Assessment Session(s)
  - a. Pause and resume an assessment session
  - b. Pause, resume, and submit a student's assessment
  - c. Reseat a student
  - d. Track students' status through the assessment with the Proctor controls

## How to Log In to the ADAM Assessment System

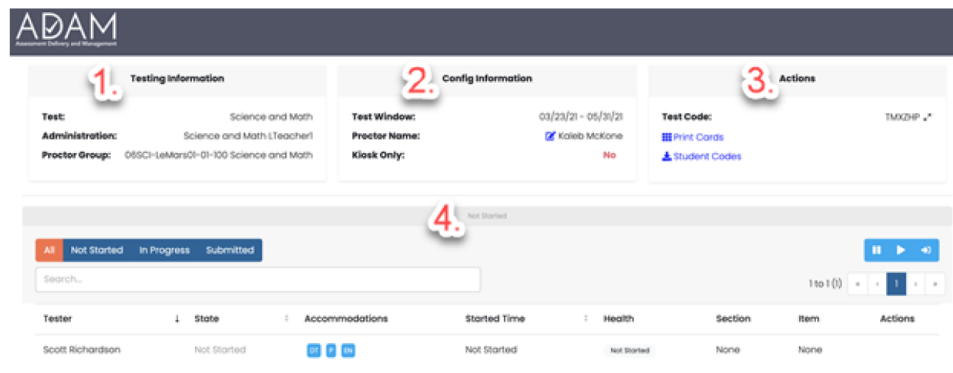
1. Navigate to <https://adamexam.com>.



2	Select "Proctor Login."	
3	<p>Complete the Proctor Login form with the test code and password provided by the School Assessment Coordinator:</p> <p>A. Enter "Test Code".          B. Enter "Proctor Password".          C. Select "Submit" to continue.</p>	
4	<p>Confirm the "Proctor Group Name" is correct.</p> <p>Select "Confirm" to continue.</p>	
5	<p>Enter your First and Last Name (if it isn't already populated).</p> <p>Select "Save" to continue.</p>	
6	View your Proctor Dashboard.	Upon successful log in, your Proctor Dashboard page will appear on the screen.

## The Proctor Dashboard Page

During an Assessment Administration, the Proctor manages the Assessment Sessions for all the students in their Proctor Group. A Proctor uses the Proctor Dashboard to administer the assessment session and assist the students as they progress through the assessment.



The following information sections appear on the Proctor Dashboard:

### 1. Testing Information

This area includes the name of the assessment and the name of the administration, which should correspond to the Grade Level and Session number, and the name of the Proctor Group.

### 2. Config Information

This area provides the assessment window for the overall Maine Science Assessment, the Proctor's name, and a field called "Kiosk Only," which for the Science Assessment will always be "Yes." "Kiosk Only" indicates that the ADAM Lockdown Browser should be installed on the students' devices. At the beginning of the assessment session, students will launch the ADAM assessment delivery platform by opening the ADAM Lockdown Browser. For more information, please see the [Device, System, and Lockdown Browser Installation Guide](#).

### 3. Actions

This area contains the "Test Code," as well as the "Print Cards," and the download "Student Codes" functions.

#### A. Test Code

- All students in this Proctor group use the test code to log in to the assessment.
- Select the expand arrows found next to the code to maximize the code to a full-screen view of the test code.

- Select the minimize arrows (on the expanded test code window) to return to the regular Proctor Dashboard page.

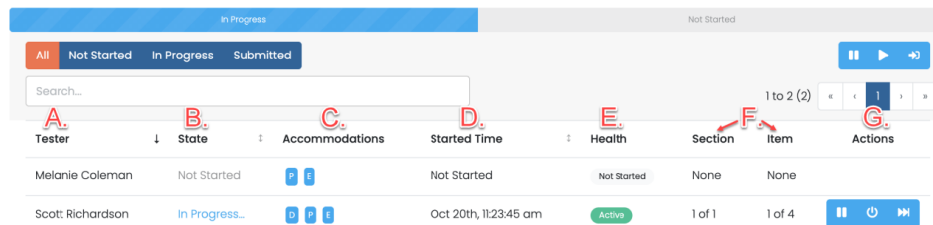
#### B. Print Cards

Proctors can do the following:

1. Print a Roster and the Student Assessment Cards (tickets) for distribution to the students. A Student Assessment Card/Ticket is a physical piece of paper that can be handed to a student. Included on the ticket/card are the Test Code, the student's name, and SSID.
2. Use the Print Cards function to open a second window displaying the student cards from this Proctor Group.

### 4. Session Management Area

In this area, you will be able to view, filter, and search for students in your Proctor Group and manage their sessions.



A. Tester	B. State	C. Accommodations	D. Started Time	E. Health	F. Section	Item	G. Actions
Melanie Coleman	Not Started		Not Started	Not Started	None	None	
Scott Richardson	In Progress...		Oct 20th, 11:23:45 am	Active	1 of 1	1 of 4	

#### A. Tester

The name of the student.

#### B. State

The state/status of the students' assessment will display one of the following. **Note that the Proctor does not “start” the assessment from the Proctor Dashboard. Once instructed to do so by the Proctor, students will start their assessment session by launching the ADAM assessment application on their devices and entering their SSID and the “test code.”**

- **Not Started** – the student has not logged into the assessment.
- **In Progress** – the student has logged into the assessment. No action is needed by the Proctor.
- **Breached** – the student has exited the lockdown browser. The Proctor needs to “reset” the student before they can log back into the assessment.
- **Paused** – the Proctor has paused one or all sessions. The student sees the “Test Paused” message on their screen. There is a time delay of about 30 seconds between pressing the pause button and the student actually being paused. The Proctor must “resume session” before the student is allowed back into the session.



- **Tester Paused** – the student has paused their own session. The student sees the “Test Paused” message on their screen. The Proctor can restart the student’s session, or the student can select the resume button to resume the assessment.
- **Reseat** – the Proctor has “reseeded” the student(s). The student has not yet logged back into the session. No action is needed by the Proctor.

**C. Accommodations**

Tools/supports/accommodations assigned by a school or district for the Maine Science Assessment will be displayed in the Accommodations column. The supports/accessibility accommodations are abbreviated. Hovering over the code opens a dialogue window showing the full description.

Supports/accessibility accommodations relevant to the assessment session administration include Text-to-Speech, Read Aloud, Scribe, and Extended Time. The [Maine Science Assessment Administration Manuals \(AAM\)](#) provide further information about supports/accessibility accommodations and directions for proctoring sessions for students using Text-to-Speech..

**D. Started Time**

Captures the time the student started the assessment session. Proctors will not need to monitor this information.

**E. Health**

Health helps the Proctor know if the student is interacting with the assessment. Health can be one of three values:

- **Not Started** – the student has not logged into the assessment. No action is needed by the Proctor.
- **Active** – the student has logged into the assessment. The student has recently interacted with the assessment.
- **No Activity** – the student has not interacted with the assessment for at least 90 seconds. This could indicate that the student has:
  1. Exited the lockdown browser by closing the browser.
    - The student will need to have their session “reseeded” by the Proctor before they can log back into the assessment.
  2. The student is still in the assessment but hasn’t interacted with the application.
    - No action is needed by the Proctor provided the student is still in the lockdown browser.




**F. Section and Item**

Section and Item display the progress of the students. All Maine Science assessments are single sections. The item progression shows which question the student is working on.

### G. Actions





The toolbar at the top of the Student Sessions list is used for actions applied to ALL student sessions.



	<b>Pause All Students</b> - Proctors can pause all students' sessions. Proctor must resume the session for students to resume participating in their assessment.
	<b>Resume All Students</b> - Proctors will use this button to resume all students' sessions, allowing students whose assessments were paused to continue their session.
	<b>* Not used for the Maine Science Assessment</b> <b>Release All to Next Section</b> – When assessments have a structured stop and release between sections, Proctors use this key to allow students to move on to the next section of the assessment.

Once the assessment session has started, a set of buttons will appear in the Action column for each student. Proctors can use these buttons to control individual student sessions:



	<b>Pause Student</b> - Proctors can pause an individual student session. Proctor must resume the session for the student to resume participating in their assessment.
	<b>Reseat Student</b> - To be used if a student has something occur that interrupts the session (e.g., computer issue, session timeout, unexpected error). Reseating allows the student to reenter their test code and SSID to resume their assessment session.
	<b>Submit Student</b> - To be used if a student finishes their assessment session but fails to submit the assessment before exiting.
	<b>Unsubmit Student</b> – To be used if a student mistakenly submits their assessment. This action is available to the Proctor on the day of the assessment. Otherwise, this is reserved for the State of Maine DOE.

Assessment (ZK7F4H)

Test Sessions

Search...

1 to 6 (6)

Tester	State	Accommodation	Actions
Carla Barker	In Progress	TTS	
Jasmine James	In Progress	TTS	
Joshua Jackson	In Progress	TTS	
Ruth Tucker	Not Started	TTS	
Steven Arnold	Not Started	TTS	
Virginia Hill	Not Started	TTS	

Annotations:

- Resume All Students. (points to the play button in the top right)
- Pause All Students. (points to the pause button in the top right)
- Leave the Proctor Page. (points to the Exit button in the top right)
- Reseat a Student. (points to the reset icon in the Actions column for Carla Barker)
- Pause a Student. (points to the pause icon in the Actions column for Joshua Jackson)
- Submit a Student Session. (points to the play icon in the Actions column for Ruth Tucker)

END OF GUIDE



## Device, System, and Lockdown Browser Installation Guide

(Document begins on next page.)



# Device, System, and Lockdown Browser Installation Guide

MAINE SCIENCE ASSESSMENT

SPRING 2022

ADAM  
Assessment Delivery and Management

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## Device and System Requirements for Online Assessments

### Introduction

This Device, System, and Lockdown Browser guide provides instructions for district and school assessment administrators and technology coordinators to prepare assessment delivery devices for the Spring 2022 Maine Science Assessment.

The online administration of the Maine Science Assessment will be delivered by the Maine Department of Education (MDOE) using the ADAM Assessment Delivery and Management platform. Student devices must be set to Lockdown Mode prior to the start of each assessment session to prevent student access to outside websites, programs, apps, or hardware. This guide explains the minimum requirements and settings configurations for assessment delivery devices as well as how to locate, download, and properly install the ADAM Lockdown Browser, a software application (app) that allows the web browser on the device to engage ADAM's Lockdown Mode.

Installation of the ADAM Lockdown Browser is a quick and easy process. There are no costs or fees associated with downloading the ADAM Lockdown Browser. In addition, it works with Mac and Windows devices, iPads, and Chromebooks.

When installed, the ADAM logo will appear as an icon on the device that Assessment Administrators, proctors, and students will use to launch their assessments at the beginning of each session.

The Lockdown Browser also allows for pre-session system checks to be run on the device to confirm that the operating system, network connection, and battery levels are compatible and ready at the beginning of each assessment session.

This document is part of a suite of guides and manuals available through Maine DOE for the Spring 2022 Maine Science Assessment, including:

- [ADAM Platform User Guide](#)
- [Assessment Administration Manuals](#), one each for grades [5](#), [8](#), and [high school](#)
- [Device, System, and Lockdown Browser Installation Guide](#) (THIS DOCUMENT)
- [Online Accessibility Tools User Guide](#)
- [Principal and Assessment Coordinator Manual](#)
- [Proctor User Guide](#)
- [Quick Guide – Starting your Maine Science Assessment](#)

If questions arise, or if any situation occurs that could cause any part of the science assessment administration to be compromised, Assessment Administrators should contact **Nancy Godfrey, Assessment Coordinator** at the Maine Department of Education at [REDACTED] OR [REDACTED].

If after reading this guide, you still need assistance, Contact the Maine Science Support Desk at: <https://mescience.zendesk.com>.

## Network Preparation

### URL Whitelist

The ADAM Assessment Delivery and Management online platform and the Lockdown Browser need to communicate with applications and services to perform correctly. To ensure things like a network firewall or other network appliances do not block those services, we require that the below list of URLs be whitelisted throughout your network. You can test to see if the network allows traffic to these sites by accessing each of the listed URLs. If you cannot get to the site, then contact your district/school's IT team.

- \*adamexam.com
- \*learnosity.com
- \*loggly.com
- \*speechstream.net
- \*sentry.io
- \*s3.amazonaws.com
- \*unpkg.com

### Blacklisted Applications

To prevent the use of unauthorized software or communications applications during the assessment. The ADAM Lockdown Browser will automatically check for other programs running simultaneously and prevent the assessment session from starting if one of the blacklisted applications is detected. If detected, a notification will appear on the screen to close the other programs. Examples of blacklisted applications include web conferencing, video conferencing, instant messaging, VOIP calling, social media, screencasting, secondary displays, and other programs.

## Device Preparation

### Lockdown Browser

The online administration of the Maine Science Assessment will be delivered by the Maine Department of Education (MDOE) using the ADAM Assessment Delivery and Management platform. Student devices must be set to Lockdown Mode prior to the start of each assessment session to prevent student access to outside websites, programs, apps, or hardware during the assessment session.

The ADAM Lockdown Browser must be

1. downloaded from <https://adamexam.com>, and
2. installed on each device that a student will use to take the assessment.

Instructions for installing the ADAM Lockdown Browser are detailed in the *ADAM Lockdown Browser Installation Instructions* section of this document.



## System Requirements

### Network

- The student computer must have access to the internet before the Lockdown Browser will initialize for student use.
- Assessment delivery devices can be networked via wired or wireless connections.
- ADAM is a lightweight browser-based application that is not bandwidth-intensive. There are no required bandwidth minimums. However, 5-10 MB per second per student is a general rule of thumb for online assessment.

### Hardware

- Cumulative CPU speed is greater than 233MHz
- Total RAM available is greater than 256MB
- iPads must be 2nd generation or later
- At least 50 MB of free hard drive space is available. (Warning – does not stop you from continuing)

### Display

- Minimum resolution of 1024x768 (Warning – does not stop you from continuing)
- Minimum color depth 24-bit
- Note: only one monitor may be attached to a student device during the assessment

### Battery

- Device is recommended to be plugged into a power source. (Warning – does not stop you from continuing)
- Battery level should be at least 50% if the device is not plugged in. (Warning – does not stop you from continuing)

### Operating System

- OS cannot be running in a virtualized environment.
- macOS: version 10.13 to 11.6
- Windows: Windows 10
- Chrome OS: latest three releases
- iOS: version 12.1 to 14.8

### Permitted Peripherals (Not Required)

- External keyboard (wired or Bluetooth)
- Mouse/Trackpad (wired or Bluetooth)
- Headset
  - Headsets of earbuds will only be needed for students using the Text-to-Speech accessibility feature
  - Wired or Bluetooth
- Microphones (not needed for this assessment)

### Assistive Devices

- Screen Readers (ADAM supports common screen readers by operating system)
  - VoiceOver for macOS and iOS
  - JAWS for Chrome on Windows
  - ChromeVox for Chromebooks

### System Startup Checks

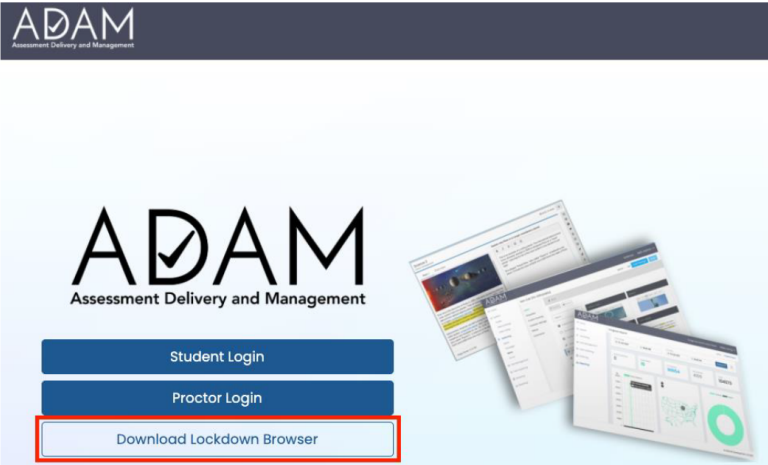
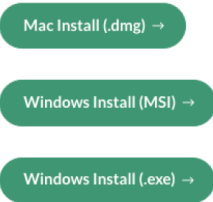

The ADAM Lockdown Browser automatically verifies the following system requirements. If a device fails one of these checks, a summary of the issue is displayed on the screen, and when possible, the user will have an opportunity to resolve it. For example, if the Lockdown Browser detects that a device has two monitors, an alert will provide instructions with an option for the user to unplug one monitor and then select “Retry” to rerun the checks. Similar notifications are provided if the device has a low battery level or is not plugged into a power outlet.

Warning messages about hard drive space, screen resolution, and battery/power status may display when ADAM starts but do not prevent students from running the assessment.



- The student computer must have access to the internet before the Lockdown Browser will initialize for student use.
- After the operating system check is complete, a final network check is needed based on how long it takes for the first page of the Lockdown Browser to load. If the initial page load exceeds the limit set, the system check will fail.

## ADAM Lockdown Browser Installation Instructions

### Mac and Windows Installation Steps

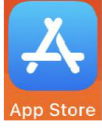
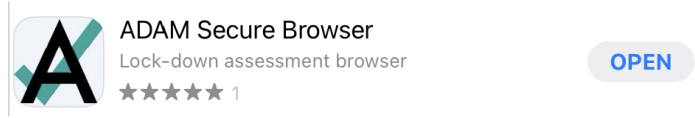

1	Navigate to <a href="https://adamexam.com/">https://adamexam.com/</a>
2	<p>Select "Download Lockdown Browser."</p> 
3	<ul style="list-style-type: none"> <li>• Select the "Mac Install (.dmg)" button if you are using a Mac.</li> <li>• Select the "Windows Install (MSI)" button if you are using a Windows computer.</li> </ul> <p>Wait for the install package to download to the device.</p> 
4	Once the download is complete, open the install package and follow the installation instructions provided on the screen.
5	<p>Once installation is complete, select the ADAM icon to launch the application.</p> 

### Chromebook Installation Steps

1	Sign in to your Google Admin console to open the Admin console Home page.	
2	Go to “Devices,” and then select “Chrome.”	
3	Select “Apps & Extensions,” and then select “Kiosks.”	
4	Leave the top organizational unit selected to apply the settings to all devices being managed through the console. Otherwise, select a “child organizational” unit.	
5	Select the Add  button and choose “Add from Chrome Web Store.”	
6	In the Chrome Web Store, select the app called “ADAM Test Delivery.” If the app is not showing, as an administrator of managed Chromebooks, one can search for the Lockdown Browser app in the Chrome Store using the ADAM Test Delivery ID: okfigdffapmhgfalhnfnhplcemcclm	
7	After the installation is complete, the ADAM Lockdown Browser should be installed on all the associated machines.  <b>Students should not log in to the Chromebook.</b> They should select the ADAM icon in the system tray.	

### iOS Installation Steps

**NOTE that the iOS installation is for iPad only.**

1	Navigate to the Apple App Store on the device.	
2	Search “ADAM Secure Browser” in the App Store, then download and open the app.	
3	After the installation is complete, select the ADAM icon to launch the application.	

**END OF INSTRUCTIONS**



## Accessibility Guide

(Document begins on next page.)



# ACCESSIBILITY GUIDE

MAINE SCIENCE ASSESSMENT  
SPRING 2022

ADAM  
Assessment Delivery and Management



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


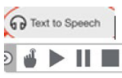
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## Maine Science Assessment Accessibility Guide ADAM Accessibility Tools

### Universal Tools – Designated Supports/Features – Accommodations

#### I. Universal Tools for all Students

##### Embedded Universal Tools

Tool	Tool Icon	Description
<b>Provisions within online assessment platform to all students automatically</b>		
<b>Review</b>		Review page shows flagged items for review and items not attempted.
<b>Accessibility</b>		Accessibility options of Color Scheme / Font Size / Zoom enlargement ( <i>ADAM Accessibility Tools</i> see page 7).
<b>Flag or Bookmark</b>		Ability to flag or bookmark an item to return to for review.
<b>Line Reader</b>		The line reader tool helps focus on reading one line of text at a time.
<b>Response Masking</b>		Ability to hide/cover an answer choice – not available on all item types such as technology enhanced.
<b>Provision within online platform that must be assigned to individual student by DAC/ITC/SAC</b>		
<b>Text-to-Speech (TTS)</b>		Text is read aloud to the student via (embedded) TTS technology. TTS should be consistent with the student's normal routine during classroom instruction. Headphones/earbuds are necessary unless tested individually in a separate setting. <i>(Text to Speech (TTS) Support</i> see page 10)

##### Non-Embedded Universal Tools Provisions outside of the online assessment platform

Tool	Description
<b>Scrap/Scratch Paper</b>	The student uses scratch paper, an individual erasable whiteboard or an assistive technology device to make notes or record responses. All scratch paper must be collected and securely destroyed at the end of each test to maintain test security.



## II. Designated Supports/Features for Some Students

Supports and features outlined below may provide increased accessibility within the assessment. Utilization and implementation of supports and features is determined on an individual basis by an educational team such as part of a multi-tiered system of supports (MTSS), Response to Intervention (RTI), Individual Language Acquisition Plan (ILAP), and/or Student Assistance Team. Supports must be consistent with the student's normal routine during classroom instruction. Provision of supports does not alter the construct of any test item.

### Non-Embedded Designated Supports Provisions outside of the online assessment platform

Tool	Description
<b>Breaks</b>	Multiple or frequent breaks may be required by students whose attention span, distractibility, physical and/or medical condition require shorter working periods.
<b>Extended Time</b>	Extended time is time beyond recommended/average of 60 minutes per session(s) 1, 2, and 3.
<b>Preferential Seating</b>	Students may have predetermined seating locations to reduce distractions for themselves or others, or to increase physical access to special equipment.
<b>Individual/Separate Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Small Group Setting</b>	Individual or small group testing may be used to minimize distractions for students whose test is administered out of the classroom or so that others will not be distracted by supports/accommodations being used.
<b>Movement</b>	This opportunity may be used in a setting other than the classroom for a student who cannot focus when seated for sustained periods of time.
<b>Alternate Aids/Supports</b>	The test may be presented through their regular communication system to a student who uses alternative or assistive technology on a daily basis. The test may be presented using visual aids such as visual magnification devices, reduction of visual print by blocking or other techniques, acetate shields; or auditory devices such as special acoustics, amplification, noise buffers, whisper phones, or calming music.
<b>Distraction Reduction</b>	Noise buffers, place markers, carrels, etc. may be used to minimize distractions for the student. This support does NOT include assistive devices such as templates, graphic organizers, or other devices intended specifically to help students organize thinking or develop a strategy for a specific question.
<b>Directions Clarification</b>	After directions have been read, the test administrator may ask the student to explain what he/she has been asked to do. If directions have been misunderstood by the student, the <u>directions</u> may be paraphrased or demonstrated. Test items MUST NOT be paraphrased or explained.
<b>Bilingual Word Glossary for ELLs</b>	A bilingual/dual language word-to-word glossary is provided to students who are English Learners as a language support as per ILAP.

### III. Accommodations Requiring IEP/504 Documentation

Accommodations are changes in procedures or materials that do not alter what the test measures and are used to increase equitable access during the assessment for students with documentation of the need on an Individualized Education Program/Plan (IEP) or 504 Plan.

#### Non-Embedded Accommodations Provisions outside of the online assessment platform based on IEP or 504 Plan

Tool	Description
<b>Read Aloud/Human Reader OR American Sign Language</b>	Text is read aloud or translated via sign language interpreter to student by Test Administrator human reader as documented in the IEP/504 plan.
<b>Braille</b>	Both contracted and un-contracted Braille (English Braille, American Edition or Unified English Braille) are available. Students who require a Braille assessment will be sent a transcribed paper-based assessment.
<b>Scribe</b>	The student may dictate answers to a human scribe in an individual setting. Human scribe records verbatim what a student dictates and must give the student an opportunity to review scribed text. Scribed text must be entered into the online testing platform - no paper submissions accepted.
<b>Paper Based + Large Print</b>	For students with an IEP/504 plan that requires assessments to be paper-based and not administered online. <a href="#">Request for Paper-Based Science Assessment</a>



## Online Accessibility Tools User Guide

### Introduction

This Online Accessibility Tools User Guide for district and school assessment administrators and technology coordinators provides the necessary information to prepare students for the Spring 2022 Maine Science Assessment.

The online administration of the Maine Science Assessment will be delivered by the Maine Department of Education (MDOE) using the Assessment Delivery and Management (ADAM) platform. ADAM features a range of on-screen tools that enhance the accessibility of the online assessments for all students, including those who require visual, auditory, and attention focus supports.

This guide describes the accessibility features used for the Spring 2022 Maine Science Assessment. It also provides a brief tutorial on how to locate and use each tool within the assessment platform.

This document is part of a suite of guides and manuals available through MDOE for the Spring 2022 Maine Science Assessment, including:

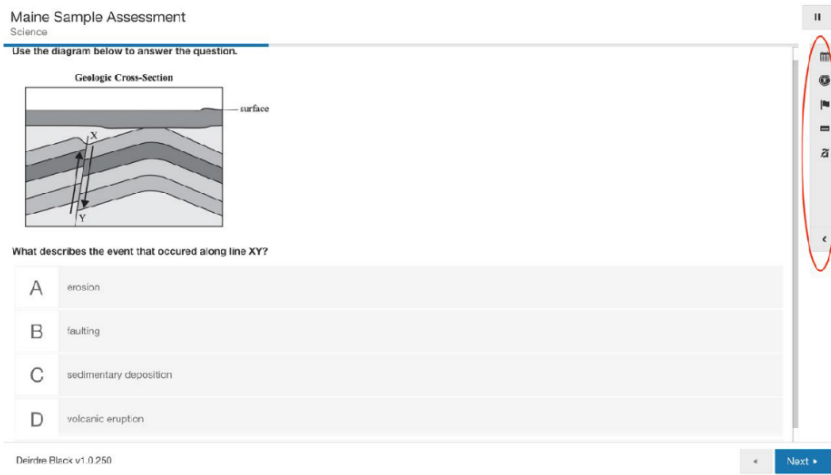
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- [Device, System, and Lockdown Browser Installation Guide](#)
- [Accessibility Guide \(THIS DOCUMENT\)](#)
- [Principal and Assessment Coordinator Manual](#)
- [Proctor User Guide](#)
- [Quick Guide – Starting your Maine Science Assessment](#)

If questions arise, or if any situation occurs that could cause any part of the science assessment administration to be compromised, Assessment Administrators should contact **Nancy Godfrey, Assessment Coordinator, at the Maine Department of Education** at [REDACTED] or [REDACTED].

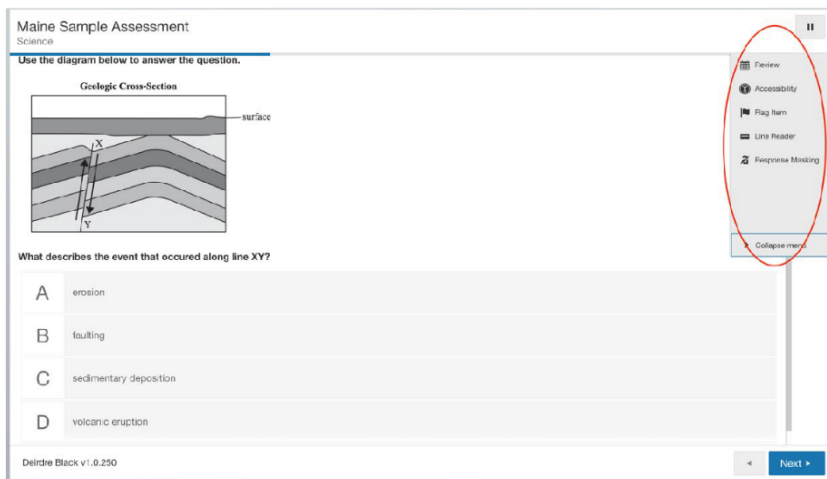
If after reading this guide you still need assistance, contact the Maine Science Support Desk at <https://mescience.zendesk.com>.

## ADAM Accessibility Tools

The Accessibility Tools Menu is located on the right side of each assessment screen within the test supports toolbar. The student can access this menu at any time during the assessment session.




The Accessibility Tools Menu can be expanded or collapsed by selecting the arrow icon at the toolbar's bottom.

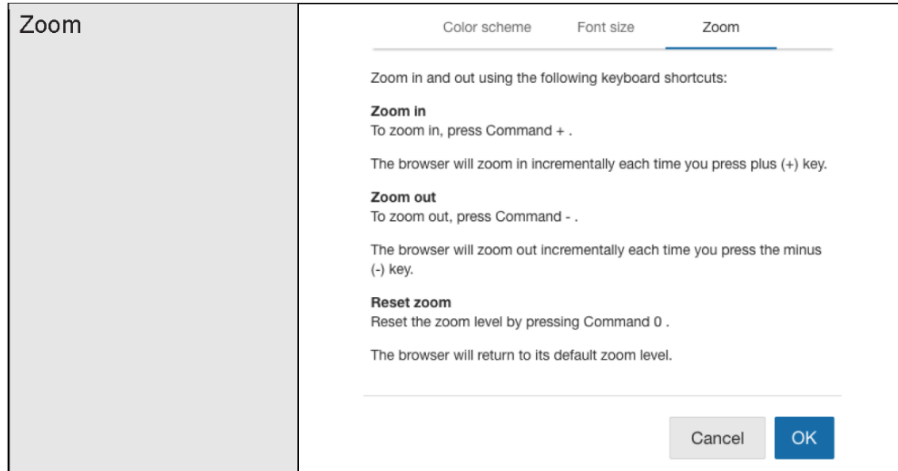


### Accessibility Tools Menu

Students can set preferences for many of the tools that will persist from screen to screen (question to question) during an assessment session.

Students must reselect their preferred settings each time they log in to a new session or rejoin a session.

 Accessibility	The accessibility menu provides options to: <ul style="list-style-type: none"> <li>• Change the Color Scheme (color contrast) of the background and text.</li> <li>• Change the font size.</li> <li>• View instructions for using the Zoom functionality built into the web browser.</li> </ul>
Color Scheme (Color Contrast)	<div style="text-align: center;"> <span>Color scheme</span>   <span>Font size</span>   <span>Zoom</span> </div> <hr/> <p>Change the background and foreground colors of your activity.</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Black on white (default)</li> <li><input type="radio"/> Grey on light grey</li> <li><input type="radio"/> Purple on light green</li> <li><input type="radio"/> Black on violet</li> <li><input type="radio"/> Yellow on navy</li> <li><input type="radio"/> White on black</li> </ul> <div style="text-align: right;"> <span>Cancel</span>   <span>OK</span> </div>
Font Size	<div style="text-align: center;"> <span>Color scheme</span>   <span>Font size</span>   <span>Zoom</span> </div> <hr/> <p>Adjust the size of fonts in your activity.</p> <ul style="list-style-type: none"> <li><input type="radio"/> Small (75%)</li> <li><input type="radio"/> Normal (100%)</li> <li><input checked="" type="radio"/> Large (125%)</li> <li><input type="radio"/> Extra large (150%)</li> <li><input type="radio"/> Huge (175%)</li> </ul> <div style="text-align: right;"> <span>Cancel</span>   <span>OK</span> </div>



Note:

1. Trackpad pinch gestures to zoom in and out are NOT ENABLED in the required ADAM Lockdown Browser for the Maine Science Assessment.
2. Touch screen devices pinch gestures to zoom in and out are ENABLED.

### Text to Speech (TTS) Support

For students for whom Text to Speech (TTS) is an approved tool for the Maine Science Assessment, a Text to Speech tool in ADAM will enable the text on the screen to be read aloud. For the TTS tool to appear on-screen for the student during the assessment session, it must be pre-selected by the District Assessment Coordinator (DAC) or School Assessment Coordinator (SAC) in the student's record within ADAM when rostering the student for each assessment session.


ADAM displays the TTS control bar at the top of the screen for each assessment question when TTS has been enabled by the DAC/SAC for the student's use during an assessment.










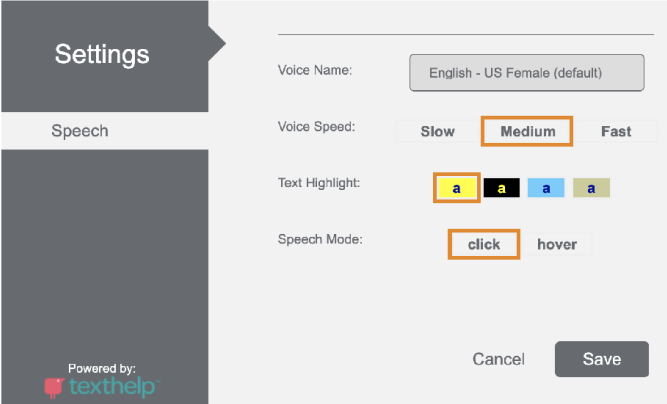

### Text to Speech (TTS) Controls Menu

Students can set preferences for different aspects of the Text to Speech (TTS) tool that will persist from screen to screen (question to question) during an assessment session.

Students must reselect their preferred settings each time they log in to a new session or rejoin a session.

 When TTS is enabled, this icon will appear within the test supports toolbar. That toolbar (*ADAM Accessibility Tools*, page 7) is on the right side of the assessment page. Students can open and close (hide) the TTS toolbar by selecting this headset icon.

 Text to Speech	
The Text to Speech player enables features for TTS.	
	Select to collapse or expand the TTS toolbar.
	Select to start TTS, then select anywhere in the text to start reading aloud.
	Speak (read aloud) the current selection.

	<p>Pause speech.</p>
	<p>Stop speech playback.</p>
	<p>Change settings.</p> <div style="text-align: center;"> <p>Settings for Text to Speech</p>  </div>
	<p>Select and hold and drag to move the toolbar.</p>



## Screen Reader Support

ADAM supports common screen readers across operating systems. Since screen reader makers optimize their screen readers for use with specific browsers, support within ADAM is available directly through the providers of these screen reader tools:

- VoiceOver for macOS and iOS
- JAWS for Chrome on Windows
- ChromeVox for Chromebooks

END OF GUIDE



## ADAM Platform User Guide

(Document begins on next page.)



# ADAM Platform User Guide

MAINE SCIENCE ASSESSMENT

SPRING 2022

**ADAM**  
Assessment Delivery and Management

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## Introduction

This ADAM Platform User Guide provides necessary information for assessment administrators and technology coordinators at the school and district levels to prepare for the Spring 2022 Maine Science Assessment.

The online administration of the Maine Science Assessment will be delivered by the Maine Department of Education (MDOE), using the Assessment Delivery and Management (ADAM) platform. This guide details how to manage user accounts for school and district coordinators; how to access and manage student rosters; how to create groupings of students for assessment administration; and how to ensure that students are assigned to the right assessments, sessions, and groups.

This document is part of a suite of guides and manuals available through MDOE for the Spring 2022 Maine Science Assessment, including:

- [ADAM Platform User Guide \(THIS DOCUMENT\)](#)
- [Assessment Administration Manuals](#), one each for grades [5](#), [8](#), and [high school](#)
- [Device, System, and Lockdown Browser Installation Guide](#)
- [Accessibility Guide](#)
- [Principal and Assessment Coordinator Manual](#)
- [Proctor User Guide](#)
- [Quick Guide – Starting your Maine Science Assessment](#)

If questions arise, or if any situation occurs that could cause any part of the Science Assessment administration to be compromised, Assessment Administrators should contact Nancy Godfrey, Assessment Coordinator at the Maine Department of Education at [REDACTED] or [REDACTED].

If after reading this guide, you still need assistance, contact the Maine Science Support Desk at: <https://mescience.zendesk.com>.

## Overview

In preparation for the Maine Science Assessment administration for Spring 2022, school and district coordinators will be undertaking the following activities in the ADAM online assessment platform:

### DISTRICT ASSESSMENT COORDINATORS (DAC):

1. Set up your ADAM User.
2. Create Other ADAM Users (Tech and School Coordinators).

### SCHOOL ASSESSMENT COORDINATORS (SAC):

1. Set up your ADAM User.
2. Create Other ADAM Users, like Technology Coordinators (TC).
3. Complete Initial Load of Classes and Enroll Students.
4. Add Un-Rostered Students to a Class.
5. Update Student Universal Tools/Designated Supports/Accommodations.
6. Print Student Assessment Cards.

This manual is full of useful information. To easily find the primary activities in this document, you can search for "TASK". Each of these activities is tagged like this:

**\*\* TASK – This is an example of a primary activity \*\***

## Section 1: How to Access ADAM

This section prepares you to access the online assessment delivery platform, ADAM, for the first time.

### \*\* TASK – Set up your ADAM User \*\*

#### Receiving Your Welcome Email

If you are a District Assessment Coordinator (DAC), your ADAM account will be created by MDOE. If you are a School Assessment Coordinator (SAC) or Technology Coordinator (TC) your account will usually be created by your DAC or another coordinator at your school.

#### New Coordinators

When your account is created in ADAM, you should receive an automated welcome email from [no\\_reply@mzdevinc.com](mailto:no_reply@mzdevinc.com) that contains a temporary link. Check your spam folder if a welcome email you are expecting has not been received.

From: ADAM Assessment System ([no\\_reply@mzdevinc.com](mailto:no_reply@mzdevinc.com))  
Subject: Your account information for the ADAM assessment management system

Select the link in the welcome email to gain access to ADAM. You will be asked to create a new password for your account. Please note that the password link in the welcome email can only be used once. The email link invitation **expires after 1 week (7 days)**.

#### Returning Coordinators

- DAC accounts are re-activated by the Maine DOE.
- Re-activated accounts do not receive welcome emails.

DACs are to

1. re-activate their confirmed returning coordinators accounts and
2. communicate to their returning coordinators (SACs and TCs) when their ADAM account re-activation is complete.

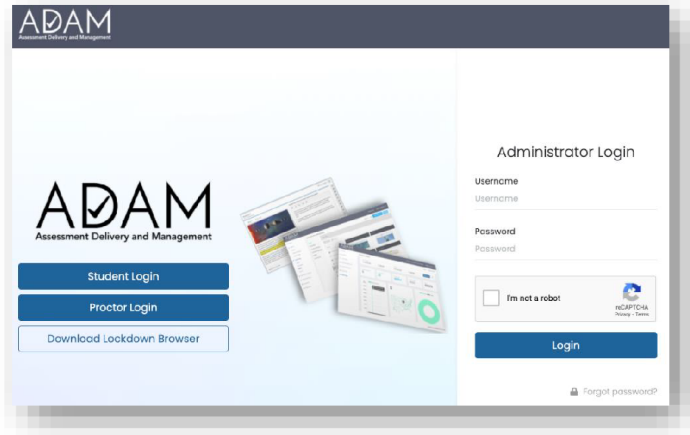
#### How to Log In

Once your user account is created and you have set your password, you can access ADAM at <https://adamexam.com>. The Login page will have options for Student, Proctor, and Administrator logins.


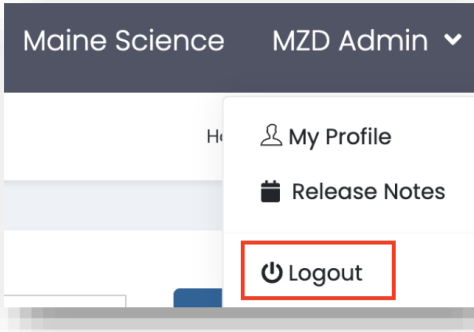
1. Enter your username and password in the **Administrator Login** area on the right,
2. complete the reCAPTCHA prompts, then



3. select **Login** to access ADAM.

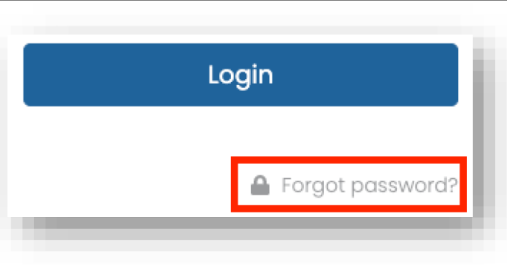
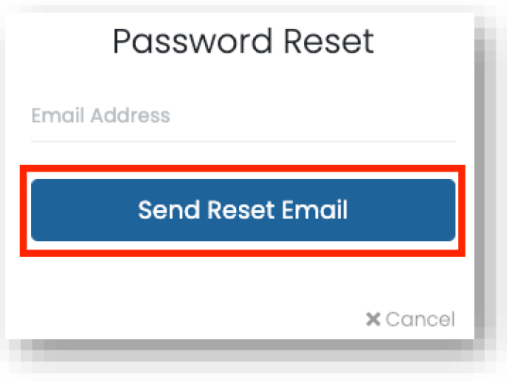


### How to Log Off

1	 <p>Find your username in the top right of the ADAM page. In this example, the username is MZD Admin. Select your username to see the options in the menu.</p>
2	<p>Select the “Logout” button.</p> 
3	<p>Logout takes you back to the login page <a href="https://adamexam.com">https://adamexam.com</a></p>

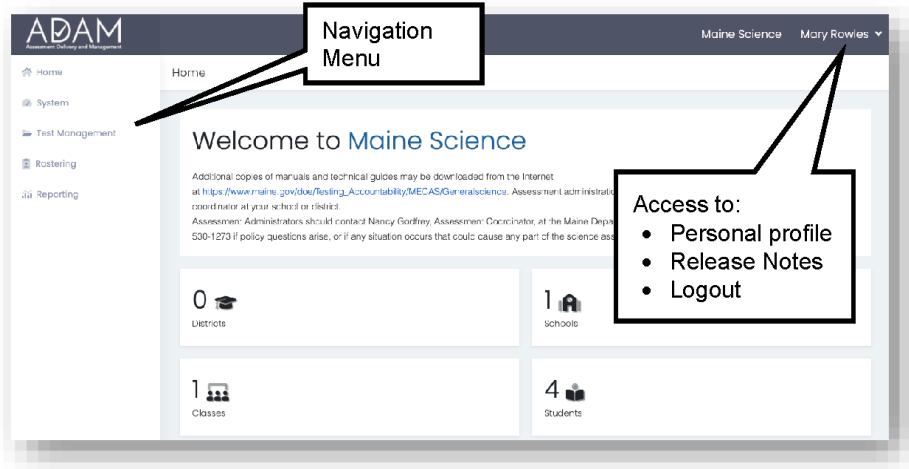
### Forgot your Password?

If you have forgotten your ADAM password, you can request to have the password reset.

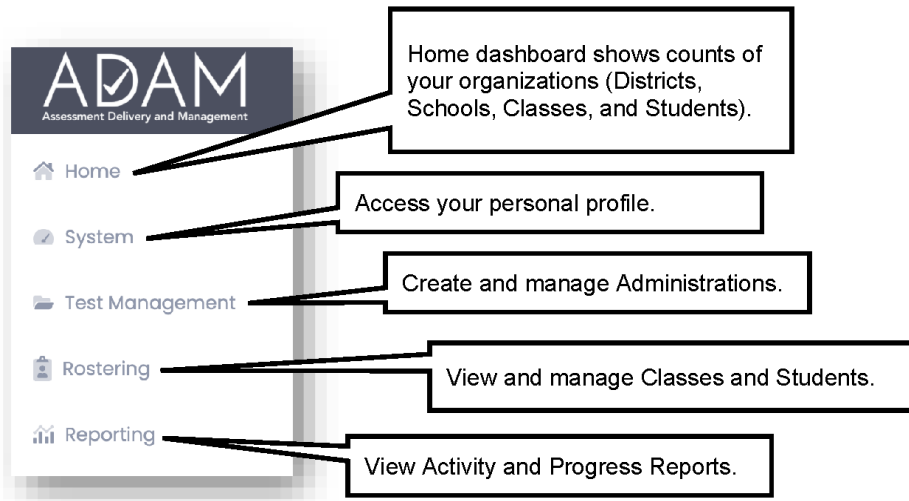
<p>1 Select "Forgot password?" from the Login screen.</p>	
<p>2 Enter your email address tied to your ADAM account, and then select the "Send Reset Email" button.</p>	
<p>3 You will receive an email from <a href="mailto:no_reply@mzdevinc.com">no_reply@mzdevinc.com</a> that contains a temporary link.</p>	<p>From: <a href="mailto:no_reply@mzdevinc.com">no_reply@mzdevinc.com</a> Subject: ADAM Password Reset</p>
<p>4 Select the link in the welcome email to gain access to ADAM. You will be asked to create a new password for your account. Please note that the password link in the welcome email can only be used once. The email link <b>expires after 24 hours</b>.</p>	

## How to Navigate ADAM

After logging into ADAM, the default location is **Home**.



Your ADAM Home Screen will include information about the Maine Science Assessment program. It will indicate the number of Districts and Schools to which you are affiliated and the number of Classes and Students to which you have administrative access.



## Section 2: Creating and Managing Users

This section demonstrates how to create new ADAM users and how to update their passwords.

### \*\* TASK – Create Other ADAM Users \*\*

#### How to Add ADAM Users

Unique ADAM accounts with logins are only needed for administrative users including District Assessment Coordinators, School Assessment Coordinators, and Technology Coordinators.

Students will not have user accounts in ADAM. Instead, students will log in to the assessments using their State Student ID number and an Assessment Code unique to each session administration.

Coordinators, teachers, and others who are proctoring assessment sessions will not have user accounts in ADAM. Instead, Proctors will access the proctor dashboard using a Proctor Code and Assessment Code.

#### Role Setup

Your ability to create other administrative user accounts is tied to the role you are assigned.

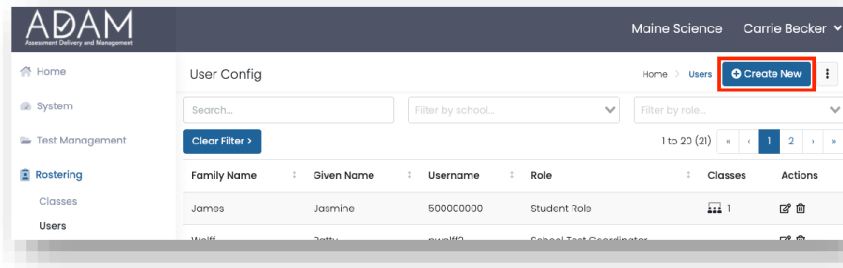
- **District Assessment Coordinators (DAC)** – can create users with the roles of Technology Coordinator and School Assessment Coordinator.
- **Technology Coordinator (TC)** – can create users with the roles of Technology Coordinator and School Assessment Coordinator.
- **School Assessment Coordinator (SAC)** – can create users with the role of Technology Coordinator.

#### Role Permissions and Data Access

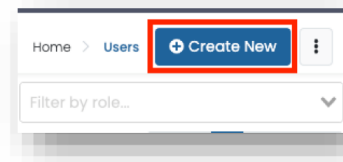
Your organization and role will determine which administrative actions and related data you will be able to access within ADAM for the Science Assessment.

- **Maine Department of Education (MDOE)** – has access to all users, classes, and administrations within the scope of the state.
- **District Assessment Coordinators (DAC)** – have access to all users, classes, and administrations within one or more districts to which they are affiliated.
- **Technology Coordinator (TC)** – there are two levels of TC's.
  - *District Technology Coordinators (DTC)* have access to users, classes, and administrations within one or more districts.
  - *School Technology Coordinators (STC)* have access to users, classes, and administrations within a specific school.

1 Navigate to **Rostering**, then **Users** from the left navigation bar.



2 Select the “Create New” button in the upper right corner.



3 Complete the User Setup form.

- Given (First) Name
- Family (Last) Name
- Role
- Identifier (Email)

Choose from the drop-down list.

<ul style="list-style-type: none"> <li>• Org Scope – Select where in the org structure this user fits.</li> </ul>	<p>Grades: Not applicable</p> <p>Org Scope: DAC – set as School District(s) SAC – set as a School TC – set as either a specific school or district(s)</p> <p>Text To Speech: Not applicable</p>
<ul style="list-style-type: none"> <li>• Sourced ID (repeat Email)</li> <li>• Username</li> <li>• User Email (repeat Email)</li> <li>• Set Password (or not). If you submit the new user without manually setting a password, the system will send an email to the new user to set up their own password.</li> <li>• Select “Submit” to SAVE and complete user creation.</li> </ul>	<p>User Sourced ID: Set to the user’s email address.</p> <p>Username: Used to log in to ADAM</p> <p>User Email: Email used to send ‘sign up email’ and ‘forgot password’</p> <p>Set Password: The Set Password feature is not part of the standard setup flow.</p>
<p><b>NOTE:</b> If you want the user to receive an automated welcome email and instructions for account set up, DO NOT use the “Set Password” button. If you do choose to set up the password for the user, they WILL NOT get a welcome email with information about their new user account with ADAM, and you will need to directly communicate their ADAM login information.</p>	

**Enter your login password (confirming you are who you say you are).**

**Set the password for the new user.**

**Retype the password for the new user.**

**Set Password** ^

Logged In User's Current Password

New Password

Confirm Password

The password must contain between 8 and 16 characters

The password must contain at least 1 lowercase character


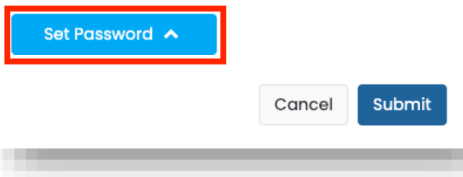
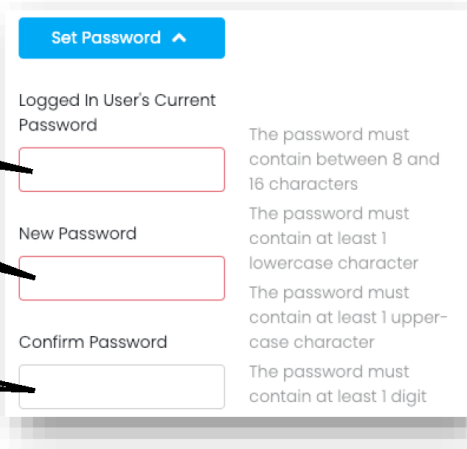
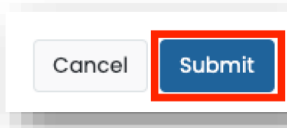
The password must contain at least 1 uppercase character

The password must contain at least 1 digit

### How to Reset the Password of an ADAM User

Users can reset their own passwords by using the Forgot Password link on the sign in page <https://adamexam.com>. If the user still has trouble with the reset, you can reset their password for them.

1	Navigate to <b>Rostering</b> , then <b>Users</b>	
2	<p>Search for your user:</p> <ol style="list-style-type: none"> <li>Search by typing in a Name like "Smith". The Name field searches:             <ol style="list-style-type: none"> <li>Given Name (First Name)</li> <li>Family Name (Last Name)</li> <li>First+Last Name (like "Kevin Graham")</li> <li>Identifier Username</li> <li>User Email</li> </ol> </li> <li>Filter by Org like "Parson Creek Elementary". NOTE: After setting a school, you also have the option to filter by class.</li> <li>Filter by Role like "School Assessment Coordinator".</li> <li>Filter by Accommodation.</li> <li>This option only applies to student accounts. Check "Show Unrostered" to only show unrostered student users.</li> </ol>	<p>Clear Search</p> <p>Name ▾</p> <p>Search...</p> <p>Org ▾</p> <p>Filter by Org...</p> <p>Role ▾</p> <p>Filter by role...</p> <p>Accommodation ▾</p> <p>Filter by Accommodation...</p> <p>Unrostered ▾</p> <p><input type="checkbox"/> Show Unrostered</p>

<p>3 Select the Edit icon.</p>	
<p>4 Scroll to the bottom of the User Setup page and select the "Set Password" button.</p>	
<p>5</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Enter your login password (confirming you are who you say you are).</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Set the password for</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Retype the password for the</p> </div>	
<p>6 Select the "Submit" button to save the password reset.</p>	



## Section 3: Rostering

Rostering is the process used to ensure students are enrolled in classes. The components of rostering are:

- **Districts** – Districts are pre-populated in ADAM.
- **Schools** – Schools are pre-populated in ADAM.
- **Courses** – Courses are pre-populated in ADAM and represent the 'grade' (5, 8, and High School).
- **Classes** – Classes are created and maintained by the DAC or SAC.
- **Students** – Students are pre-populated and assigned to a school but need to be added and maintained within a class by the DAC or SAC.

This guide prepares DACs and SACs on

1. How to initially **create classes** in a school and enroll students into the class(es) using *Quick Class Upload*.
2. How to ensure all students in your school remain enrolled in a class when changes are processed from the State DOE.

**Maintaining accurate class enrollment is critical.** The assessments are automated to keep class enrollments in synch with the list of students eligible for the assessments.

### Schools and Students

#### How to Add a School

States, districts, and schools have already been created in ADAM. If a school needs to be added to your district, contact Nancy Godfrey, Assessment Coordinator at the Maine Department of Education, at [REDACTED].

#### How to Add a Student

Students are created through an automated daily process by the Department of Education. If a student cannot be found in ADAM **Rostering | Users**, then the student needs to be added to ADAM by the Maine DOE. ADAM is updated nightly with these changes. If the student exists in ADAM, but is missing from a specific class, then SACs, DACs, or TCs can add the student to the class. If a student is missing when the SAU/school has confirmed SIS enrollment, please contact Nancy Godfrey, Assessment Coordinator at the Maine Department of Education, at [REDACTED].

#### How to Add a Homeschooled Student

If a Homeschooled student isn't showing up for your school in ADAM, contact the support desk to request the student be activated for your school. Support will add the student to ADAM if the requested student is found on the pre-approved list of homeschooled students from the Maine DOE. If the support desk does not find the requested student on the pre-approved list of homeschooled students, they will notify you of this and ask you to contact Nancy Godfrey, Assessment Coordinator at the Maine Department of Education, at [REDACTED].

## How to Add a Class and Enroll Students

Classes are a way to organize the students in your schools to assign students to proctor groups within an Administration. As long as classes have been defined and each student is enrolled in a class, ADAM maintains the rosters for the administrations (assessment sessions).

Once gaining access to ADAM for the first time, one of the first tasks for DACs and SACs is to create classes and enroll students into those classes.

### There are three ways to add classes in ADAM:

#### 1. Quick Class Upload

- This process is most likely used by the School Assessment Coordinator to create all the classes and add the students into those classes, one grade at a time. This is accomplished by following the on-screen instructions in ADAM by navigating to **Rostering | Classes**. This is a three-step process:
  1. generate a list of students in a specified grade and school.
  2. assign each student to a class.
  3. upload the file into ADAM.

#### 2. One At a Time

- This process is most likely used by the School Administrator if a new class is identified after the Quick Class Upload is completed. This is a two-step process:
  1. navigate in ADAM to **Rostering | Classes** and use the “Add Classes” button to add a single class.
  2. modify the class and enroll the students into the class.
- You will find this as a separate guide “Adding Classes and Enrolling Students – Alternative Methods” at <https://mescience.zendesk.com> called.

#### 3. Upload of Multiple Classes Using One Roster

- This process is used to upload a large number of classes for multiple grades. Two separate files are created, one for uploading the classes and one for uploading the students into the classes.
- You will find this as a separate guide “Adding Classes and Enrolling Students – Alternative Methods” at <https://mescience.zendesk.com> called. This is a four-step process:
  1. Create the CSV file for the Class Upload
  2. Use the CSV file in ADAM to upload the classes
  3. Create the CSV file for the Student Upload
  4. Use the CSV file in ADAM to upload the students

### Preparing to Create Classes:

Before starting the process of creating classes, it is helpful to decide on a system of conventions for class codes.

- **class\_code** – The class code is a unique value for each class within a school. The class code is alphanumeric and can be anything that makes sense for

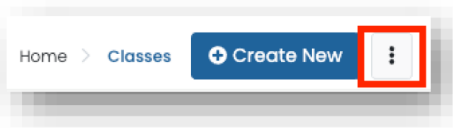
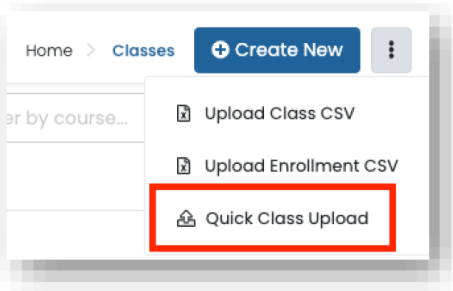
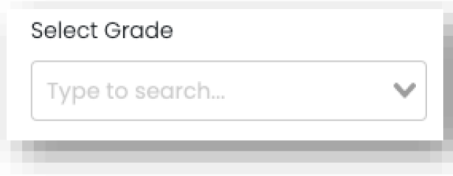
- managing your classes. For example, 8GR-Smith (grade level plus the teacher's last name) could be used to represent an existing class/section name.
- `class_name` – The class name is automatically set to the same as the `class_code` in the Quick Class Upload process. Administrations are separated into Proctor Groups based on classes. The `class_name` is used as the name of the Proctor Groups.

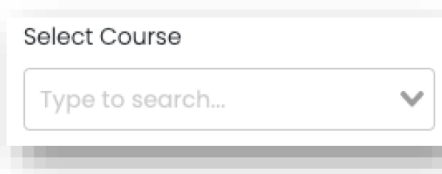
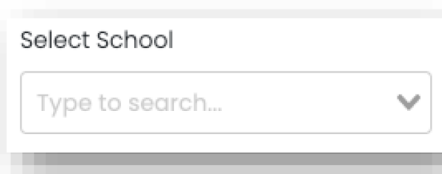

**\*\* TASK – Complete Initial Load of Classes and Enroll Students \*\***

**Quick Class Upload**

The Quick Class Upload is an excellent tool to quickly create a class and enroll students into the class using a single file, instead of the alternate methods requiring multiple files. For each file upload, one must select a specific Grade, Course and School.

**NOTE: Before creating a quick class, establish a naming convention for a Class Code. See hints for naming conventions in #8 below.**

<p>1</p> <p>Navigate in ADAM to <b>Rostering   Classes</b> – select the ellipses in the top right of the page.</p>	
<p>2</p> <p>Select “Quick Class Upload”.</p>	
<p><b>Step 1:</b> The file generated in this step is populated with one row for each student in the grade and school selected.</p>	
<p>3</p> <p>Select the grade to match the class(es) you are creating.</p>	

4	<p>Select the course to match the class(es) you are creating.</p>	
5	<p>Select the school to match the class(es) you are creating.</p>	
6	<p>Select the “Click to download template” button.</p> <p>The file download is named using the school, course, and date. An example file would be named “quick_class_James H Bean School_Grade 8 Science_05-01-2021.csv”.</p>	
<p><b>Step 2:</b> You will modify the file from Step 1 by adding the class assignments for each student.</p>		
7	<p>Open the download file from Step 1 (look in the download tray or download folder). A file made up of six columns will open for you. Column A (user_sourced_id) is the student SSID. Columns B and C are for the student names. Ignore but do not modify columns D and E.</p>	

	A	B	C	D	E	F
1	user_sourced_id	first_name	last_name	course_sourced_id	school_sourced_id	class_code
2	5384725	John	Huston	01-06SCI	idoe01-d01-s02	
3	6985715	Becky	Lynn	01-06SCI	idoe01-d01-s02	
4	3569774	John	Kline	01-06SCI	idoe01-d01-s02	
5	8754627	Jean	Falster	01-06SCI	idoe01-d01-s02	
6	2596842	Kenny	Master	01-06SCI	idoe01-d01-s02	
7	1589754	Troy	Groetken	01-06SCI	idoe01-d01-s02	

8 Populate column F with the class\_code. There should be 1 row per student being enrolled in the class.

The class\_code must be a unique value for the school. It could be your existing class/section code or some combination of the school, teacher name, and academic session (e.g., JHBean\_Wilson\_21).

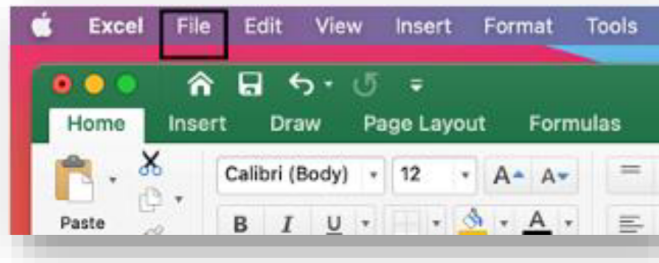
Consider generating a class file from your student system + the SSID of the students in those classes. Using the existing class/section ids as the class\_code.

The class code is displayed as the Proctor Group name in the Administration.

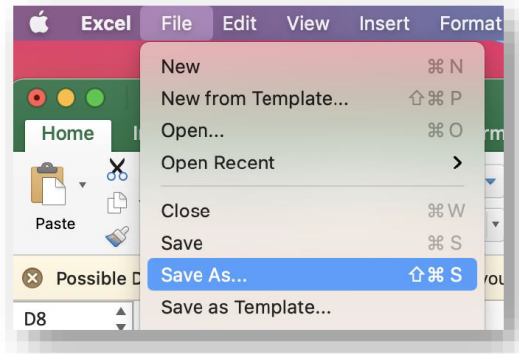
9 **Saving the CSV File**

The file format is critical. Even though you will be editing this file in Excel (numbers or sheets), you will need to save this file as a particular file type called CSV (Comma-Separated Value). There is some difference between using a Mac or a Windows machine, but these steps are very similar.

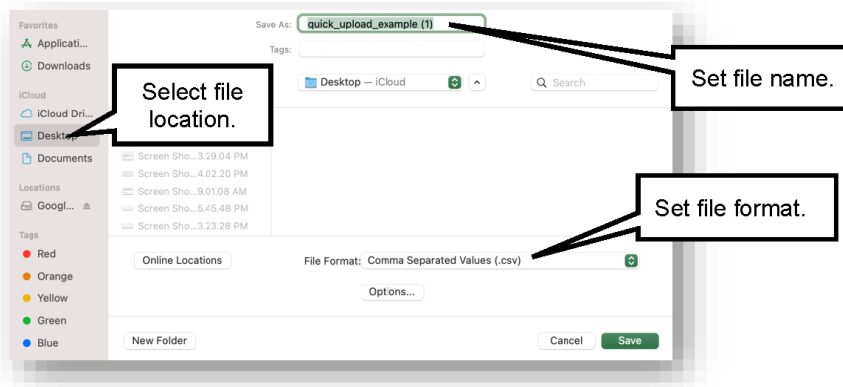
A. Find and select “File” at the top of the Excel window (this is an example of a Mac screen).



B. Select “Save As” from the available options.



C. Select where to save your file, name your file, and set the File Format to “Comma Separated Values (.csv)”.



D. Select the “Save” button.

**Step 3:** Upload the file into ADAM by browsing out to the file saved in Step 2.

Step 3: Upload the Student/Class file

Upload the Student/Class CSV file created in Step 2.

Choose a file or drop it here...

Browse

Once the CSV is uploaded, ADAM modifies the CSV Validation criteria based on the success of the upload. If the criteria is highlighted green, then the CSV file passes the criteria test. Otherwise, you will receive an error message identifying why the file failed the test.

Adding New Classes

New Classes: 1

New Enrollments: 4

Cancel OK

10 Select the “OK” button to accept the added classes and students.

Class Config

Home > Classes + Create New

Search... Filter by school... Filter by course...

Clear Filter > 1 to 2 (2) < 1 >

Title	School	Course	Class Code	Teacher	Students	Subjects	Grades	Created	Actions
Mrs. Cline	Northview Elementary	Demo 5th Grade Science	C00001	0	5	DEMO_SCIENCE	05	2021-02-17	
Mrs. Harper	Northview Elementary	Demo 5th Grade Science	C00005	0	4	None	None	2021-03-22	



## How to Update Class Enrollment

All students should be enrolled in a class. Once one enrolls their students in a class, then use a manual process to modify class enrollments. If a current student is transferring from one class to another, they need to be removed from one class and enrolled into the new class.

To remove or add students, you must know the student name and the class name for each class you edit.

CHECK	<input type="checkbox"/>	Student Name
LIST	<input type="checkbox"/>	Class Name

You then have two methods to edit the class roster, either edit the Class (by removing/adding the student) or edit the User (by removing/adding the class). Both methods have the same end result; the difference is where you start.

- **Removing/Adding Student(s) from a Class** – You start in ADAM by searching for the class, then edit the Student Name list.
- **Removing/Adding a Class on a User** – You start in ADAM by searching for the user (student), then edit the Class(es) Name list.

### Removing/Adding Student(s) from a Class

In this process, you are starting from a Class and modifying the students enrolled in the class.

1	Navigate in ADAM to <b>Rostering   Classes</b>							
2	Search for the class you are editing <ol style="list-style-type: none"> <li>Search by typing in the name of the class (e.g., Ms. Cline). The keywords will search on the Class Title field.</li> <li>Filter by school (e.g., Northview Elementary).</li> <li>Filter by course (e.g., Grade 5 Science).</li> </ol>							
3	Select the Edit icon.	<table border="1"> <thead> <tr> <th>Grades</th> <th>Created ↓</th> <th>Actions</th> </tr> </thead> <tbody> <tr> <td>05</td> <td>2021-02-17</td> <td> </td> </tr> </tbody> </table>	Grades	Created ↓	Actions	05	2021-02-17	
Grades	Created ↓	Actions						
05	2021-02-17							

<p>4 Scroll to the bottom of the Class Setup page to see the enrolled students.</p>	<table border="1"> <thead> <tr> <th colspan="3">Students (6)</th> <th>+</th> </tr> </thead> <tbody> <tr> <td>Arnold</td> <td>Steven</td> <td>(500000002)</td> <td></td> </tr> <tr> <td>Hill</td> <td>Virginia</td> <td>(500000004)</td> <td></td> </tr> <tr> <td>Jackson</td> <td>Joshua</td> <td>(500000001)</td> <td></td> </tr> <tr> <td>James</td> <td>Jasmine</td> <td>(500000000)</td> <td></td> </tr> <tr> <td>Tucker</td> <td>Ruth</td> <td>(500000003)</td> <td></td> </tr> <tr> <td>Barker</td> <td>Carla</td> <td>(400000001)</td> <td></td> </tr> </tbody> </table>	Students (6)			+	Arnold	Steven	(500000002)		Hill	Virginia	(500000004)		Jackson	Joshua	(500000001)		James	Jasmine	(500000000)		Tucker	Ruth	(500000003)		Barker	Carla	(400000001)	
Students (6)			+																										
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James	Jasmine	(500000000)																											
Tucker	Ruth	(500000003)																											
Barker	Carla	(400000001)																											
<p>5 Select the Delete icon to remove the student from the class list.</p> <p>or</p> <p>Select the + icon to add a student to the class list.</p>	<table border="1"> <thead> <tr> <th colspan="3">Students (6)</th> <th>+</th> </tr> </thead> <tbody> <tr> <td>Arnold</td> <td>Steven</td> <td>(500000002)</td> <td></td> </tr> <tr> <td>Barker</td> <td>Carla</td> <td>(400000001)</td> <td></td> </tr> <tr> <td>Hill</td> <td>Virginia</td> <td>(500000004)</td> <td></td> </tr> <tr> <td>Jackson</td> <td>Joshua</td> <td>(500000001)</td> <td></td> </tr> <tr> <td>James</td> <td>Jasmine</td> <td>(500000000)</td> <td></td> </tr> <tr> <td>Tucker</td> <td>Ruth</td> <td>(500000003)</td> <td></td> </tr> </tbody> </table>	Students (6)			+	Arnold	Steven	(500000002)		Barker	Carla	(400000001)		Hill	Virginia	(500000004)		Jackson	Joshua	(500000001)		James	Jasmine	(500000000)		Tucker	Ruth	(500000003)	
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Jackson	Joshua	(500000001)																											
James	Jasmine	(500000000)																											
Tucker	Ruth	(500000003)																											
<p>6 Select the “Submit” button to complete class edit.</p> <p><b>NOTE: IF YOU DON'T SELECT “SUBMIT”, THE REMOVAL/ADD IS NOT SAVED FOR THE CLASS.</b></p>	<div style="display: flex; justify-content: center; gap: 20px;"> <span>Cancel</span> <span style="border: 2px solid red; padding: 2px;">Submit</span> </div>																												

7

Title	School	Course	Class Code	Teachers	Students	Subjects	Grades	Periods	Actions
Mrs. Cline	Northview Elementary	Demo 5th Grade Science	C00001	0	5	DEMO_SCIENCE	05	None	

### Removing/Adding a Class on a User

In this process you are starting by looking up a user, then adjusting the class assigned to the user.

1	Navigate in ADAM to <b>Rostering   Users</b>
2	<p>Search for your user</p> <ul style="list-style-type: none"> <li>f. Search by typing in a Name like 'Smith'. The Name field searches:             <ul style="list-style-type: none"> <li>i. Given Name (First Name)</li> <li>ii. Family Name (Last Name)</li> <li>iii. First+Last Name (like "Kevin Graham")</li> <li>iv. Identifier Username</li> <li>v. User Email</li> </ul> </li> <li>g. Filter by Org like "Parson Creek Elementary". NOTE: After setting a school, you also have the option to filter by class.</li> <li>h. Filter by Role like "Student Role".</li> <li>i. Filter by Accommodation.</li> <li>j. Check "Show Unrostered" to only show unrostered student users.</li> </ul>

3	<p>Select the Edit icon next to the student.</p>	
4	<p>Scroll down to Classes: <b>Add a class</b></p> <p>Chose the class from the dropdown list. The list is filtered to only show classes in this student's school.</p> <p><b>Remove a class</b></p> <p>Select the "X" next to the class.</p>	
5	<p>Select the "Submit" button to save the edits to enrollment.</p>	

## Section 4: Managing Students

In this section you are introduced to maintaining the class lists and updating student universal tools/designated supports/accommodations.

### \*\* TASK – Add Unrostered Students to a Class \*\*

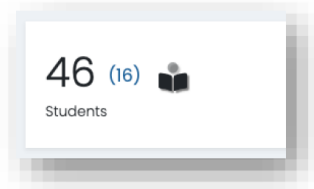
#### Maintain the Class Rosters

All students should be enrolled in a class group in ADAM. You may be notified as students move from one class to another within your school. If a student moves into or out of your school, that change is coming into ADAM through a nightly change file. The change information does not include which class a student belongs in. When a student moves to a new school, they are automatically removed from the current class and from any un-started Administrations.

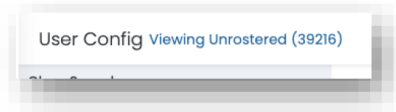
One of your primary tasks is to ensure that all students are enrolled into a class. There isn't a hard rule as to how often this should be done, as long as all students are in their correct classes prior to the start of each Administration.

There are three very simple ways to locate students who are not in a class.

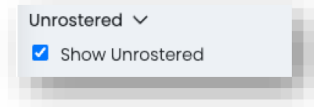
1. In ADAM, look on the Home page. The number in parenthesis on the Student Card represents the number of students without a class. Select the number in parenthesis. You are taken to **Rostering | Users** using the "Show Unrostered" User filter.



2. In ADAM, navigate to **Rostering | Users**. The number in parenthesis at the top of the page represents the number of students without a class. Select the number in parenthesis to filter the User page for unrostered users.



3. In ADAM, navigate to **Rostering | Users**. Check “Show Unrostered”.




Follow the instructions to add the student into a class.

1	Select the Edit icon next to the student.	
2	Scroll down to Classes and select the class from the dropdown list. The list is filtered to only show classes in this student's school.	
3	Select the “Submit” button to save the enrollment.	

### How to Update the Student Universal Tools/Designated Supports/Accommodations

Student universal tools/designated supports/accommodations are displayed in the Proctor Dashboard. The Proctor can hover over the tool/support/accommodation to get a full text description. This is an example of student with a text-to-speech accommodation.

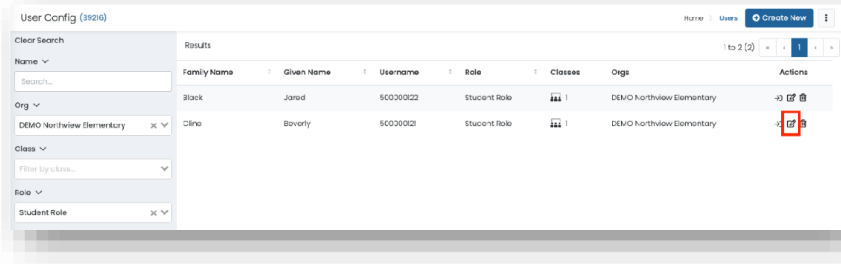

Tester	State	Accommodations
Adrian Greene	Submitted	

There are two varieties of accommodations:

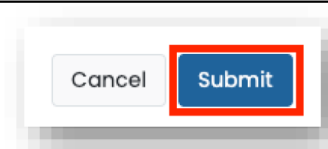
- **State Accommodations** – These accommodations are included in the Daily update file provided from the State of Maine DOE. It includes accommodations of Large Print, Braille, and Paper. All three of these accommodations are set to exclude the student from the online assessment.
- **Local Universal Tools/Designated Supports/Accommodations** – These tools/supports/accommodations are updated on the student’s record in ADAM by the SAC. They include Text-to-Speech, Read Aloud, Scribe and Extended Time. The Proctor can use the flag to determine which students need a specific accommodation.

**NOTE:** Tools/Supports/Accommodations must be set on the student 30 minutes prior to the student starting the assessment so the system has time to update the Administration.

**\*\* TASK – Update Student Tools/Supports/Accommodations \*\***

1.	Navigate to <b>Rostering   Users</b>	
2.	 <p>Search for your student</p> <ol style="list-style-type: none"> <li>Search by typing in a keyword like 'Smith'. The Name field searches:             <ol style="list-style-type: none"> <li>Given Name (First Name)</li> <li>Family Name (Last Name)</li> <li>First+Last Name (like "Kevin Graham")</li> <li>Identifier – State ID</li> </ol> </li> <li>Filter by Org for a school like "Northview Elementary". NOTE: After setting a school, you also have the option to filter by class.</li> <li>Filter by Role like "Student Role".</li> </ol>	
3.	Select the Edit icon.	



<p>4.</p>	<p>The accommodations for the student are found on the right side of the page.</p> <p>Accommodations set by the State DOE are:</p> <ul style="list-style-type: none"> <li>• Large Print,</li> <li>• Braille, and</li> <li>• Paper.</li> </ul> <p>These accommodation types exclude students from online testing.</p> <p>Tools/Supports/ Accommodations set at the local level by DAC/SAC are:</p> <ul style="list-style-type: none"> <li>• Text-To-Speech,</li> <li>• Read Aloud,</li> <li>• Scribe, and</li> <li>• Extended Time.</li> </ul>	<p>Accommodations</p> <p><input type="checkbox"/> Text To Speech If checked the student will have the TTS accommodation.</p> <p><input type="checkbox"/> Read Aloud If checked the student will have the Read Aloud accommodation.</p> <p><input type="checkbox"/> Large Print If checked the student will have the Large Print accommodation.</p> <p><input type="checkbox"/> Braille If checked the student will have the Braille accommodation.</p> <p><input type="checkbox"/> Scribe If checked the student will have the Scribe accommodation.</p> <p><input type="checkbox"/> Extended Time If checked the student will have the Extended Time accommodation.</p> <p><input type="checkbox"/> Paper If checked the student will have the paper accommodation</p>
<p>5.</p>	<p>Select the “Submit” button to save the school assignment reset.</p>	

## Section 5: Assessment Management

This section explains the components of an Administration, how to navigate an administration, how to create Alias Proctor Groups and how to print the Student Assessment Cards.

### Overview

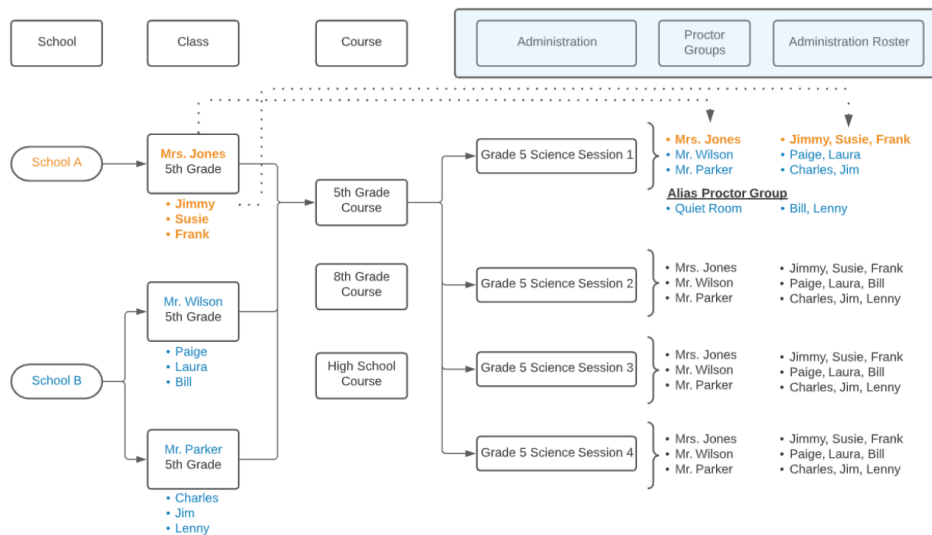
Assessment Management is where setup of Classes, Courses and Administrations all come together to ensure students are enrolled into the correct assessments for the day of the assessment.

This diagram demonstrates how the pieces work together:

- **School** – Found in ADAM in **Rostering | Orgs**. Schools are identified by their name and Type = school.  
The diagram shows two (2) schools – School A and School B.
- **Class** – Found in ADAM in **Rostering | Classes**. Classes can be filtered by Name, School or Course (grade).  
The diagram shows School A with one (1) 5<sup>th</sup> Grade Class and School B has two (2) 5<sup>th</sup> Grade Classes.
- **Class List** – Found in ADAM in **Rostering | Classes**. Class Lists are found by editing a specific Class to find the Students associated with the class.  
The diagram shows three (3) students enrolled in each of the three (3) classes.
- **Course** – Set to identify grade level, either 5<sup>th</sup> Grade, 8<sup>th</sup> Grade or High School.  
The diagram shows all three classes pointing to the 5<sup>th</sup> Grade Course.
- **Administration** – Found in ADAM in **Test Management | Administrations**. These represent the assessments available during the assessment window.  
Each student takes four (4) assessment sessions, seen in ADAM as Administrations (Grade 5 Science Session 1 – Session 4).  
The diagram shows the four Administrations, all pointing to the 5<sup>th</sup> Grade Course.
- **Proctor Groups** – Found in ADAM in **Test Management | Administrations** then viewing the Proctor Group in a specific Administration. A Proctor Group breaks the students eligible for the assessment into groups based on the class the student is enrolled in.  
The diagram shows the Administrations associated with the 5<sup>th</sup> Grade Course having three (3) Proctor Groups. That corresponds directly with the three (3) classes associated with the 5<sup>th</sup> Grade Course. *The exception is the addition of the Alias Proctor Group in Session 1.*
- **Alias Proctor Group** – Found in ADAM within an Administration, in the same place as Proctor Groups. You can move any student from an existing Proctor Group into an Alias Proctor Group—useful if you need to subset a Proctor Group by something smaller than a class. The diagram shows a single Alias Proctor Group, added to Session 1, called ‘Quiet Room’. Bill from Mr. Wilson’s Proctor Group and Lenny from Mr. Parker’s Proctor Group were moved into the ‘Quiet Room’ Alias Proctor Group to take ‘Grade 5 Science Session 1’ Administration.

- Administration Roster** – Found in ADAM within an Administration, either by Viewing Students or by Viewing a Proctor Group (Sessions or Proctor). This is a list of the students eligible for the Administration. This list is kept in sync with the class list using the Course as the common element.
 

The diagram shows the students associated with Proctor Groups in the Administration are directly related to the Class lists for the Classes sharing the same names. The exception is when an Alias Proctor Group is created. The students in the Alias Proctor Group are maintained in the Administration Roster, based on the original class.



This diagram displays information based on a DAC with oversight of School A and School B.

An SAC with oversight of **School A** would only see the Schools, Classes, Proctor Groups and Administration Rosters associated with School A (text color in orange).

An SAC with oversight of **School B** would only see the Schools, Classes, Proctor Groups and Administration Rosters associated with School B (text color in blue).

## Working in an Administration

### Administration Terms

- **Administration** – an assessment in ADAM. Each grade participating in the Maine Science Assessment has 4 Administrations (assessment sessions).
- **Proctor Group** – a group of students within an Administration. One Proctor Group is created for each Class participating in the assessment.
- **Alias Proctor Group** – a group of students within an Administration. An Alias Proctor Group is created when an Administration needs students from the existing Proctor Groups broken up. You might create an Alias Proctor Group if the original Proctor Group is too large to be assessed in a single room.
- **Student Assessment Card** – a physical piece of paper that can be handed to a student. Included on the card are the Test Code, the student's name, and SSID.
- **Roster** – a list by Proctor Group showing the list of all the students in the Proctor Group also includes the Student Assessment Cards.

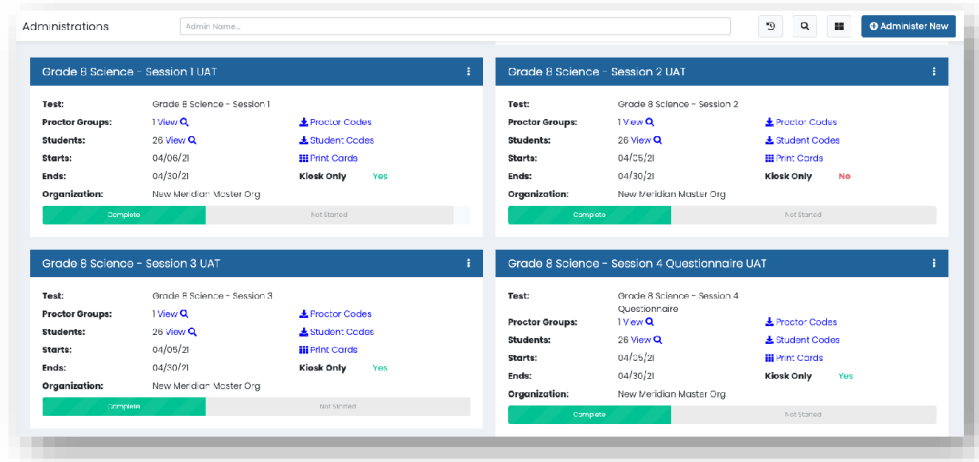
“Administrations” are assessment sessions to which students are assigned automatically if the students are enrolled in a class. Administrations have already been created by the state in ADAM for the Spring 2021 assessments. There are 12 established Administrations. For each grade level, there are 4 required Sessions. Sessions 1, 2, and 3 will be delivered on separate days. Session 4 is a student questionnaire that will be administered on the same day as Session 3. See the Maine Science Assessment Administration Manual for further information.

- **Grade 5 Science – Session 1** through **Grade 5 Science – Session 4**
- **Grade 8 Science – Session 1** through **Grade 8 Science – Session 4**
- **High School Science – Session 1** through **High School Science – Session 4**

When logged in to ADAM, you will see Administrations available for students within your organizational scope. For example, an SAC for a Middle School will see the four (4) Grade 8 Science Administrations. The DAC will see all twelve (12) Administrations... assuming the district has schools that include grades 5, 8, and High School. The State Administrator will see all twelve (12) Administrations.

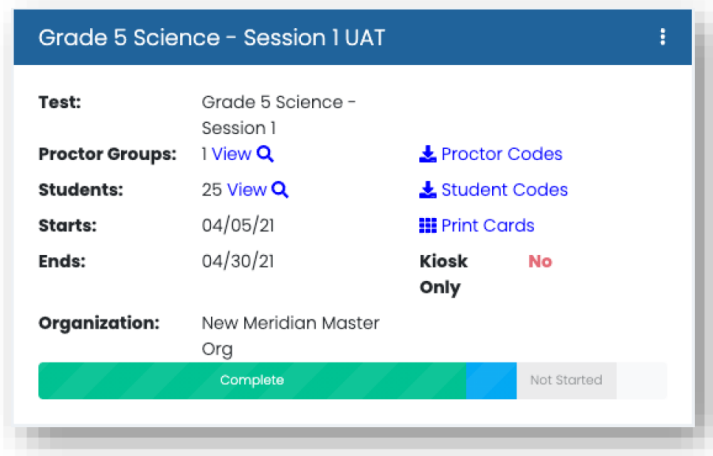
ADAM maintains these Administrations through frequent data updates, based on the students enrolled in the associated classes.

Administrations are found in ADAM by navigating to **Test Management**, then **Administrations**.



This is representative of what an 8<sup>th</sup> Grade SAC would see on the Administration page.

### Administration Card



You need to remember four things about the Administration Card. Items with asterisks are covered in more detail within this manual.

1. **Student progress** – Hover over the three student status bars to see an actual count for Complete, In Progress, and Not Started. The status bar is at the bottom of the card.

2. **Students** – Select the View link next to Students. This page shows a list of all the students registered for the Administration. The functions within Students includes:
  - a. A list of Student Names, Session State, Test Code for the Administration
  - b. Being able to enable Text-to-Speech for a student in the Administration  
NOTE: You cannot adjust the State of a student from here, that can only be done within the Proctor Dashboard.
3. **Print Cards icon** – Use this button to print Rosters and Student Assessment Cards for the entire Administration.
4. **Proctor Groups** – Select the View link next to Proctor Groups. The functions within Proctor Groups include:
  - a. Create Proctor Group Alias.
  - b. See Test Code and Proctor Password for each Proctor Group.
  - c. See Student progress for each Proctor Group.
  - d. Access the **Sessions** page. This page shows a list of all the students registered in this Proctor Group:
    - i. See the list of Student Name, Session State, Test Code for the Proctor Group.
    - ii. Enable Text-to-Speech for the students in the Proctor Group. \*  
NOTE: You cannot adjust the State of a student from here; this can only be done within the Proctor Dashboard.
  - e. Access the **Proctor** Dashboard page. This page is the same page provided to the Proctors. Use the Proctor Dashboard to control the student session state (pause, reseal, submit, etc.) and see the progress of individual students.
    - i. **Print Cards icon** – Use this button to print Rosters and Student Assessment Cards for the students in this specific Proctor Group. \*

### How to Create Alias Proctor Groups

An Alias Proctor Group allows students to be assigned a proctor group that is different than their default Class group. A Class may have students being administered assessments in multiple Proctor Groups, but the student results data will still be connected to their Class. Alias Administrations will have unique test codes and proctor codes.

Common examples of when to create an Alias:

- A class is divided into multiple Proctor Groups, each taking the assessment in several different locations within the school, or offsite.
- Students with an Extra Time designated support are taking the assessment in a separate room.
- Students taking a make-up session are being proctored together at a later date.

<p>1 Navigate to <b>Test Management   Administrations</b> search for the Administration needing an alias.</p>	
<p>2 Select the “View” link in the Proctor Groups row.</p>	
<p>3 Select the “Create Alias” button.</p>	

<p>4</p> <ul style="list-style-type: none"> <li>• Set the Alias Name.</li> <li>• Select the plus symbol to start adding students.</li> </ul>	
<p>5</p> <p>Select the plus symbol next to the student to move the student into the Alias Proctor Group.</p> <p>NOTE: You can search for students by name or accommodation.</p>	



<p>6 Select the “Done” button to exit the Add Sessions page.</p> <p>Select the “Submit” button to save the Alias Proctor Group.</p>																
<p>7 The Alias Proctor Group is displayed with the original list of Proctor Groups. The Alias Proctor Group has both a unique Assessment Code and Proctor Password.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>Test Code</th> <th>Proctor Pw</th> <th>Progress</th> <th>Actions</th> </tr> </thead> <tbody> <tr> <td>Mrs. Cline Maine Demo Assessment</td> <td>ZK7F4H</td> <td>GLTWRR</td> <td>Not Started</td> <td>Sessions Proctor</td> </tr> <tr> <td>Mr. Graham</td> <td>KMM8T5</td> <td>HGCHAH</td> <td>Not Started</td> <td>Sessions Proctor</td> </tr> </tbody> </table>	Name	Test Code	Proctor Pw	Progress	Actions	Mrs. Cline Maine Demo Assessment	ZK7F4H	GLTWRR	Not Started	Sessions Proctor	Mr. Graham	KMM8T5	HGCHAH	Not Started	Sessions Proctor
Name	Test Code	Proctor Pw	Progress	Actions												
Mrs. Cline Maine Demo Assessment	ZK7F4H	GLTWRR	Not Started	Sessions Proctor												
Mr. Graham	KMM8T5	HGCHAH	Not Started	Sessions Proctor												

**\*\* TASK – Print Student Assessment Cards \*\***

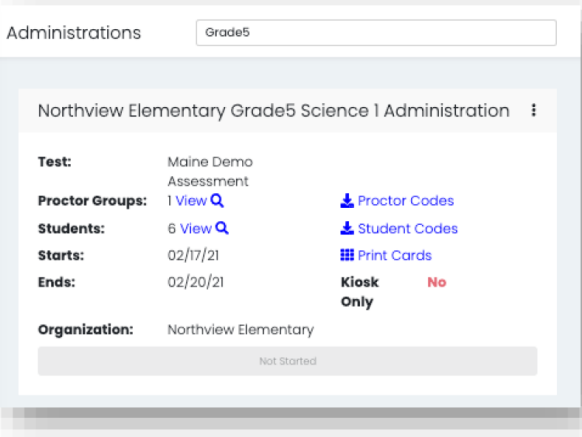
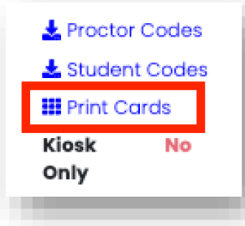
**Print Student Assessment Cards and Roster Sheets**

Each Administration has printable sheets to hand out to the Proctors containing the information students need to sign into their session. These sheets can be separated and handed out to each student in the Proctor Group.

With multiple Proctor Groups, each group has a unique Assessment Code, and the sheets are separated.

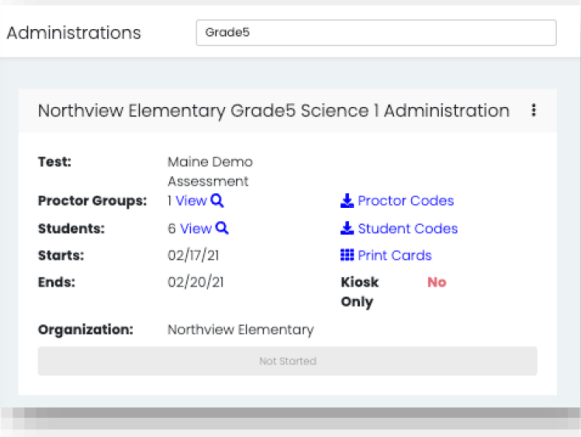

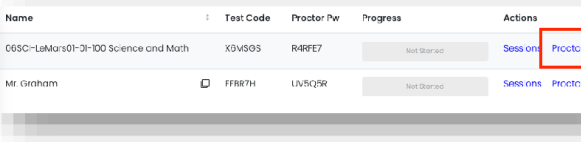
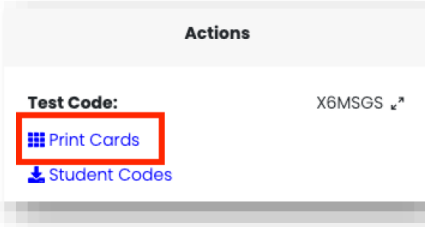
You can choose to print the cards for all Proctor Groups in the Administration or print cards for a specific Proctor Group.

### Print Cards for the Entire Administration

1	Navigate in ADAM to <b>Test Management   Administrations</b> .	
2	Search for the Administration (e.g., Grade5).	 <p>The screenshot shows the 'Administrations' page with a search filter set to 'Grade5'. It displays details for 'Northview Elementary Grade5 Science   Administration'. Key information includes: Test: Maine Demo Assessment; Proctor Groups: 1 View; Students: 6 View; Starts: 02/17/21; Ends: 02/20/21; Organization: Northview Elementary. Action buttons include Proctor Codes, Student Codes, and Print Cards. A 'Kiosk Only' indicator is set to 'No'.</p>
3	Select the “Print Cards” option to open a second window displaying the cards.	 <p>This close-up shows the 'Print Cards' button, which is highlighted with a red rectangle. Other buttons visible include Proctor Codes, Student Codes, and the Kiosk Only indicator.</p>

This step includes cards for Proctor Groups; therefore, there is no need to print cards for a proctor group. Please continue to 'Working with the Print Controls' on page 42.

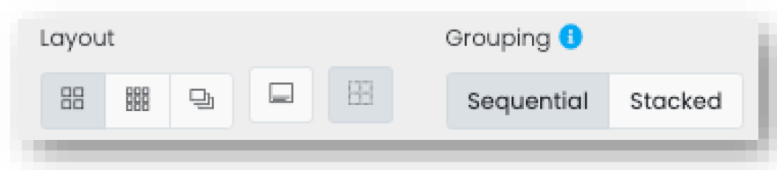
### Print Cards for a Proctor Group

1	Navigate in ADAM to <b>Test Management   Administrations</b>
2	<p>Search for the Administration (e.g., Grade5).</p> 
3	<p>Select the “View” link next to Proctor Groups.</p> 
4	<p>Select the “Proctor” link to access the Proctor Dashboard.</p> 
5	<p>Select the “Print Cards” option to open a second window displaying the cards.</p> 


Next: continue on to ‘Working with the Print Controls’.

### Working with the Print Controls

- 1 Use the controls at the top of the page to modify the layout and grouping of the cards.



#### Card Layout Options

 Prints 2 cards side by side (4 rows)

**ADAM**

**Paula Arnold**

---

Test Code  
**22D7VS**

State Student ID  
**500000032**

Grade 8 Science - Session 2 Northview School District  
Mrs. Jordan Grade 8 Science - Session 2

**ADAM**

**Steven Arnold**


---

Test Code  
**22D7VS**

State Student ID  
**500000002**

Grade 8 Science - Session 2 Northview School District  
Mrs. Jordan Grade 8 Science - Session 2

 Prints 3 cards side by side (6 rows)

 Prints 1 card per printed page

Adds a Title Page to the card view for each Proctor Group (Roster sheet for proctor)

**ADAM**

Grade 8 Science - Session 2 Northvie...

Mrs. Jordan Grade 8 Science - Sessio...

Test Code: **22D7VS**      Proctor Password: **4TPF6T**

Student	State Student ID
1. Paula Arnold	500000032
2. Steven Arnold	500000002

Adds or removes the border between the cards

2 Select the Print icon to print.

3 The cards contain what the students need to log in to the session:

- Student Name
- Assessment/Test Code
- State Student ID (SSID)

**ADAM**

**Paula Arnold**

Test Code  
**22D7VS**

State Student ID  
**500000032**

Grade 8 Science - Session 2 Northview School District  
Mrs. Jordan Grade 8 Science - Session 2

**ADAM**

**Steven Arnold**

Test Code  
**22D7VS**

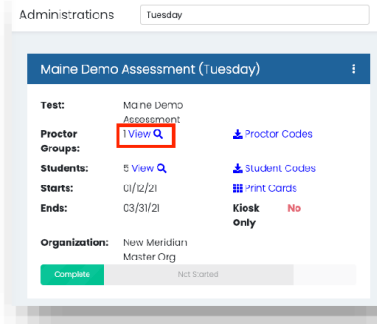
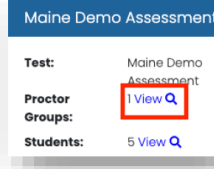
State Student ID  
**500000002**

Grade 8 Science - Session 2 Northview School District  
Mrs. Jordan Grade 8 Science - Session 2

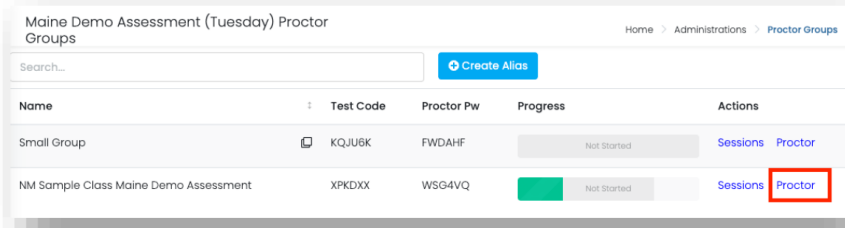
### How to Unsubmit an Assessment

When a student completes their assessment, it is in the Submitted State. They do not have access to re-open the assessment. On the day of the assessment the Proctor and SAC/DAC's have the authority to allow the student back into the assessment. The session needs to be Unsubmitted, then Reseated to allow the student access to the assessment session.

**NOTE: Only the State of Maine DOE has the authority to unsubmit a student's assessment once the assessment day is over.**

1.	Navigate to <b>Test Management   Administrations</b>
2.	<p>Search for the Administration containing the student that needs a session unsubmitted.</p> 
3.	<p>Select the "View" link next to Proctor Groups.</p> 

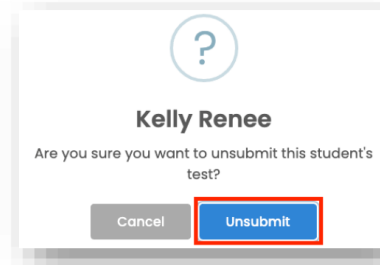
4. Select "Proctor" to enter the Proctor Dashboard.



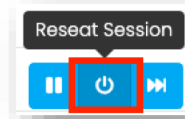
5. Find the student in Submitted State and select the "Unsubmit" button.

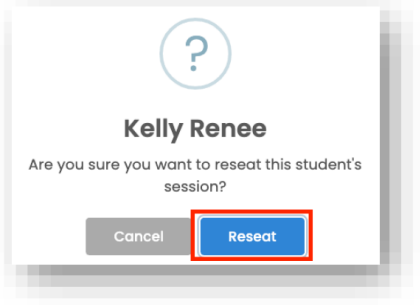


6. Confirm the "Unsubmit" action.



7. The student status should now be "In Progress". Select the "Reset Session" button to allow the student to re-enter the session.



8.	Confirm the 'Reseat' action.  The student status should now be "Reseat".	 <p>The screenshot shows a confirmation dialog box with a question mark icon at the top. Below the icon, the name 'Kelly Renee' is displayed. The text asks, 'Are you sure you want to reseat this student's session?'. At the bottom, there are two buttons: 'Cancel' and 'Reseat'. The 'Reseat' button is highlighted with a red border.</p>
----	--	--



### How to Update the Roster in an Administration

Every 30 minutes, ADAM actively updates Administration rosters when students are added to or removed from classes linked to active Administrations, or universal tools/designated supports/accommodations are added or removed from student profiles.

A flag icon displayed on the Administration card indicates that the automated rescan process has not yet processed. If it is critical for the update to complete, this can be manually triggered using the 'Scan New Students' feature.

In this example, we learn that Carla Barker recently enrolled in Ms. Cline's class and thus is missing from the 'Northview Elementary Grade5 Science 1' Administration.

*Requirements: The student needs to be added or removed from the class in ADAM.*

1	Navigate in ADAM to <b>Test Management   Administrations</b>	
2	Search for the Administration (e.g., Grade5).	
3	Select the ellipses in the top right of the Administration card and select "Scan New Students".	

4 Select the "OK" button to complete the updated roster.

**Scan for new students?**

Scanning for new students will:

1. Update the admin with any new rostered students
2. Update all (not yet in progress) sessions' assigned forms to correspond to the associated user's configured accommodations
3. Remove any sessions for which the associated user is no longer rostered
4. Remove any sessions for which the associated user's configured accommodations indicate that they should not be delivered this test

Current		New	
Proctor	1	Proctor	1
Groups:	1	Groups:	1
Students	5	Students	6

Cancel OK

Student count in the current roster

Student count in current classes

NOTE: In this example, we see that there is one (1) new student in a class who is not in the Administration. This process replaces the Administration Roster with the updated class lists.

## Section 6: Reporting

There are two reports available in ADAM.

### Progress Report

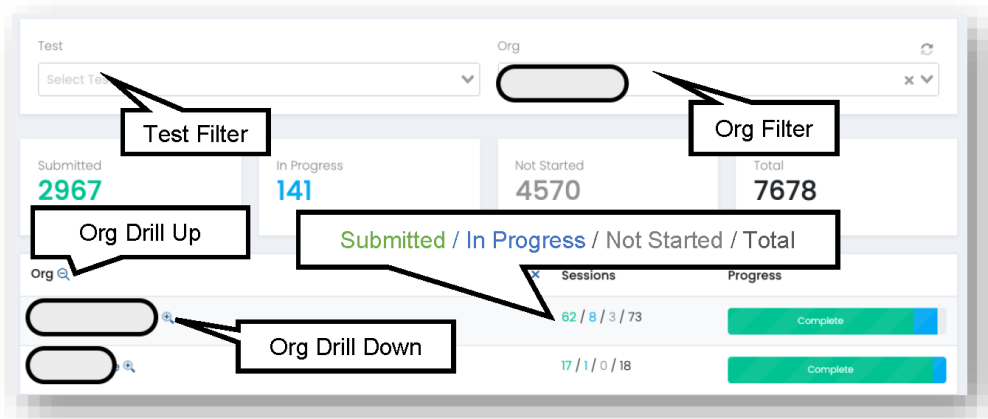
The Progress Report can be used to watch the progression of Administrations for a School or District.

#### Filters

The Progress report filters the detail by Test and Organization. Details in the report are delivered as 4 tiles with counts of sessions: Submitted, In Progress, Not Started, and Total.

#### Organizational Session Status

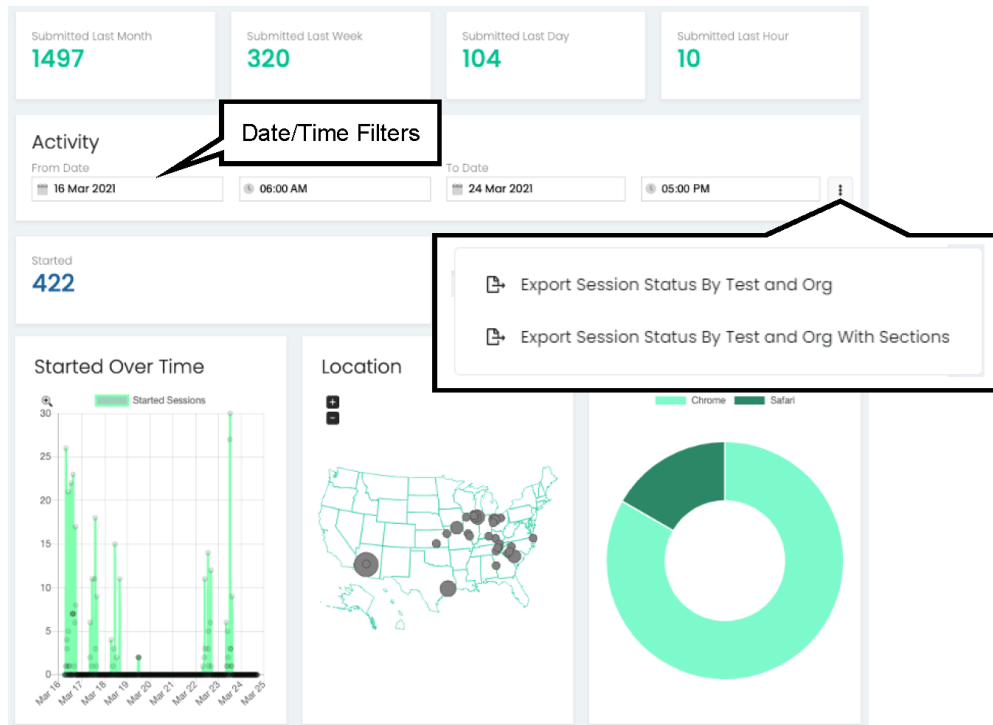
The bottom section is an Organizational drill down/up to see the session counts by Organizational level (based on the user's Org Scope): State, District, School, and Proctor Group.



## Activity Report

The Activity Report provides information about sessions based on the user's Org Scope.

The top tiles display session counts for the number of sessions: Submitted Last Month, Submitted Last Week, Submitted Last Day, and Submitted Last Hour.



### Date/Time Filter

Use the Activity Date/Time Filter to look at activity for a specified date/time range. The date/time filter is used on the session count tiles:

- **Started** – the count of individual student sessions for which a student has logged in to the assessment.
- **Completed** – the count of individual student sessions for which a student has submitted the assessment.

### Export Session Status

Use the horizontal ellipses found in the Activity section (where the date/time filters are set) to “Export Session” status.

### Additional Statistics

The dashboard includes several other statistics by default:

- **Started Over Time** – uses the date/time filters. This graph represents the count of assessment sessions started.
- **Location** – uses the date/time filters. This graph represents the geographic location of the computer used to log in to the assessment session.
- **Browsers** – uses the date/time filters. This pie chart represents the browser type used during the assessment session. Because the Spring 2021 Maine Science Assessment requires use of the lockdown browser on devices, this chart will always be 100% Chrome.

**END OF GUIDE**



## Quick Guide – Starting Your Maine Science Assessment

(Document begins on next page.)



# QUICK GUIDE – STARTING YOUR MAINE SCIENCE ASSESSMENT

MAINE SCIENCE ASSESSMENT

SPRING 2022

**ADAM**  
Assessment Delivery and Management



**Table of Contents**

<i>Introduction</i>	<b>3</b>
<i>How to Login to a Test</i>	<b>4</b>
<i>Tools Available During Testing</i>	<b>8</b>





## Introduction

This Quick Guide can be used along with the Tutorial, explaining from a students perspective:

1. Learn how to sign in to the Maine Science Assessment in the Lockdown browser
2. Learn how to navigate the assessment from the Welcome page through the Review Page.
3. Learn about the tools you can use while taking the assessment.

This document is part of a suite of guides and manuals available through Maine DOE for the Spring 2022 Maine Science Assessment, including:


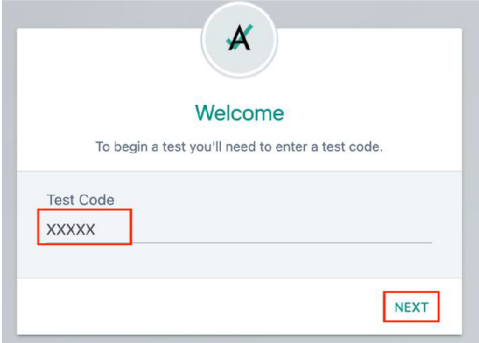
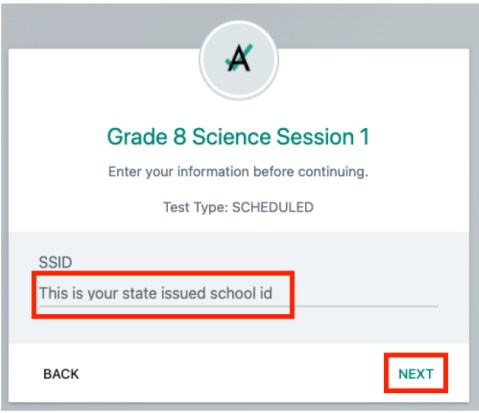
- *Accessibility Guide*
- *ADAM Platform User Guide*
- *Assessment Administration Manuals, one each for grades 5, 8, and high school*
- *Device, System, and Lockdown Browser Installation Guide*
- *Principal and Assessment Coordinator Manual*
- *Proctor User Guide*
- *Quick Guide – Starting Your Maine Science Assessment (THIS DOCUMENT)*

If questions arise, or if any situation occurs that could cause any part of the science assessment administration to be compromised, Assessment Administrators should contact **Nancy Godfrey, Assessment Coordinator, at the Maine Department of Education** at [REDACTED] or [REDACTED].

If after reading this guide, you still need assistance, Contact the Maine Science Support Desk at <https://mescience.zendesk.com>



## How to Login to a Test

<p>1</p> <p>When your teacher/proctor instructs you to open the lockdown browser, click on the Adam Lockdown Browser icon</p>	
<p>2</p> <p>When your teacher/proctor provides you with the test code, type it into the open field</p> <p>Press the NEXT button to continue</p>	
<p>3</p> <p>Enter your SSID</p> <p>Press the NEXT button to continue</p>	



<p>4</p> <p>Verify the Assessment (Test) Name and Your Name (You).</p> <p>Press the NEXT button to continue</p>	
<p>5</p> <p>Read the assessment introduction and instructions</p> <p>Press the <b>Start</b> button to begin</p>	
<p>6</p> <p>The Next button moves you forward through the questions.</p> <p>You may move to previous questions using the back arrow.</p>	
<p>7</p> <p>You can see the item number you are on by looking in the upper right part of each page.</p>	

+



8	<p>If you move to another question without first answering the question you are on, you will receive a warning message.</p> <p>NOTE: You can come back to these questions later.</p>	<p><b>Item not complete</b></p> <hr/> <p>Some questions in the current item remain unattempted. Do you wish to navigate to another item anyway?</p> <p><input type="button" value="Cancel"/> <input type="button" value="Continue"/></p>
9	<p>After answering the last question, the Next button takes you to the Review page.</p> <p>Note: You can navigate back to unanswered or flagged questions from the Review page.</p>	<p><input type="button" value="◀"/> <input type="button" value="Next ▶"/></p>
10	<p>The review screen is presented at the end of the assessment, even if all items have been answered. In this review screen, we can see that a student flagged one item (question 14). Items highlighted in red (or without the black footer) have not been completed (questions 1 and 13). You can click on any item number and review the item before submitting the assessment.</p> <p>Click the <b>Finish</b> button to submit the assessment.</p>	<p>Filter to display only flagged items</p> <p>Filter to display only unattempted items</p>
11	<p>This is the final screen asking for your permission to submit.</p> <ul style="list-style-type: none"> <li>Click the <b>Yes</b> button to submit</li> <li>Click the <b>No</b> button to return to the Review screen</li> </ul>	<p><b>Test submitted</b> <span style="float: right;">✕</span></p> <p>🕒 04:22 / 01:00:00</p> <hr/> <p>2 questions are unattempted.</p> <p>Are you sure you want to submit the test?</p> <p><input type="button" value="No"/> <input type="button" value="Yes"/></p>



12

Test submitted



Thank you for completing the session. Please click the close button below.

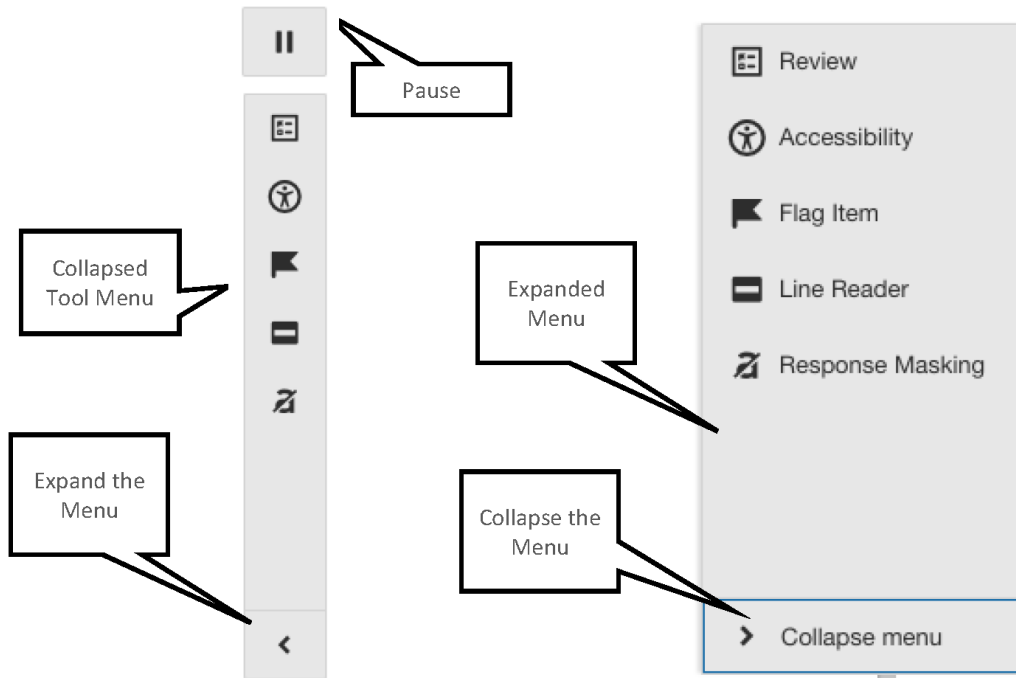
Close

Click the **Close** button to exit the lockdown browser


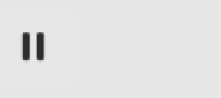
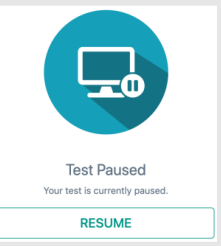


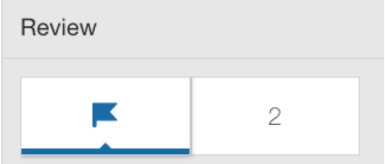




## Tools Available During Testing
















There are many tools available to assist you during the test. Not all are available for all tests. The applicable tools will be reviewed prior to the start of the test.






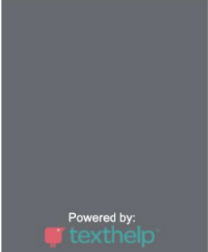
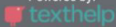

	<p>The question navigation is displayed at the bottom of the page. You may move forward through the questions by clicking on the Next button. You can move to previous questions using the back arrow button.</p>
	<p>The Pause button allows you to “pause” your test session. This should be used when you need to leave your workstation momentarily. The proctor is notified when your test is paused.</p>
	<p>You will see the Resume button once you click on the pause button. To resume the assessment, you should click on the resume button.</p>
	<p>The accessibility menu option gives you the option to: Change the color of the background and text. Change the font size. Instructions for using built-in browser zoom</p>
	<p>If you set a flag on a question, the lockdown browser displays it on the Review page. It is reminding you to re-look at this question. In this example, question 1 is flagged.</p> 
	<p>You can remove the flag by clicking Unflag item.</p>
	<p>When response masking is on, answer options can be shaded on the screen to help you think through your response. Mask an answer option by clicking on it. You click the answer option again to remove the masking.</p>



 Highlight ▼	Apply highlighting to a section of text by first selecting the text, then choosing the highlight color using the popup Highlight drop-down menu.
 Remove	After highlighting text, the highlight can be removed by first selecting the highlighted text, then click the remove option from the popup.
 Text to Speech	When Text to Speech is enabled, this option toggles the TTS player (found at the top of the page) on and off. Only students with an assigned accessibility tool will be able to use TTS for the Science Assessment.
<div style="border: 1px solid gray; padding: 5px; display: flex; justify-content: space-around; align-items: center;">        </div> <p>The text to speech player enables features for TTS</p>	
	Click to collapse the TTS toolbar
	Select this button, then click anywhere in the text to start reading aloud
	Speak the current selection
	Pause Speech
	Stops speech playback



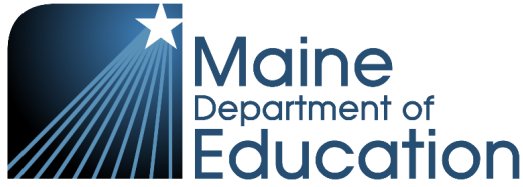


	<p>Change settings</p> <div data-bbox="643 464 862 569"> <p><b>Settings</b></p> </div> <div data-bbox="643 579 849 611"> <p>Speech</p> </div> <div data-bbox="643 615 849 865">  </div> <div data-bbox="683 821 797 861"> <p>Powered by: </p> </div>
	<p>Click and hold and drag to move the toolbar</p>



## Practice Assessment Administration Manual–Grade 5

(Document begins on next page.)



**Practice  
Assessment  
Administration  
Manual**

**Spring 2022**

**SCIENCE**

**GRADE**

**5**



## Table of Contents

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## Maine Science Assessment Practice Test Supplemental Materials and Resources

### Grade 5

There are two systems that can be used to help prepare your student for the Maine Science Assessment.

1. The [Maine Science Assessment Tutorial](#) is a set of online questions that allow students to better understand and practice using the tools and response methods they may experience using ADAM, the Maine Science Assessment platform. This tutorial does not provide practice on the content or item types from a content perspective. It will, however, provide exposure to the navigation, tools, accessibility features, and methodology for responding to item types such as drag and drop and other technology-based item types that require manipulation of the mouse.

Tutorial test code:

- No Text-to-speech (TTS): STUTOR
- Text-to-speech (TTS) enabled: STUTORT

2. The Grade 5 [Maine Science Assessment Practice Test](#) is an online set of scenarios and items meant to familiarize students with the types of questions they may encounter when they take the Maine Science Assessment. The practice test is not scored, nor are the students' answers retained. Each online question can be answered and checked via the online interface. The students will receive real-time feedback that indicates the accuracy of their answers using the following messages:

- Correct, way to go!
- Incorrect, you may want to try again.

Practice Test code:

- No Text-to-speech (TTS): SPTGR5
- Text-to-speech (TTS) enabled: SPTGR5T

Each student has up to three (3) attempts to reason through and find the correct answer. The rationales, or reasons why the incorrect answers are wrong, can be found starting on page 5 of this packet and should be used to help explain the error that they likely made that led them to choose that specific wrong answer. The rationales are developed based on the most frequent errors and may not be the exact logic or factual error a student made.

For test questions that are not scored by the system, those that require a written or constructed response, we recommend that students answer these questions on paper so that their responses can be reviewed against the rubric and discussed outside of the system. The rubrics for these questions can be found starting on page 5 of this packet.

While these tools do not take the place of your science instruction, which is the number one preparation that all students should receive, we do recommend that you have students access and take the tutorial (see URL below) to familiarize themselves with the ADAM platform, navigation, and features. Once there is good familiarity with the platform, we recommend that your students work through the practice test (see URL below) to become acquainted with how their science content will be assessed during the Maine Science Assessment.

Links:

- Maine Science Assessment Tutorial: <https://adamexam.com/tester/>
- Maine Science Assessment Practice Test: <https://adamexam.com/tester/>
- Supplemental Materials and Resources: <https://mescience.zendesk.com/hc/en-us/sections/1500001237162-Resources-Document-Downloads>

### **Universal Features, Designated Supports/Features, and Accommodations**

The full list of Universal Features, Designated Supports/Features, and Accommodations for students with disabilities and English learners can be found in Appendix A of the [\*Maine Principal and Assessment Coordinator \(PAC\) Manual\*](#).

### Grade 5 Practice Test Table of Rationales and Exemplars

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
Daytime Moon								
1	A	N/A	N/A	N/A	N/A	N/A	The Sun should be placed in the drop box in the middle of the orbit circle, and Earth should be placed on the drop box on the orbit circle. Earth should orbit the Sun.	N/A
1	B	N/A	N/A	N/A	N/A	N/A	Earth should be placed in the drop box in the middle of the orbit circle, and the Moon should be placed on the drop box on the orbit circle. The Moon should orbit Earth.	N/A
1	C	This is incorrect because although the Moon orbits Earth and the Sun, the Sun doesn't orbit Earth.	This is incorrect because neither the Earth nor the Sun orbit the Moon.	This is correct because the Earth/Moon system orbits the Sun.	N/A	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
2	N/A	This is incorrect because the Moon does not produce its own light. Instead, it reflects the light of the Sun.	This is incorrect because the Moon's orbit does not make the Moon move closer to the Sun.	This is incorrect because the Moon is small in comparison to the other objects in the sky that are visible from Earth. It is because it is closer to Earth that it appears larger.	This is correct because the apparent size of the moon, in comparison to other objects in the sky, is due to how close the Moon is to Earth.	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A	The Full Moon should be placed in the drop box to the left of Earth because the side of the Moon that the sunlight shines on is visible to an observer on Earth. The New Moon should be placed in the right drop box between Earth and the Sun because the dark side of the Moon is facing an observer on Earth. The top and bottom drop boxes will not be used.	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
4	A	N/A	N/A	N/A	N/A	N/A	Day should be placed in the drop box to the right of Earth, between Earth and the Sun, because the sunlight would shine on that side of the Earth. Night should be placed in the drop box to the left of Earth, because the sunlight would not shine on that side of the Earth. The top and bottom drop boxes will not be used.	N/A
4	B	This is correct because Earth spins counterclockwise as seen from above the north pole on its axis, which causes the Sun to appear to rise in the East and set in the West.	This is incorrect because although Earth revolves around the Sun, it does not cause us to experience day and night. Earth's revolution around the Sun results in seasons.	This is incorrect because even though the Sun rotates on its axis, this does not result in the rising and setting of the Sun as seen from Earth.	This is incorrect because the Sun does not revolve around Earth.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	We can see the Moon in the daytime because its orbit around Earth periodically places it above the horizon, when the Sun is also above the horizon. The light from the Sun reflecting off the Moon makes the Moon visible during the day.
<b>Cooler</b>								
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The weight of the cooler should be measured both before and after the ice melts, so the measurements can be compared to determine whether the weight of the cooler changed.



Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
7	N/A	N/A	N/A	N/A	N/A	N/A	'Before investigation' should be placed under the picture on the left, because this is a model that shows the regular pattern found in the molecules in solid water (ice). 'After investigation' should be placed under the picture on the right, because this is a model that shows a random pattern of molecules closer together in liquid water.	N/A
8	N/A	This is incorrect because liquid water evaporates at a similar rate to ice sublimation. Therefore, the water level in either process will not change very much.	This is correct because when water freezes, the molecules arrange themselves so that the solid water expands and takes up more space than liquid water. When solid water melts, liquid water takes up less space.	This is incorrect because the number of molecules in water does not change when water changes states from solid to liquid.	This is correct because solid water does not take the shape of its container, and there is additional space between the ice cubes. Liquid water does take the shape of its container with no additional empty space.	N/A	N/A	N/A

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Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
9	N/A	N/A	N/A	N/A	N/A	N/A	The horizontal line should be placed in the 'Ice Weight Over Time' graph because the weight of the ice doesn't change as it melts. The diagonal line from bottom left to top right should be placed in the 'Ice Temperature Over Time' graph because the temperature of liquid water is greater than the temperature of solid water. The diagonal line from top left to bottom right should be placed in the 'Ice Volume Over Time' graph because solid ice takes up more volume than liquid water.	N/A

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Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
10	A	This is incorrect because the weight of a substance does not change when the substance changes states. This is due to the Law of Conservation of Matter/Mass: Matter cannot be created or destroyed; it can only change forms.	This is correct because the weight of a substance does not change when the substance changes states. This is due to the Law of Conservation of Matter/Mass: Matter cannot be created or destroyed; it can only change forms.	N/A	N/A	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
10	B	This is incorrect because even though the water may have dissolved air, it is not enough to make a difference in weight.	This is incorrect because although the liquid water molecules will move more than the ice molecules, this doesn't affect the weight of the ice/liquid water. The same number of molecules will be present in both the ice and the liquid water.	This is incorrect because a change in thermal energy would normally result in the particles of matter moving further apart and taking up more space. However, water takes up more space when it is frozen, due to the arrangement of the molecules.	This is correct because of the Law of Conservation of Matter/Mass. The number of molecules does not change when a substance changes states. Matter cannot be created or destroyed; it can only change forms.	N/A	N/A	N/A
Parakeet Ecosystems								

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
11	N/A	This is incorrect because the arrows on a food web indicate the direction in which matter flows. The parakeet does not consume the falcon; therefore, matter does not flow from the falcon to the parakeet.	This is incorrect because the arrows on a food web indicate the direction in which matter flows. The mouse does not consume bacteria and fungi; therefore, matter will not transfer from the bacteria and fungi to the mouse.	This is incorrect because the arrows on a food web indicate the direction in which matter flows. Berries do not consume grasses and seeds; therefore, matter will not transfer from the grasses to the berries.	This is correct because the grasses with seeds are consumed by the grasshopper, which is in turn consumed by the parakeet. When the parakeet dies, the bacteria and the fungi (decomposers) will break down the parakeet. Therefore, matter will transfer from the grasses to the grasshopper, then to the parakeet, and then to the bacteria and fungi.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
12	N/A	N/A	N/A	N/A	N/A	N/A	The grass image should be placed under the Producer heading because grasses produce food through photosynthesis. The parakeet, falcon, and grasshopper should be placed under the Consumer heading because they eat plants/animals and do not produce their own food. The mushroom image should be placed under the Decomposer heading because they break down dead organisms.	N/A
13	N/A	This is correct because according to the food web, mice consume berries. So, it is logical they would eat the fallen ones.	This is incorrect because according to the food web, falcons do not consume berries.	This is incorrect because decomposers break down organisms, not protect them from being eaten.	This is incorrect because decomposers break down organisms, and their nutrients are returned to the soil. Decomposers do not break down food for	This is correct because decomposers break down organisms, and the nutrients return to the soil.	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
					other consumers to eat.			
14	N/A	This is incorrect because there is no data to support the height of the grass.	This is correct because Pot A received more sunlight than Pot B, and the data shows that the mass of the plant in Pot A increased by 340 g more than Pot B.	This is incorrect because there is no data to support the health of the plant.	This is incorrect because there is no data to support the amount of area the grass takes up.	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Planting more grasses would provide more food to support more parakeets. It would also provide more food for the grasshoppers, resulting in an increase in the grasshopper population. Grasshoppers would

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Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
								then become an additional source of food for parakeets.

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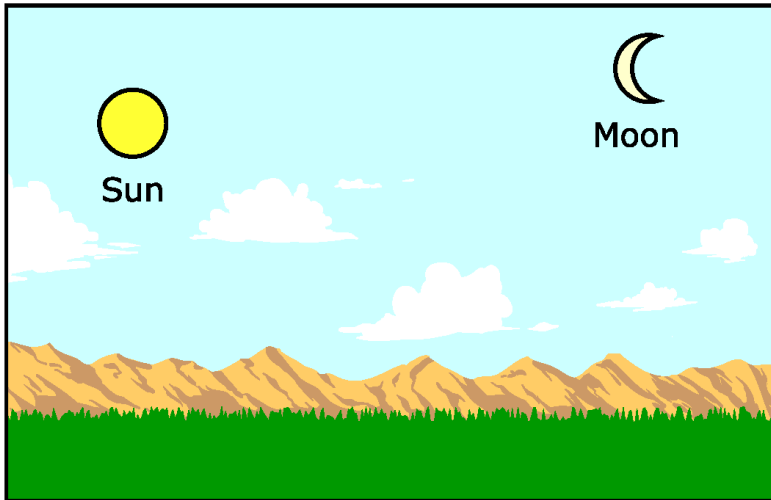
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## Rubrics

### Item 05 - Phases of the Moon

Jeremy is walking home from school in the early afternoon. He sees the Sun and the Moon together in the sky. This surprises Jeremy because he thought that the Moon could be seen only at night. He wonders why the Moon is visible during the day.



How is the Moon visible from Earth during the daytime? Provide an explanation.

Points	Qualities of the Student Response
2	<p>The response must state that both the Sun and Moon are above the horizon at the same time during the day, and the light from the Sun reflects off the Moon to make the Moon visible.</p> <p><b>Example Student Response:</b>            We can see the Moon in the daytime because its orbit around Earth periodically places it above the horizon, when the Sun is also above the horizon. The light from the Sun reflecting off the Moon makes the Moon visible during the day.</p> <p><b>Note:</b> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must include</p> <ul style="list-style-type: none"> <li>• that both the Sun and Moon are above the horizon at the same time OR</li> <li>• that the light from the Sun reflects off the Moon to make the Moon visible during the day.</li> </ul>
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>

**Item 06 - Cooler**

Max is helping to clean up after a picnic. A large cooler filled with ice was used to keep drinks cold. Max tries to move the cooler, but the cooler is too heavy for him to carry.

Max wonders if the cooler will weigh less once the ice inside melts.



Max wants to find out if the cooler will weigh less once the ice melts.

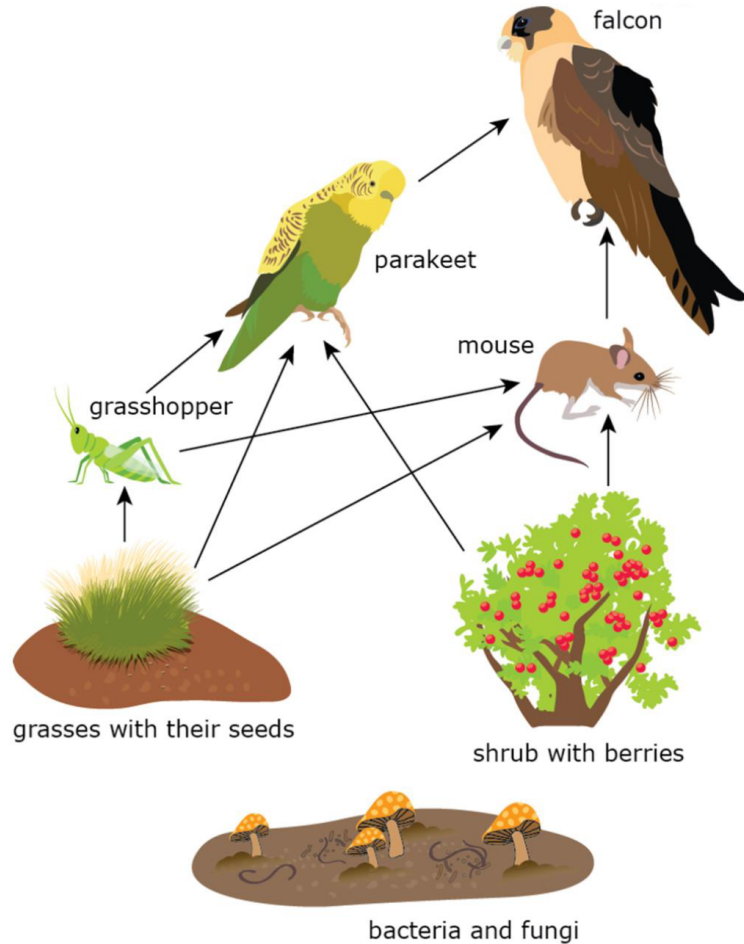
What data must Max collect? Explain, and include information about when he should collect his data.

Points	Qualities of the Student Response
2	<p>The response must state that the weight of the cooler should be measured both before and after the ice melts, so they can be compared to determine whether the weight changes.</p> <p><b><u>Example Student Response:</u></b>            Max must collect his data before and after the ice in the cooler melts. This will help Max know if the weight in the cooler changes.</p> <p><b><u>Note:</u></b> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must include collecting the weight of the cooler before and/or after the ice melts but does not explain why.</p>
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>



### Item 15 - Parakeet Ecosystem

Nancy works at the zoo and is in charge of the parakeet exhibit. She has been studying the role of the parakeets in their natural environment. She builds an incomplete model of a food web.



Nancy notices a parakeet nest with several eggs inside and wants to increase the food supply to support the growing parakeet population. One idea is to plant more grass inside the parakeet exhibit by increasing the amount of sunlight.

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Nancy tests her idea by planting the same amount of grass seeds in two different pots, Pot A and Pot B. Each has the same amount of soil. Nancy places Pot A in the sunlight for 2 hours more per day than Pot B. After two months, she weighs each grass plant to see how much it grew. She records her data in a table.

Results of Grass Plant Growth		
Pot	Starting Mass of Plant (g)	Ending Mass of Plant (g)
A	453	1,247
B	453	907

How will planting more grasses support the needs of the growing parakeet population in the exhibit? Explain your reasoning.

Points	Qualities of the Student Response
2	<p>The response must state that planting more grasses would provide more food to support more parakeets. It would also provide more food for the grasshoppers, resulting in an increase in the grasshopper population. Grasshoppers would then become an additional source of food for parakeets.</p> <p><b>Example Student Response:</b> Planting more grasses would provide more food to support more parakeets. It would also provide more food for the grasshoppers, resulting in an increase in the grasshopper population. Grasshoppers would then become an additional source of food for parakeets.</p> <p><b>Note:</b> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must state</p> <ul style="list-style-type: none"> <li>• that planting more grasses would provide more food for the parakeets because parakeets eat the grass OR</li> <li>• that it would provide more food for the grasshoppers which will help the population of grasshoppers increase.</li> </ul> <p>The increase in the population of grasshoppers affect the population of parakeets since parakeets also eat grasshoppers.</p>
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>



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## Appendix G. Student Population

Table 46. Grade 5 Summary of Participation by Demographic Category

Description	Count	Percent
All Students	11,740	100.00
Male	5,944	50.65
Female	5,791	49.35
Hispanic or Latino	306	2.61
American Indian or Alaskan Native	74	0.63
Asian	163	1.39
Black or African American	511	4.35
Native Hawaiian or Other Pacific Islander	7	0.06
White	10,267	87.49
Two or More Races	407	3.47
Currently Receiving EL Services	421	3.59
English-Speaking Students	11,314	96.41
Students with an IEP	2,455	20.92
IEP: All Other Students	9,280	79.08
Economically Disadvantaged Students	4,622	39.39
SES: All Other Students	7,113	60.61
Migrant Students	2	0.02
Migrant: All Other Students	11,733	99.98
Plan 504	606	5.16
Plan 504: All Other Students	11,129	94.84



Table 47. Grade 8 Summary of Participation by Demographic Category

Description	Count	Percent
All Students	12,210	100.00
Male	6,323	51.79
Female	5,885	48.21
Hispanic or Latino	334	2.74
American Indian or Alaskan Native	74	0.61
Asian	185	1.52
Black or African American	437	3.58
Native Hawaiian or Other Pacific Islander	10	0.08
White	10,770	88.22
Two or More Races	398	3.26
Currently Receiving EL Services	288	2.36
English-Speaking Students	11,920	97.64
Students with an IEP	2,318	18.99
IEP: All Other Students	9,890	81.01
Economically Disadvantaged Students	4,320	35.39
SES: All Other Students	7,888	64.61
Migrant Students	5	0.04
Migrant: All Other Students	12,203	99.96
Plan 504	804	6.59
Plan 504: All Other Students	11,404	93.41



Table 48. High School Summary of Participation by Demographic Category

Description	Count	Percent
All Students	9,960	100.00
Male	5,167	51.90
Female	4,789	48.10
Hispanic or Latino	254	2.55
American Indian or Alaskan Native	73	0.73
Asian	173	1.74
Black or African American	361	3.63
Native Hawaiian or Other Pacific Islander	8	0.08
White	8,880	89.19
Two or More Races	207	2.08
Currently Receiving EL Services	207	2.08
English-Speaking Students	9,749	97.92
Students with an IEP	1,421	14.27
IEP: All Other Students	8,535	85.73
Economically Disadvantaged Students	2,759	27.71
SES: All Other Students	7,197	72.29
Migrant Students	5	0.05
Migrant: All Other Students	9,951	99.95
Plan 504	797	8.01
Plan 504: All Other Students	9,159	91.99



## Appendix H. Accommodation Frequencies

Table 49. Accommodation Frequencies

Accommodation Code	Description	Grade 5	Grade 8	High School
accomReadaloud	Read Aloud	670	363	61
accomLargeprint	Large Print	0	1	0
accomBraille	Braille	0	0	0
accomScribe	Scribe	488	231	37
accomExtendedtime	Extended Time	1661	1500	452
accomTexttospeech	Text to Speech	1588	1391	329
accomPaper	Paper	0	2	124





# Appendix I. Inter-Rater Agreement

Table 50. Inter-Rater Agreement by Grade

Grade	ItemCode	Total	Read-behinds	Read-behinds %	Resolutions	Resolutions %	Exact Agreement	Exact/Adjacent Agreement
05	DamCreekBear	11,952	1,225	10.2	139	11.6	88.3	99.9
05	AlgaeBloom	11,883	1,201	10.1	66	5.6	94.4	99.3
08	Running	12,576	1,276	10.1	19	1.5	98.6	100
08	AnalyzingGeoTime	12,576	1,286	10.2	148	11.8	88.3	99.9
08	DamagedApple	12,480	1,303	10.4	71	5.7	94.3	100
08	ShapingEarth	12,480	1,253	10.0	131	10.5	89.5	100
HS	Ecosphere	10,475	1,043	10.0	66	6.3	93.8	100
HS	Calorimetry	10,367	1,025	10.0	98	9.5	90.6	100
HS	ConservingMass	10,367	1,138	11.0	82	7.9	92.1	99.9
HS	BouncingBalls	10,475	1,113	10.6	93	8.9	91.1	100



## Appendix J. Psychometric Operational Procedure Memo

(Document begins on next page.)



# Psychometric Operational Procedures Manual

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## Version History

Version	Date	Reviewer	Notes
3.0	03/02/2022		Ready for ME DOE and TAC review
3.1	3/24/2022	Donna Butterbaugh	Update Schedule to reflect the 2-week window extension
3.2	6/30/2022	Donna Butterbaugh	Added additional file cleaning for Operational IA and Calibration



## Section 1. Introduction

The purpose of this document is to outline the psychometric analysis plan and procedures for the Spring 2022 administration of the Maine Educational Assessment (MEA) in science for students in grades 5, 8 and the third year of high school. The Spring 2022 assessments consist of items in the New Meridian Science Exchange. The items are aligned to the Next Generation Science Standards (NGSS) as articulated in the [New Meridian Framework for Quality Review of NGSS Science Assessment Items](#) and measure the science standards of the Maine Learning Results.

New Meridian is an assessment design and development company on a mission to support quality education for all students by fostering deeper learning. Since 2017, the nonprofit's diverse team of assessment design experts have collaborated with accomplished classroom educators to develop a better way to assess students and prepare them for the opportunities of tomorrow. New Meridian's standards-based tests emphasize the skills that are most important for success: critical thinking, problem solving, and effective communication. New Meridian works closely with states to develop innovative assessment solutions that provide educators with insight into how students apply content knowledge to solve real-world challenges while providing policy makers with rich, actionable data to accelerate educational equity.

Prior to 2021, the MEA science assessment was designed to measure both Maine's academic content standards in science and the 2007 Maine Learning Results and to identify the knowledge and skills essential to prepare Maine students for work, higher education, citizenship, and personal fulfillment. The typical two-week administration windows were late March through early April for high school students and late April through early May for students in grades 5 and 8.

The Spring 2021 administration overcame several challenges due to the ongoing COVID-19 pandemic. On February 22, 2021, the U.S. Department of Education issued a [letter](#) to the Chief State School Officers that allowed flexibility with respect to assessment administration for the 2020–2021 school year. The Maine Department of Education (ME DOE) requested a waiver for accountability purposes. In addition, the ME DOE requested that districts put forth a "best faith effort" to assess science. However, the ME DOE acknowledged that a 95 percent participation rate was unlikely. Further, the four-week administration window for 2021 was shifted to later dates (late May through early June) rather than windows typically followed in previous years to allow for students in remote and/or hybrid learning environments the opportunity to come into schools to assess in a secure environment.

While the blueprints for the Spring 2021 administration were aligned with NGSS, they were based on a subset of performance expectations that were approved by the ME DOE for a single administration year. Beginning with the Spring 2022 administration, the ME DOE approved new NGSS-aligned blueprints for future administrations. The administration window will remain a four-week duration. Grades 5 and 8 assessments will be administered from May 2 through May 27, 2022, and the high school administration window will follow from May 16 through June 10, 2022. Standard-setting activities will follow in July 2022.

## Section 2. Assessments

The science assessments consist of dichotomous and polytomous items that are machine- or hand-scored. Items may be stand-alone or a part of a “cluster” that has a common phenomenon or stimulus. The assessments contain selected-response (i.e., multiple-choice and multiple-select), brief constructed-response, and technology-enhanced items (e.g., inline choice, order, hot spot, match table grid, graphic gap match).

The assessments are offered online as computer-based tests (CBT) with a wide range of accessibility features for all students (e.g., color scheme, font size, and zoom) and as paper-based tests (PBT) with accommodations for students with disabilities (e.g., braille and large-print [LP] versions of the test, as well as response accommodations that allow students to respond to test items using different formats). Table 1 provides the structure for the assessment administration at all three grades. Each assessment is composed of three administration sessions followed by a session for the student questionnaire.

Table 1. Test Session Order and Time Allowances

Session	Total Time
Session 1: Science Assessment	60 minutes
Session 2: Science Assessment	60 minutes
Session 3: Science Assessment	60 minutes
Session 4: Student Questionnaire	15–20 minutes
<b>TOTAL (not including distribution/instructions)</b>	<b>200 minutes</b>

### Assessment Linking Design

The Spring 2022 online assessments only consist of one operational base form per grade. Therefore, there is no cross-year linking design for this year’s analysis. In the future, a common item, nonequivalent-groups design will be used to link forms across administration years (Kolen & Brennan, 2014).

Some technology-enhanced items cannot be administered efficiently to students requiring a paper-based form (i.e., large print and braille). Therefore, a limited number of item substitutions are made to facilitate administration of the paper-based forms.

Table 2 lists the number of forms per grade and administration type. The volume of paper-based assessments is expected to be very small in comparison to online testing.

Table 2. Number of Operational Forms per Grade and Administration Type

Grade	Online	Paper
5	1	1
8	1	1
HS	1	1



## Section 3. Operational Administration

Thorough psychometric processes for the Spring 2022 operational administration are essential to provide accurate and reliable test results. The following quality control (QC) procedures are planned for the administration:

- Clearly define psychometric specifications during all phases of form development and results analyses
- Consistently apply data cleaning rules post administration
- Engage in clear and frequent communication both internally and with the ME DOE
- Test run analyses
- Independently replicate analyses
- Develop and adhere to checklists for statistical procedures

Psychometric analyses are conducted separately by grade. However, the processes are the same.

### Workflow Process

High-level psychometric tasks for the Spring 2022 administration include the following:

1. Key-Checks and Adjudication – to inform whether machine-scored items are performing as expected (i.e., according to documented scoring rules)
2. Item Analysis and Calibration – to determine item performance statistics
3. Standard Setting – to determine achievement levels
4. Conversion Files – to provide overall reported scale scores based on the total raw score earned
5. Technical Report – to complete documentation of the operational program for the administration year
6. Field-Test Item Analysis and Calibration – to determine item performance statistics

Table 3 lists the high-level psychometric tasks and timeline for the Spring 2022 administration.

Table 3. High-Level Psychometric Tasks and Timelines

Task	Timeline
Final Psychometric Operational Procedures Manual (OPM)	April 31, 2022
Maine Science Administration Windows	Grades 5 & 8: May 2–27, 2022 High School: May 16–June 10, 2022
Key-Checks and Adjudication	June 10–27, 2022
Operational Item Analysis and Calibration	June 23–July 12, 2022
Standard Setting	July 26–28, 2022
Conversion Files	August 9–31, 2022
Technical Report	September 6–December 16, 2022
Field-Test Item Analyses and Calibration	August 31–September 30, 2022





## Key-Check and Adjudication

The purpose of the key-check analysis is to evaluate whether machine-scored items are performing as expected empirically in the field while hand-scoring is still in progress. Student performance on the items is evaluated with classical test theory (CTT) to verify the item answer key(s).

### Data Processing

Student results files are available in a single file layout [[Internal New Meridian Link](#)]. Information that New Meridian needs for calibration will be appended to the approved ME DOE file layout. The file will contain both student item-level data and test-level data. A single record contains all test information for a student taking a test, including demographic variables, form identification, item scores, and total raw scores, as well as the student responses and item scores for each item and the separate parts of composite items (when applicable). Some item parts of a composite item will have scores if there is a one-to-one relationship between the number of item parts and the overall score for the composite item.

The key-check is performed by form. Student records are removed prior to running the analyses if the records meet either of the following criteria<sup>1</sup>.

1. Record has an invalid form number (e.g., if Student Grade  $\neq$  Form Name Grade).
2. Record is flagged as “not valid” (e.g., flagged `scInvSes1`, `scInvSes2`, `scInvSes3` OR `SciTestStatus` is blank, or Total Number Attempted = 0).

Items may not be scored due to a student omitting the item or due to the student not yet reaching an item within the test or skipping entire sessions. “Omitted” items are items for which a student did not provide a response as indicated by responses for preceding and subsequent items in the session (e.g., if a student answered items 10 and 12, but not 11, item 11 is omitted). These nonresponses are designated with “?” or blank in the response file and are recoded as “0” in CTT analyses. The “?” or blank depends on whether the student interacted with the item. Omitted items will have a nonmissing time on item, which may include 0.

“Not Administered” and “Not Reached” items are items for which no responses were provided that occur at the end of the session—i.e., items that the student probably did not reach during the administration or the entire session was not administered. These nonresponses are considered *missing* in CTT analyses and therefore do not contribute to the statistics. For online forms, these items will have a missing time on the item.

### Classical Test Theory (CTT) Item Analyses

For the key-check analyses, CTT statistics are computed by form for each item. All administration types (online and paper accommodations) are evaluated. However, the paper-based forms may not have sufficient response volumes for reliable results.

---

<sup>1</sup> At the time of the key-check, file production invalidations and student testing status may not be populated.



### Item *p*-value (pseudo *p*-value for polytomous items)

The *p*-value represents the mean item score as a proportion of the maximum obtainable score points, indicating the item difficulty. Values range between 0 and 1. Higher values indicate easier items while lower values indicate more difficult items. For dichotomous items (items scored as either correct = 1 or incorrect = 0) the *p*-value is calculated as

$$p \text{ value} = \bar{x}_i = \frac{1}{n} \cdot \sum_1^n x_i$$

where  $x_i$  are the individual student item scores on item  $i$  and  $n$  is the total number of students for whom the item was administered.

For polytomous items, the pseudo *p*-value is calculated by further dividing by the maximum obtainable points possible for the item:

$$\text{pseudo } p \text{ value} = \frac{\bar{x}}{T}$$

where  $\bar{x}$  is the mean item score and  $T$  is the maximum obtainable points possible for the item.

Frequently, the *p*-value is reported as a percentage by multiplying by 100. For instance, a *p*-value of 0.67 means that 67 percent of the students answered a dichotomous item correctly.

### Response Option or Score Point Proportions

A dichotomous item's alternate response options (i.e., distractors) are plausible but incorrect options that are included to test common misconceptions or miscalculations. Ideally, all response options should garner a proportion of student selections with the correct answer obtaining the greatest proportion. These proportions are calculated by this simple formula:

$$\text{proportion} = \frac{N_O}{N_T}$$

where  $N_O$  is the number of students selecting the specific option or omitting a response and  $N_T$  is the total number of students for whom the question was administered.

In the case of polytomous items, the numerator becomes the number of students obtaining the specific score point ( $N_{SP}$ ):

$$\text{proportion} = \frac{N_{SP}}{N_T}$$

### Item Total Correlations

The item total correlation is the relationship between students' performance on the item and students' performance on the criterion<sup>2</sup>. Possible values range between -1 and +1. The correlation will be positive when the mean test score of the students answering the item correctly is greater than the mean test score of the

<sup>2</sup> For the key-check this correlation is the machine-scorable total raw score. Otherwise, it is the total raw score.



students answering the item incorrectly. Negative values may indicate that an item has multiple correct answers or an incorrect answer key.

The point-biserial correlation (Crocker & Algina, 1986) is one possible item total correlation for dichotomously scored items. However, the correlation will be spuriously high because the item of interest is also included in the total test score (i.e., correlating with itself; Henrysson, 1963). Therefore, a correction is made by using the means with the item deleted (i.e., the total operational test score not including the item of interest) from the calculation

$$r_{pbis} = \frac{(\bar{M}'_+ - \bar{M}')}{S'} \sqrt{\frac{p}{1-p}}$$

where  $\bar{M}'_+$  is the mean score with the item deleted for students who answered the item correctly,  $\bar{M}'$  is the mean score with the item deleted for all students,  $S'$  is the standard deviation with the item deleted for all students, and  $p$  is the item  $p$ -value (difficulty).

The Pearson correlation (polyserial) with the item of interest deleted is typically calculated for polytomous items by using this formula:

$$r = \frac{\sum(x_i - \bar{x})(y'_i - \bar{y}')}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y'_i - \bar{y}')^2}}$$

where  $x_i$  is the student score point on the item,  $\bar{x}$  is the mean score for the item,  $y'_i$  is the total score with the item deleted for the student, and  $\bar{y}'$  is the mean total score with the item deleted for all students (Lemke & Wiersma, 1976).

### Response Option or Score Point Correlations

Similar to the overall item point-biserial correlation calculation, a correlation can be calculated for each incorrect response option (O) for multiple-choice single-response items or for the score point in the case of other item types by using this generalized formula:

$$r_{pbiso} = \frac{(\bar{M}'_O - \bar{M}')}{S'} \sqrt{\frac{p_O}{1-p_C}}$$

where  $\bar{M}'_O$  is the mean score for students who selected the distractor/received the number of score points,  $\bar{M}'$  is the mean score for all students with the item deleted,  $S'$  is the standard deviation of all students with the item deleted,  $p_O$  is the proportion of students selecting the distractor/receiving the number of score points, and  $p_C$  is the proportion of students selecting the correct response/receiving full credit.

### Flagged Item Review and Adjudication

Items flagged for issues during the key-check analyses are provided to the science test-development manager for review and/or adjudication. The items' scoring rules and responses (correct and partially correct) are reviewed. If items are confirmed to have a scoring issue, recommendations are provided for rectifying scoring, if possible. Otherwise, items may be recommended for an unscored status.

Table 4 presents the classical test theory criteria for flagging an item.



Table 4. Key-Check Classical Test Theory Flagging Criteria

Analysis	Criteria
p-value (pseudo p-value)	p-values above 0.95 or below 0.20
Item Total Correlation	Item-total correlations below 0.15
Distractor-Total Correlation	Distractor-total correlations above 0.00
Omits	5% omit rate for a dichotomous item 15% omit rate for a polytomous item
Polytomous Item Score Distribution	A low percentage (<3%) of students obtaining a score point or no students obtaining a score point <sup>3</sup>

## Item Analysis and Calibration

Once all machine- and human-scoring is complete, the following data processing and item-level statistics are computed.

### Data Processing

Student results files are available in a single file layout. Information that New Meridian needs for calibration will be appended to the approved ME DOE file layout [[Internal New Meridian Link](#)]. The file contains both student item-level data and test-level data. A single record contains all test information for a tested student, including demographic variables, form identification, item scores, and total raw scores, as well as the student responses and item scores for each item and the separate parts of composite items (when applicable). Some item parts of a composite item will have scores if there is a one-to-one relationship between the number of item parts and the overall score for the composite item.

For the Spring 2022 administration there will be a limited number of paper-based forms, i.e., the Test Type Mode of Administration is Paper (2), Large Print (3) or Braille (4). Student results from these forms will be key-entered into the scoring system by the subcontractor.

The preliminary analysis is performed on an incomplete data matrix (IDM) that is generated from the results file. Analyses are done by form. Student records are removed prior to running the analyses if the records meet any of the following criteria:

1. Record has an invalid form number (e.g., if Student Grade  $\neq$  Form Name Grade).
2. Record is flagged as "not valid" (e.g., flagged scInvses1, scInvses2, scInvses3 OR SciTestStatus is blank).
3. Record is a duplicate (if a student has duplicate valid records, only the record with the higher raw score is included).
4. Record indicates that the student attempted less than 25% of items within any session.
5. Record indicates that the Test Type Mode of Administration does not match the accommodation received (e.g., Test Type Mode of Administration = 2 (Paper) but accomPaper = 0 (No); Test Type Mode of Administration = 3 (Large Print) but accomLargeprint = 0 (No); Test Type Mode of Administration = 4 (Braille) but accomBraille = 0 (No)).

<sup>3</sup> This criterion may be reconsidered based on data from the initial operational administration.



Administration = 4 (Braille) but accomBraille = 0 (No); or Test Type Mode of Administration = 1 (Online) but at least one of the paper accommodations is 1).

6. All demographics are missing
7. StuStatus not equal to "0"

Items may not be scored due to a student omitting the item or due to the student not yet reaching an item within the test or skipping entire sessions. "Omitted" items are items for which a student did not provide a response as indicated by responses for preceding and later items in the session (e.g., if a student answered items 10 and 12, but not 11, item 11 is omitted). These nonresponses are designated with "?" or blank in the response. The "?" or blank depends on whether the student interacted with the item. Omitted items will have a nonmissing time on item, which may include 0.

"Not Administered" and "Not Reached" items are items for which no responses were provided that occur at the end of the session—items that the student probably did not reach during the administration or the entire session was not administered. For online forms, these items will have a missing time on the item.

Item response scores for "Omitted" are recoded as "0" in the CTT analyses and IRT IDM files whereas "Not Reached"/"Not Administered" items are considered *missing* and therefore do not contribute to the statistics.

### Classical Test Theory (CTT) Item Analyses

The majority of CTT item statistics are computed following the same procedures provided in the previous [Key-Check section](#). The following sections describe additional statistics included in the analysis.

### Summarized, Aggregated Item Response Times

The amount of time students take to answer questions is important to ensure the majority of students have sufficient time to answer all test questions in each session. Available timing summary statistics may include the median and 10th, 25th, 75th, and 90th percentiles as measures of central tendency and variation, respectively, for each item.

### Differential Item Functioning (DIF)

Differential item functioning is a procedure that matches students based on total test scores to compare the performance of similarly able students across subgroups. The procedure identifies two contrasting groups (i.e., reference and focal) for which differences in item performances are computed. Table 5 indicates potential comparison groups depending on sufficient volumes of students (i.e., at least 100 Focal and at least 300 Reference). For the procedures described next, positive values indicate that for students of similar ability the focal group has a higher mean item score than the reference group. Negative DIF values indicate that for students of similar ability the focal group has a lower mean item score than the reference group.

Table 5. DIF Comparison Groups

Comparison Type (Variable Name)	Reference Group (N ≥ 300)	Focal Group (N ≥ 100)
<b>Gender (Gender)</b>	Male (M)	Female (F)
<b>Ethnicity (Ethnic)</b>	White (6 = White)	African American (4 = Black or African American)
	White (6 = White)	Asian (3 = Asian)
	White (6 = White)	American Indian/Alaska Native (2 = American Indian or Alaska Native)
	White (6 = White)	Hispanic (1 = Hispanic or Latino)
	White (6 = White)	Pacific Islander (5 = Native Hawaiian or Other Pacific Islander)
	White (6 = White)	Multiple (7 = Two or more races)
<b>Economic Status (EconDis)</b>	Not Economically Disadvantaged (0 = All Other Students)	Economically Disadvantaged (1 = Yes)
<b>English Learners (EL)</b>	English Proficient (2 = Former EL student - monitoring year 1, 3 = Former EL student - monitoring year 2, 4 = Former EL student - monitoring year 3 5 = Former EL student - monitoring year 4 0 = All Other Students)	EL (1 = Currently receiving EL services)
<b>Students with an IEP (IEP)</b>	Not IEP (0 = All Other Students)	IEP (1 = Yes)

**Dichotomous Items: Mantel-Haenszel**

The Mantel-Haenszel (*MH*) chi-square approach (Mantel & Haenszel, 1959) is used to detect DIF in dichotomously scored one-point items. The range of total scores is divided into ten stratifications (*S*) and those strata are used to match samples from each group. Contingency tables (Table 6) for each stratum are constructed for the responses to the item in which *S* represents the strata;  $W_{1s}$  and  $W_{fs}$  represent the number of students (in the reference and focal groups, respectively) who answer the item incorrectly;  $R_{1s}$  and  $R_{fs}$  represent the number of students (in the reference and focal groups, respectively) who answer the item correctly; and  $N_{ts}$  represents the total number of students ( $W_{1s} + R_{1s} + W_{fs} + R_{fs}$ ).

Table 6. Mantel-Haenszel Contingency Table

Score Stratum (S)	Incorrect/Wrong (0)	Correct/Right (1)	Total
Reference	$W_{rs}$	$R_{rs}$	$W_{rs} + R_{rs}$
Focal	$W_{fs}$	$R_{fs}$	$W_{fs} + R_{fs}$
Total	$W_{rs} + W_{fs}$	$R_{rs} + R_{fs}$	$N_{ts}$

A common odds ratio is computed across all intervals of matched groups using the following formula (Dorans & Holland, 1993):

$$\hat{\alpha}_{MH} = \frac{\sum_{s=1}^S R_{rs}W_{fs} / N_{ts}}{\sum_{s=1}^S R_{fs}W_{rs} / N_{ts}}$$

Furthermore, the Mantel-Haenszel delta statistic ( $MH_{D-DIF}$ ) (Holland & Thayer, 1988) is computed to measure the degree and magnitude of DIF using this formula:

$$MH_{D-DIF} = -2.35 \ln(\hat{\alpha}_{MH}).$$

**Polytomous Items: Standardized Mean Difference**

For polytomous items, the  $MH_{D-DIF}$  is not calculated. Rather, a standardized mean difference (SMD) is calculated using a contingency table that extends the possible item scores beyond 1 point using this formula:

$$SMD = \sum_s w_{fs} m_{fs} - \sum_s w_{rs} m_{rs}$$

where  $w_{fs} = n_{f+s} / n_{f++}$  is the focal group proportion at the sth stratification variable;  $m_{fs} = (1/n_{f+s})F_s$  is the focal group's mean item score in the sth stratum; and  $m_{rs} = (1/n_{r+s})R_s$  is the reference group's mean item score in the sth stratum. Because the focal group proportion is used in both terms of the equation, the reference group's item mean is weighted, whereas the focal group's item mean is unweighted.

The effect size (ES) is then computed by dividing by the total group standard deviation (SD) using this formula:

$$ES = \frac{SMD}{SD}.$$

Using Mantel's chi-square statistic (1963), the magnitude of the ES is interpreted by using Golia's (2012) rules.

**Item Response Theory (IRT) Analyses**

The Rasch model for dichotomous items (Rasch, 1960) posits two sets of variables: item parameters  $\delta$  (difficulty or location) and  $\theta$  (student ability or latent trait) using this formula:

$$P_{ij}(\theta) = \frac{\exp(\theta_j - \delta_i)}{1 + \exp(\theta_j - \delta_i)}$$

where  $P_{ij}(\theta)$  is the probability that a student  $j$  gets item  $i$  correct.

Masters (1982) proposes a Partial Credit Model (PCM) for use when there are two or more ordered categories

of responses (i.e., polytomous items). The PCM is defined as  $P_{ijx}(\theta) = \frac{\exp \sum_{k=0}^x (\theta_j - \delta_{ik})}{\sum_{h=0}^m \exp \sum_{k=0}^h (\theta_j - \delta_{ik})}$ ,  $x = 1, 2, \dots, m_i$ .



where  $P_{ijk}(\theta)$  is the probability that a student  $j$  gets a score of  $x$  on item  $i$ .

Furthermore, for notational convenience:

$$\sum_{k=0}^0 (\theta_j - \delta_{ik}) \equiv 0$$

and

$$\sum_{k=0}^h (\theta_j - \delta_{ik}) \equiv \sum_{k=1}^h (\theta_j - \delta_{ik}).$$

The program Winsteps 5.1.7.0 (Linacre, 2021) is used to estimate the item parameters. To ensure quality, two members of the New Meridian psychometrics team independently replicate the results of the item calibrations. The results must match exactly across replicators. An example of the control file is provided in Appendix A.

### Incomplete Data Matrix (IDM)

For the IRT item calibrations, items are removed if their CTT statistics appear flawed or problematic based on the following criteria:

1. Item has an item total correlation less than 0.
2. Item has 100% of the students with same item score, such as 100% omitted the item or received the same score.

New Meridian will document flagged items and notify the ME DOE regarding the recommendation to omit from calibration.

### IRT Model Assumptions

Internal structure validity studies investigate “the degree to which the relationships among test items and test components conform to the construct on which the proposed test score interpretations are based” (AERA, APA, & NCME, 2014, p. 16). Dimensionality and local independence analyses provide validity evidence for internal structure.

### Fit Indices

One assumption of IRT models is that the data fit the model. These two fit indices are calculated for the items in Winsteps to evaluate the assumption:

- **Mean Square Infit (IN.MSQ)** – An information-weighted statistic based on patterns of responses that is more sensitive to a student responding unexpectedly to an item difficulty near the student’s ability level.
- **Mean Square Outfit (OUT.MSQ)** – An unweighted statistic that is more sensitive to a student responding unexpectedly to an item far from the student’s ability level. For example, one would expect students demonstrating eighth-grade ability to answer an item with fifth-grade difficulty correctly. Careless mistakes would generate underfit. Equally, lucky guesses for students with a fifth-grade ability answering items with an eighth-grade difficulty correctly would also produce underfit.





Both are chi-squared statistics divided by the degree of freedom in which the expected value is 1.0 but can range from 0 to  $+\infty$ . Winsteps documentation suggests that values between 0.5 and 1.5 are productive for measurement.

Winsteps also tests the overall model fit using the Root Mean Square Error (RMSE)—a conservative value for the reliability of measures based on the items and students in the IDM. The RMSE is the square root of the average error variance. The real RMSE is calculated assuming data misfit from the IRT model.

### Local Independence

Local independence is an assumption of IRT models that is directly related to the dimensionality of the data (Hambleton & Swaminathan, 1985; Hambleton, Swaminathan, & Rogers, 1991). Local independence exists when the items on a test are unrelated after accounting for the factor(s) underlying the data. Violation of the local independence assumption suggests that there is an unmodeled factor that is underlying some of the items on the test.

The assumption of local independence will be assessed using Yen's (1984; 1993) Q3. The Q3 statistic is the correlation between item residuals after accounting for the primary factor underlying the data. The Q3 statistic is obtained by first calculating the item residuals ( $d_i$ ) as the difference between the observed item score ( $X_i$ ) and expected score conditional on the model's ability estimate ( $E(X_i|\hat{\theta})$ ):

$$d_i = X_i - E(X_i|\hat{\theta}).$$

Next, the Pearson correlation between each pair of item residuals is calculated as

$$Q_{3,ij} = r_{d_i d_j},$$

where  $d_i$  and  $d_j$  are residuals for items  $i$  and  $j$ , respectively.

Chen and Thissen (1997) argue that an absolute residual correlation greater than 0.20 suggests the presence of local dependence. However, Marais (2013) argues that "the correlations should also always be considered relative to [the] overall set of correlations" (p. 120). Thus, Christensen, Makransky, and Horton (2017) state that an absolute residual correlation greater than 0.20 after adjusting for the mean suggests the presence of local dependence. Consequently, both absolute raw and mean-adjusted residual correlations will be investigated where item residual correlations are flagged when either value is greater than 0.20. The percentage of flagged item residual correlations will be used to determine whether the assumption of local independence is violated.

### Dimensionality

Unidimensionality is another essential assumption of the IRT models commonly used in large-scale summative assessments (Hambleton & Swaminathan, 1985; Hambleton, Swaminathan, & Rogers, 1991). That is, all of the items on the assessment are measuring a single construct, or a dominant dimension. New Meridian is planning a dimensionality study to assess the appropriateness of the assumption given that the standards are considered "three dimensional" (3D) and that topic/discipline and science practice subscores will be provided to students. Dimensionality studies conducted by states contributing to the Science Exchange have indicated that items are essentially unidimensional in nature and that it is appropriate to calibrate all items jointly. Therefore, New Meridian anticipates similar findings. However, should the analysis results provide substantive evidence of

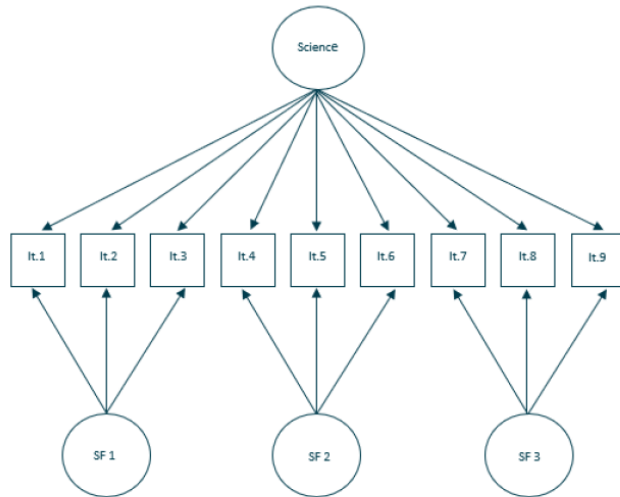
multidimensionality, items from different dimensions would require separate calibrations and a weighted composite score to be developed.

The dimensional structure of the data will be evaluated by running two multidimensional IRT models in flexMIRT (2022): the bifactor model and the correlated factor MIRT model. The models should provide similar information regarding dimensionality although resulting parameter estimates will likely be different.

#### Bifactor Model

Figure 1 shows an example path diagram for the bifactor model in which “Science” is the general factor, “SF1” to “SF3” are specific factors, and “It. 1” to “It. 9” are items. Note that each item has an associated error term that is not included in the figure for simplicity. In this example, items 1 through 3 are associated with specific factor 1, items 4 through 6 are associated with specific factor 2, and items 7 through 9 are associated with specific factor 3. Therefore, each item has three sources that contribute to the item variance; i.e., the general Science factor, a specific factor, and error. There is no correlation between the specific factors because in this model the correlations are absorbed by the general Science factor. Hence, items will have insignificant loadings on the specific factors if there is strong unidimensionality.

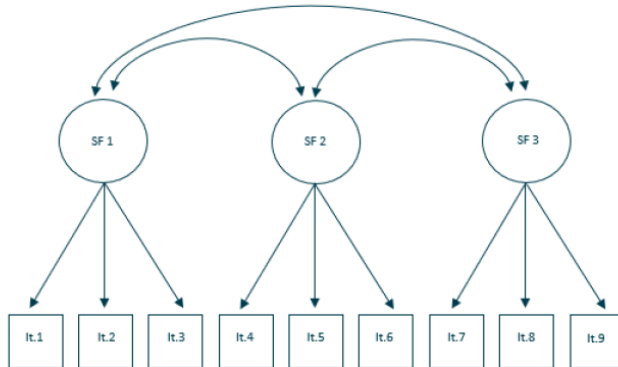
Figure 1. Bifactor Path Model



#### Correlated Factor MIRT Model

In contrast to a bifactor model, in a correlated factor MIRT model each item has only two sources of variance; the specific factor—since items 1 through 3 are associated with specific factor 1, items 4 through 6 are associated with specific factor 2, and items 7 through 9 are associated with specific factor 3—and error (as shown in Figure 2). The correlations between the specific factors are freely estimated, and strong unidimensionality will be reflected in high correlations among the specific factors.

Figure 2. Correlated Factor MIRT Path Model



#### Dimensionality Evaluation

Dimensionality will be evaluated by following the framework outlined by Rodriguez, Reise, and Haviland (2016) and include the coefficient omega hierarchical (OmegaH), coefficient omega subscale (OmegaS), explained common variance (ECV), and relative parameter bias (RPB).

#### Item Flagging Criteria

Items are flagged during the analysis based on the criteria listed in Table 7. The flagged items are provided to the science test-development manager for review. Items flagged with C-DIF are provided to both the science test-development manager and the accessibility, accommodations, and fairness (AAF) specialist as part of the preliminary analysis communication plan.

Table 7. Preliminary Item Analysis Flagging Criteria

Analysis	Criteria
<b>Classical Test Theory (CTT) Statistics</b>	
<b>p-value (pseudo p-value)</b>	p-values above 0.95 or below 0.20
<b>Item-Total Correlation</b>	Item-total correlations below 0.15
<b>Distractor-Total Correlation</b>	Distractor-total correlations above 0.00
<b>Omits</b>	5% omit rate for a dichotomous item 15% omit rate for a polytomous item
<b>Polytomous Item Score Distribution</b>	A low percentage (<3%) of students obtaining a score point or no students obtaining a score point
<b>Differential Item Functioning (DIF)</b>	+ Favors the focal group - Favors the reference group
<b>Mantel-Haenszel (MH)</b>	A: Negligible – MH D-DIF is not significantly different from 0, OR (MH D-DIF is significantly different from 0 and  MH D-DIF  < 1) B: Slight to Moderate – MH D-DIF is significantly different from 0 AND $1 \leq  MH D-DIF  < 1.5$ C: Moderate to Large – MH D-DIF is significantly different from 0 AND $ MH D-DIF  \geq 1.5$
<b>Standardized Mean Difference</b>	A: Negligible - Mantel's chi-square is not significantly different from 0 OR $ Effect Size  \leq 0.17$ B: Slight to Moderate - Mantel's chi-square is significantly different from 0 AND $0.17 <  Effect Size  \leq 0.25$ C: Moderate to Large - Mantel's chi-square is significantly different from 0 AND $ Effect Size  > 0.25$
<b>Item Response Theory (IRT) Statistics</b>	
<b>a</b>	Not applicable
<b>b</b>	Difficulty parameter < -4.5 OR > +4.5
<b>c</b>	Not applicable
<b>Fit Index</b>	
<b>Mean Square Infit</b>	< 0.5 or > 1.5
<b>Mean Square Outfit</b>	< 0.5 or > 1.5

## Standard Setting

New Meridian will facilitate a standard-setting workshop during July 2022. Materials for the workshop will be drafted and saved locally to [\[Internal New Meridian Link\]](#).

The ME DOE reports student achievement as one of four levels: Well Below State Expectations, Below State Expectations, At State Expectations, or Above State Expectations. Achievement Level Descriptors (ALDs) will be developed that describe the observable knowledge, skills, and abilities (KSAs) for each performance expectation across the four achievement levels. Documentation for the ALDs will be found locally in [\[Internal New Meridian Link\]](#).

## Score Scaling and Conversion Files



Because the Spring 2022 assessment content is not linked to the previous administration scale, care is needed in reporting student results so that stakeholders do not attempt to compare these scores to previous administrations. The final lowest obtainable scale score (LOSS) and highest obtainable scale score (HOSS) will be confirmed after calibration and in consultation with the ME DOE.

Overall science scale scores, which reflect performance across all items on the assessment, can be used to categorize students into one of the four achievement levels. The transformation constants will be determined by using the standard-setting theta cut scores ( $\theta$ ) and the corresponding scale scores (SS):

$$A = \frac{(\text{Level 3 } cut_{SS} - \text{Level 2 } cut_{SS})}{(\text{Level 3 } cut_{\theta} - \text{Level 2 } cut_{\theta})}$$

and

$$B = \text{Level 3 } cut_{SS} - A \times \text{Level 3 } cut_{\theta}$$

### Overall Science Score

In the Rasch model, each possible raw score corresponds to a student ability ( $\theta$ ) value. To produce the scaled score, a linear transformation is used to transform  $\theta$  to the scale score metric:

$$\text{Scale Score} = A \times \theta + B$$

The conditional standard error of measurement (CSEM) is also transformed using this formula:

$$CSEM_{SS} = CSEM_{\theta} \times A$$

The scale scores and CSEMs are rounded to the nearest whole number.

New Meridian generates the raw score to scale score conversion tables for the subcontractor in an agreed-upon format for use in creating the final state reporting file [\[Internal New Meridian Link\]](#).

### Subscores

Subscores are produced based on the subset of items aligned to particular science topics or disciplines and Science and Engineering Practices (SEPs) according to the approved blueprints [\[Internal New Meridian Link\]](#). Subscores will be reported on the raw score metric. A minimum of 13 points is necessary to compute a subscore. Tables 8 and 9 provide the item metadata used to calculate the subscores.

Table 8. Topic/Discipline Subscore Composition by Grade

Score	Grade	Topic / Discipline	NGSS Standards (with ADAM identifiers)
SubScore01	5	Matter and Energy in Organisms and Ecosystems	SCI.5.5-PS3-1 SCI.5.5-LS1-1 SCI.5.5-LS2-1
SubScore01	8	Physical Science	SCI.6-8.MS-PS1-1 SCI.6-8.MS-PS1-2 SCI.6-8.MS-PS1-3 SCI.6-8.MS-PS1-4 SCI.6-8.MS-PS1-5 SCI.6-8.MS-PS1-6 SCI.6-8.MS-PS2-1 SCI.6-8.MS-PS2-2 SCI.6-8.MS-PS2-3 SCI.6-8.MS-PS2-4 SCI.6-8.MS-PS2-5 SCI.6-8.MS-PS3-1 SCI.6-8.MS-PS3-2 SCI.6-8.MS-PS3-3 SCI.6-8.MS-PS3-4 SCI.6-8.MS-PS3-5 SCI.6-8.MS-PS4-1 SCI.6-8.MS-PS4-2 SCI.6-8.MS-PS4-3
SubScore01	HS	Physical Science	SCI.9-12.HS-PS1-1 SCI.9-12.HS-PS1-2 SCI.9-12.HS-PS1-3 SCI.9-12.HS-PS1-4 SCI.9-12.HS-PS1-5 SCI.9-12.HS-PS1-6 SCI.9-12.HS-PS1-7 SCI.9-12.HS-PS1-8 SCI.9-12.HS-PS2-1 SCI.9-12.HS-PS2-2 SCI.9-12.HS-PS2-3 SCI.9-12.HS-PS2-4 SCI.9-12.HS-PS2-5 SCI.9-12.HS-PS2-6 SCI.9-12.HS-PS3-1 SCI.9-12.HS-PS3-2 SCI.9-12.HS-PS3-3 SCI.9-12.HS-PS3-4 SCI.9-12.HS-PS3-5 SCI.9-12.HS-PS4-1 SCI.9-12.HS-PS4-2 SCI.9-12.HS-PS4-3 SCI.9-12.HS-PS4-4 SCI.9-12.HS-PS4-5



Score	Grade	Topic / Discipline	NGSS Standards (with ADAM identifiers)
SubScore02	5	Structure and Properties of Matter	SCI.5.5-PS1-1 SCI.5.5-PS1-2 SCI.5.5-PS1-3 SCI.5.5-PS1-4
SubScore02	8	Life Science	SCI.6-8.MS-LS1-1 SCI.6-8.MS-LS1-2 SCI.6-8.MS-LS1-3 SCI.6-8.MS-LS1-4 SCI.6-8.MS-LS1-5 SCI.6-8.MS-LS1-6 SCI.6-8.MS-LS1-7 SCI.6-8.MS-LS1-8 SCI.6-8.MS-LS2-1 SCI.6-8.MS-LS2-2 SCI.6-8.MS-LS2-3 SCI.6-8.MS-LS2-4 SCI.6-8.MS-LS2-6 SCI.6-8.MS-LS3-1 SCI.6-8.MS-LS3-2 SCI.6-8.MS-LS4-1 SCI.6-8.MS-LS4-2 SCI.6-8.MS-LS4-3 SCI.6-8.MS-LS4-4 SCI.6-8.MS-LS4-5 SCI.6-8.MS-LS4-6

Score	Grade	Topic / Discipline	NGSS Standards (with ADAM identifiers)
SubScore02	HS	Life Science	SCI.9-12.HS-LS1-1 SCI.9-12.HS-LS1-2 SCI.9-12.HS-LS1-3 SCI.9-12.HS-LS1-4 SCI.9-12.HS-LS1-5 SCI.9-12.HS-LS1-6 SCI.9-12.HS-LS1-7 SCI.9-12.HS-LS2-1 SCI.9-12.HS-LS2-2 SCI.9-12.HS-LS2-3 SCI.9-12.HS-LS2-4 SCI.9-12.HS-LS2-5 SCI.9-12.HS-LS2-6 SCI.9-12.HS-LS2-7 SCI.9-12.HS-LS2-8 SCI.9-12.HS-LS3-1 SCI.9-12.HS-LS3-2 SCI.9-12.HS-LS3-3 SCI.9-12.HS-LS4-1 SCI.9-12.HS-LS4-2 SCI.9-12.HS-LS4-3 SCI.9-12.HS-LS4-4 SCI.9-12.HS-LS4-5 SCI.9-12.HS-LS4-6
SubScore03	5	Earth's Systems and Space Systems: Stars and the Solar System	SCI.5.5-PS2-1 SCI.5.5-ESS1-1 SCI.5.5-ESS1-2 SCI.5.5-ESS2-1 SCI.5.5-ESS2-2 SCI.5.5-ESS3-1
SubScore03	8	Earth and Space Science	SCI.6-8.MS-ESS1-1 SCI.6-8.MS-ESS1-2 SCI.6-8.MS-ESS1-3 SCI.6-8.MS-ESS1-4 SCI.6-8.MS-ESS2-1 SCI.6-8.MS-ESS2-2 SCI.6-8.MS-ESS2-3 SCI.6-8.MS-ESS2-4 SCI.6-8.MS-ESS2-5 SCI.6-8.MS-ESS2-6 SCI.6-8.MS-ESS3-1 SCI.6-8.MS-ESS3-2 SCI.6-8.MS-ESS3-3 SCI.6-8.MS-ESS3-4 SCI.6-8.MS-ESS3-5
SubScore03	HS	Earth and Space Science	SCI.9-12.HS-ESS1-1 SCI.9-12.HS-ESS1-2 SCI.9-12.HS-ESS1-3





Score	Grade	Topic / Discipline	NGSS Standards (with ADAM identifiers)
			SCI.9-12.HS-ESS1-4 SCI.9-12.HS-ESS1-5 SCI.9-12.HS-ESS1-6 SCI.9-12.HS-ESS2-1 SCI.9-12.HS-ESS2-2 SCI.9-12.HS-ESS2-3 SCI.9-12.HS-ESS2-4 SCI.9-12.HS-ESS2-5 SCI.9-12.HS-ESS2-6 SCI.9-12.HS-ESS2-7 SCI.9-12.HS-ESS3-1 SCI.9-12.HS-ESS3-2 SCI.9-12.HS-ESS3-3 SCI.9-12.HS-ESS3-4 SCI.9-12.HS-ESS3-5 SCI.9-12.HS-ESS3-6

Table 9. Science Practice Subscore Composition

Score	Grade	Science Practice	NGSS Science and Engineering Practice (with ADAM identifiers)
SubScore04	5, 8, HS	Science Practice: Investigate	Include if the first four characters are one of the following: SEP1 SEP3
SubScore05	5, 8, HS	Science Practice: Evaluate	Include if the first four characters are one of the following: SEP4 SEP5 SEP7
SubScore06	5, 8, HS	Science Practice: Reason Scientifically	Include if the first four characters are one of the following: SEP2 SEP6

## Technical Report

New Meridian anticipates that the technical report will follow the same format as the most recently produced technical report (i.e., *Maine Educational Assessment Grades 5, 8, and 11 Science 2020–21 Technical Report*). However, New Meridian will work with the ME DOE and its TAC to finalize the outline to facilitate peer review.



## Field-Test Item Analyses and Calibrations (Field-Test Linking Analysis)

Items that are field-tested are evaluated after the base scale has been established. Field-test items are positioned in sessions 2 and 3. Each session has two field-test versions, resulting in four possible administration combinations:

- S2FT1, S3FT1
- S2FT1, S3FT2
- S2FT2, S3FT1
- S2FT2, S3FT2

Students are randomly assigned a field test session as they are rostered. Therefore, each field-test session will have an approximate sample size of 5,000 students.

Prior to item analyses and calibration the field-test sessions will be evaluated for baseline equivalence. Overall score effect sizes (ES), i.e., standardized mean differences, will be computed using Hedge's  $g$ .

$$ES = g = \frac{y_{FT1} - y_{FT2}}{\sqrt{\frac{(n_{FT1} - 1)s_{FT1}^2 + (n_{FT2} - 1)s_{FT2}^2}{n_{FT1} + n_{FT2} - 2}}}$$

where  $y_{F1}$  and  $y_{F2}$  are the overall score means for the operational items for each field-test block in the session,  $n_{F1}$  and  $n_{F2}$  are the student sample sizes,  $s_{FT1}$  and  $s_{FT2}$  are the student-level standard deviations.

The field-test samples are satisfactory if  $0.00 \leq |ES| \leq 0.05$ .

Furthermore, two key demographic groups will be checked that they are within 5% of each other and the total population

- Gender
- Economically disadvantaged status

Should  $0.05 < |ES|$  or key demographic groups differ by more than 5% then matched subsampling is required.

Once the field test student samples are confirmed equivalent CTT analyses are calculated in the same manner as for the operational items. To bring the field-test items onto the base IRT scale, calibrations are run with both operational and field-test items, concurrently holding the operational item difficulties constant (i.e., "anchored").

### Item Data Review

For Spring 2022, New Meridian will conduct a virtual data-review meeting to evaluate the field-test items. Details and materials for the Item Data Review meetings are documented separately; see [Internal New Meridian Link](#).

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## Appendix A. Example Winsteps Control File

```
&INST
Title= "MESCI05 Initial "

DATA = "P:\Contracts\MESCI\2021\SUM\ANALYSIS\FINAL_CES\MESCI05_dat.txt"
ITEM1 = 48 ; Starting column of item responses
NI = 42 ; Number of items
NAME1 = 1 ; Starting column for person label in data record
NAMLEN = 47 ; Length of person label
XWIDE = 1
MODEL = R
ISGROUPS = 010111111101111011111111110011100111111110 ; Partial Credit model
CODES = 012 ; matches the data
TOTALSCORE = Yes ; Include extreme responses in reported scores
PTBISERIAL = X

;User Scaling
UDECIM = 4 ; reported decimal places

CONVERGE = BOTH
RCONV = .001
LCONV = .00001

IFILE = "MESCI05_IFILE.txt"
SFILE = "MESCI05_SFILE.txt"
PFILE = "MESCI05_PFILE.txt"
SCOREFILE="MESCI05_SCORE.txt"
OUTFILE = "MESCI05_OUT.txt"

TFILE = *
1.1
1.2
3
14
20.2
;30
0
*

; Person Label variables: columns in label: columns in line
```



@VENDOR\_ID = 1E36  
@Gender = 38E38  
@Ethnic = 40E40  
@EconDis = 42E42  
@EL = 44E44  
@IEP = 46E46

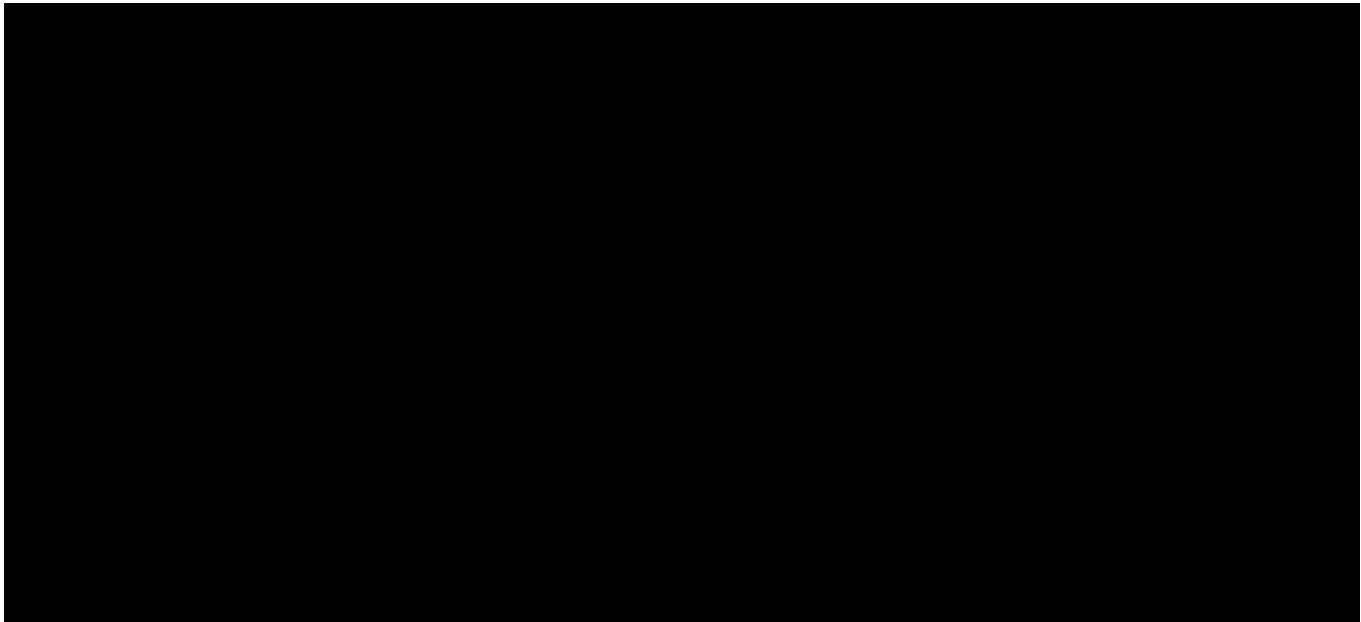
&END ; Item labels follow: columns in label  
END NAMES



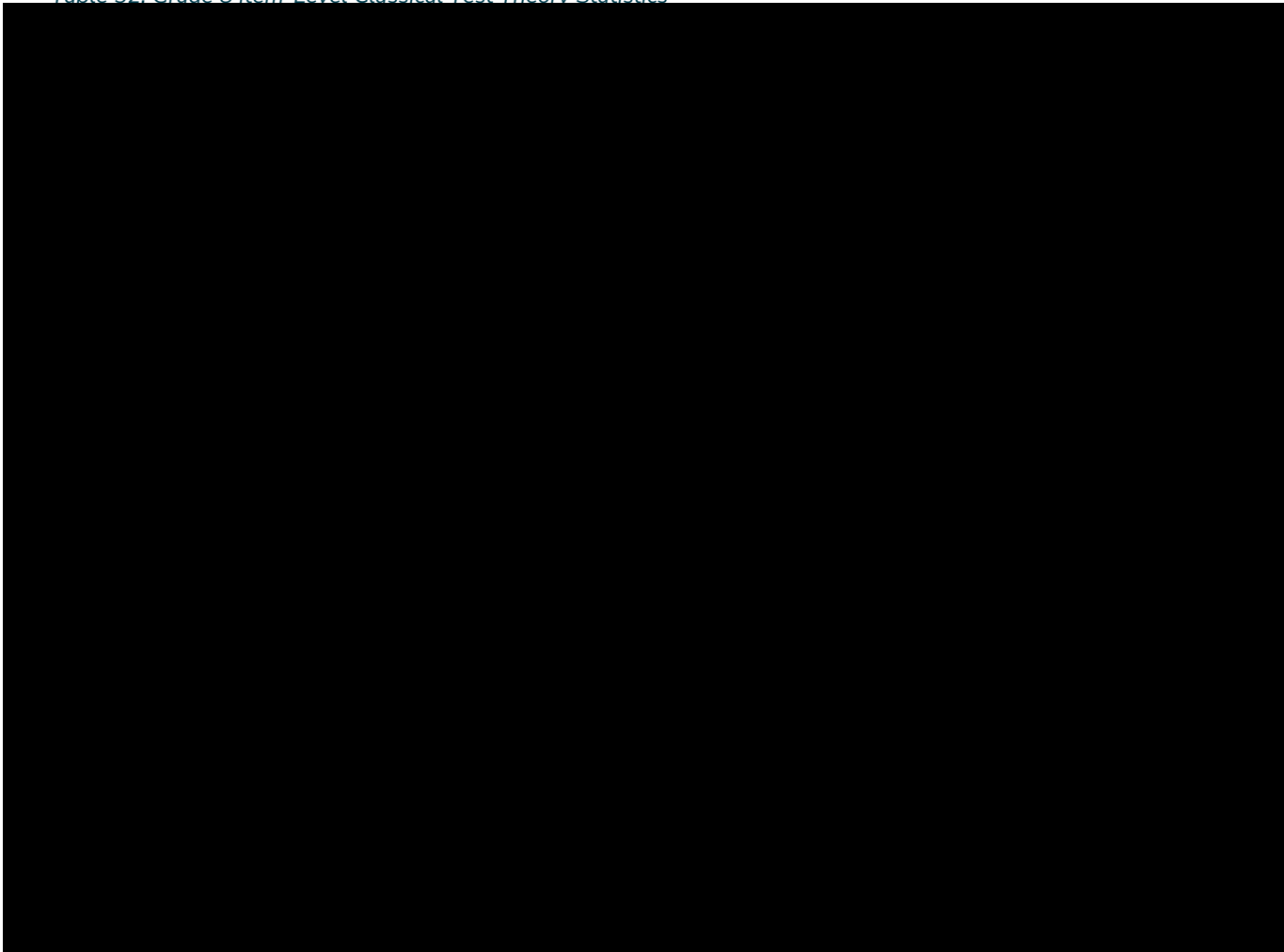
## Appendix K. Classical Item Analysis

*Table 51. Grade 5 Item-Level Classical Test Theory Statistics*

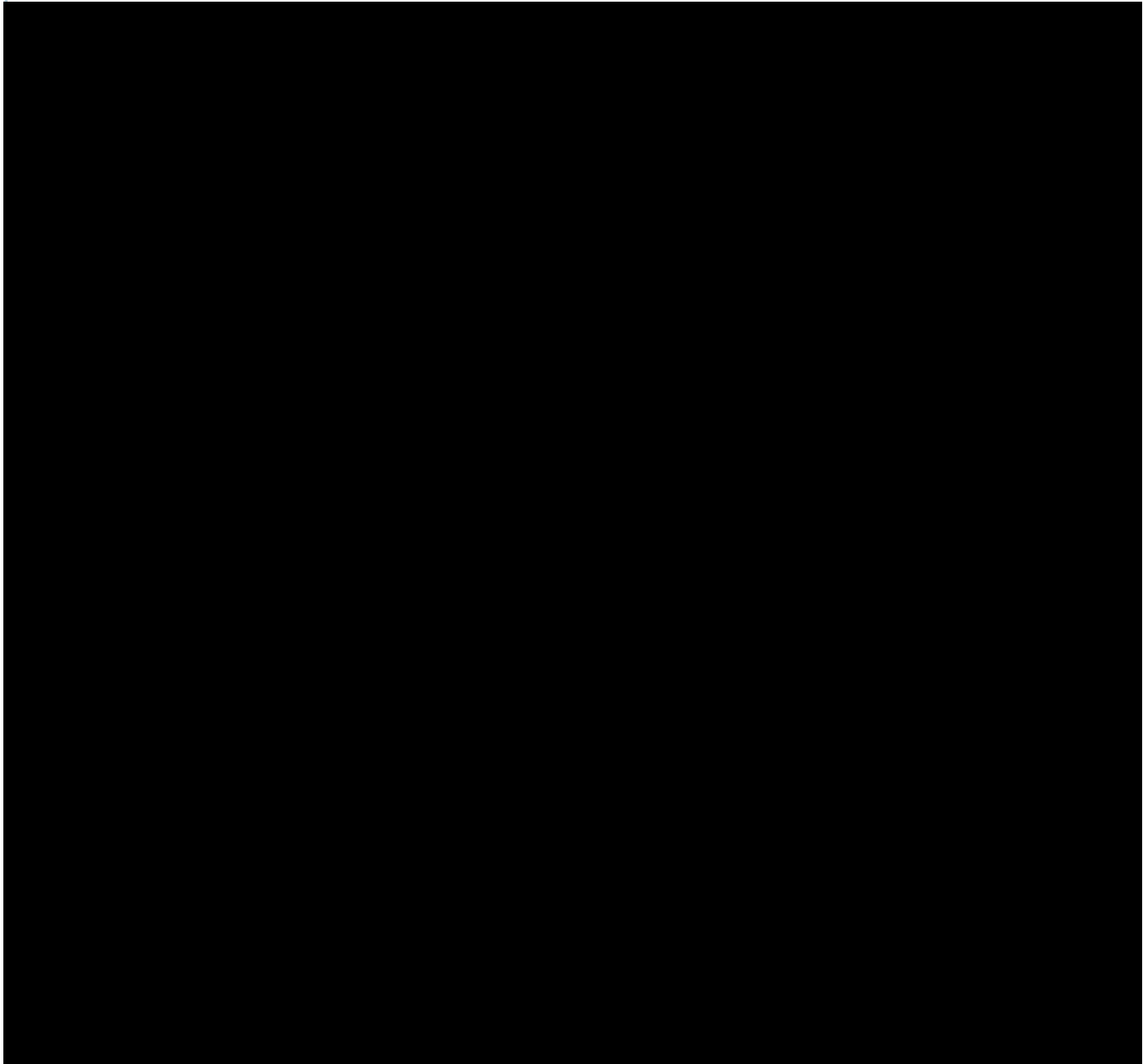
A large black rectangular box covers the entire area where the table data would be located, indicating that the content has been redacted.



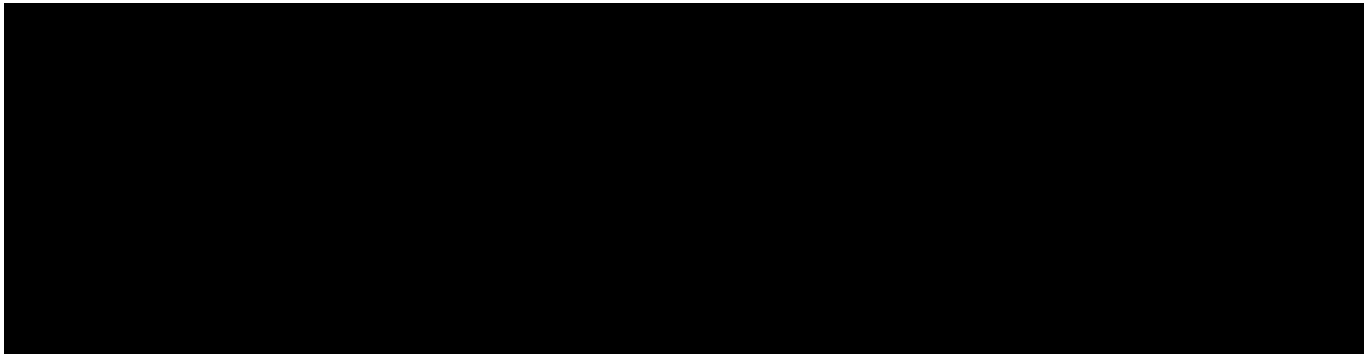
*Table 52. Grade 8 Item-Level Classical Test Theory Statistics*

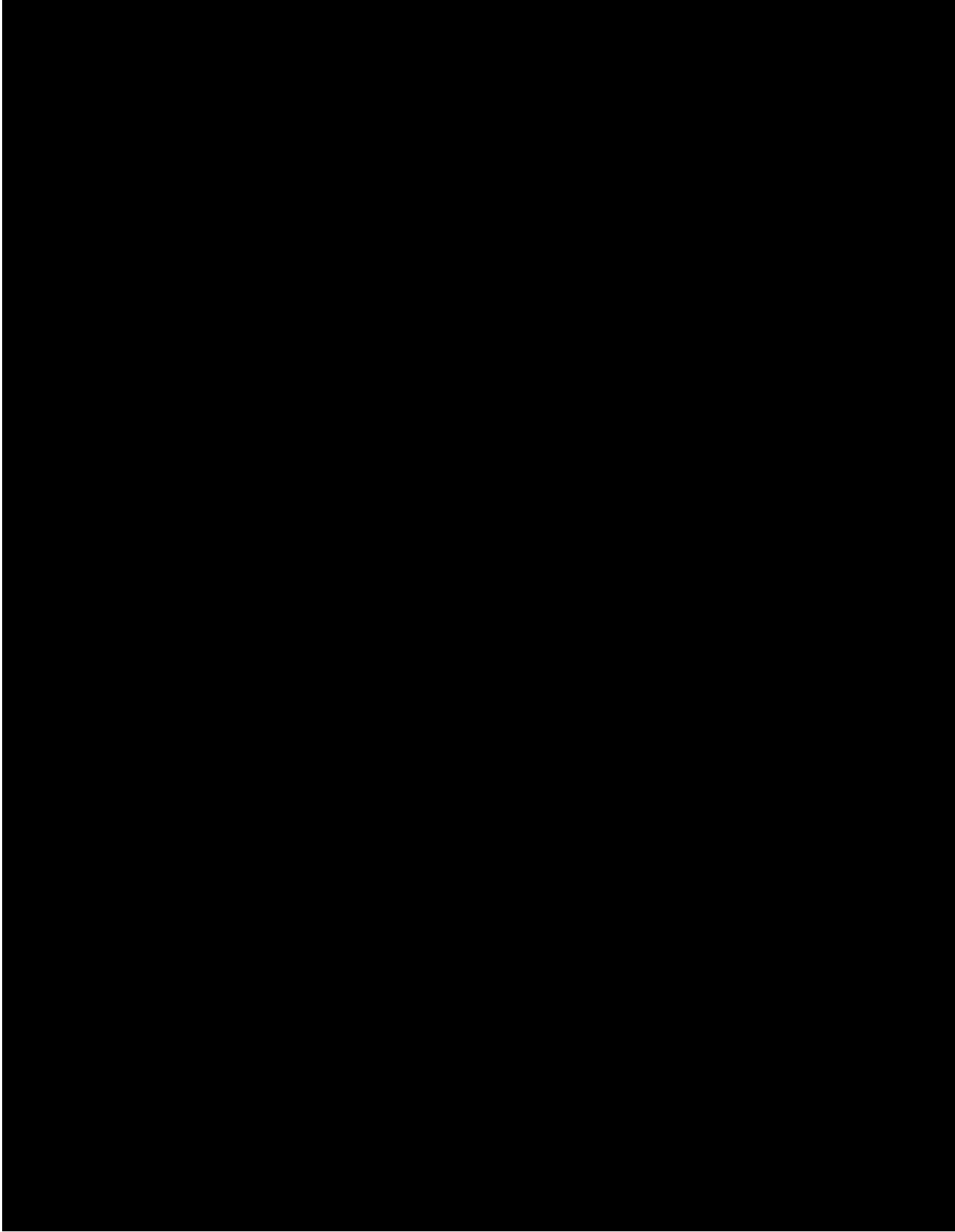


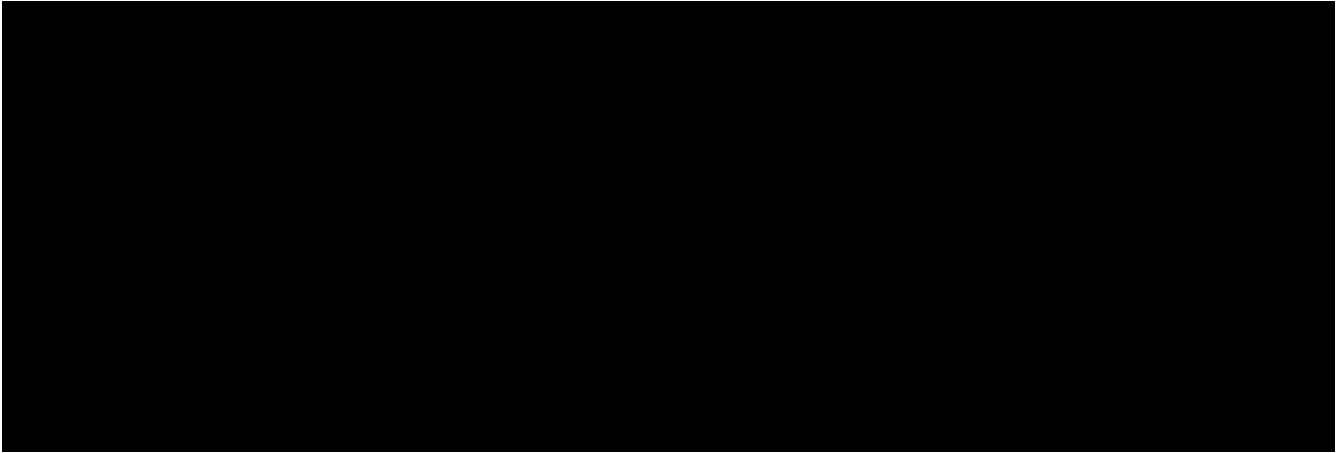




*Table 53. High School Item-Level Classical Test Theory Statistics*

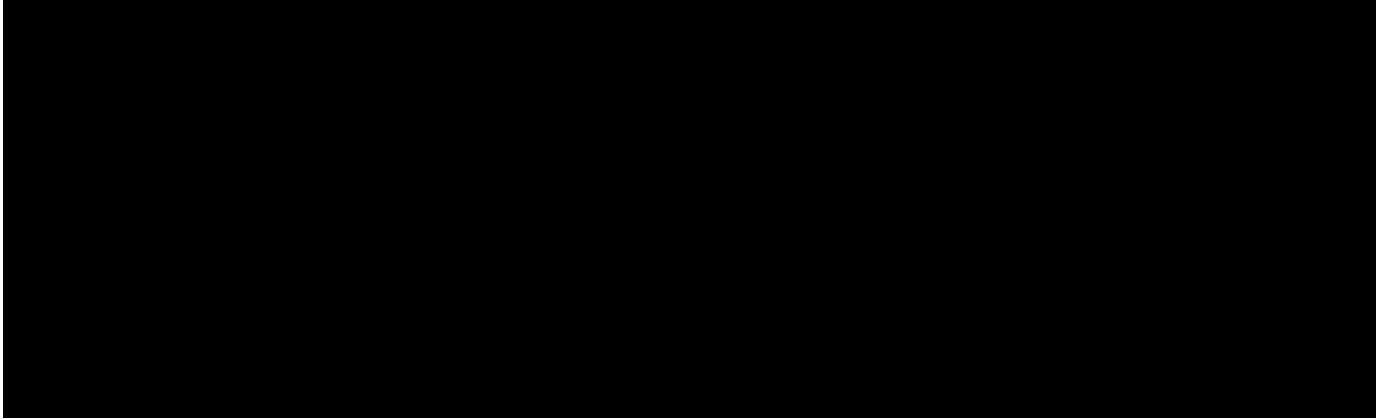




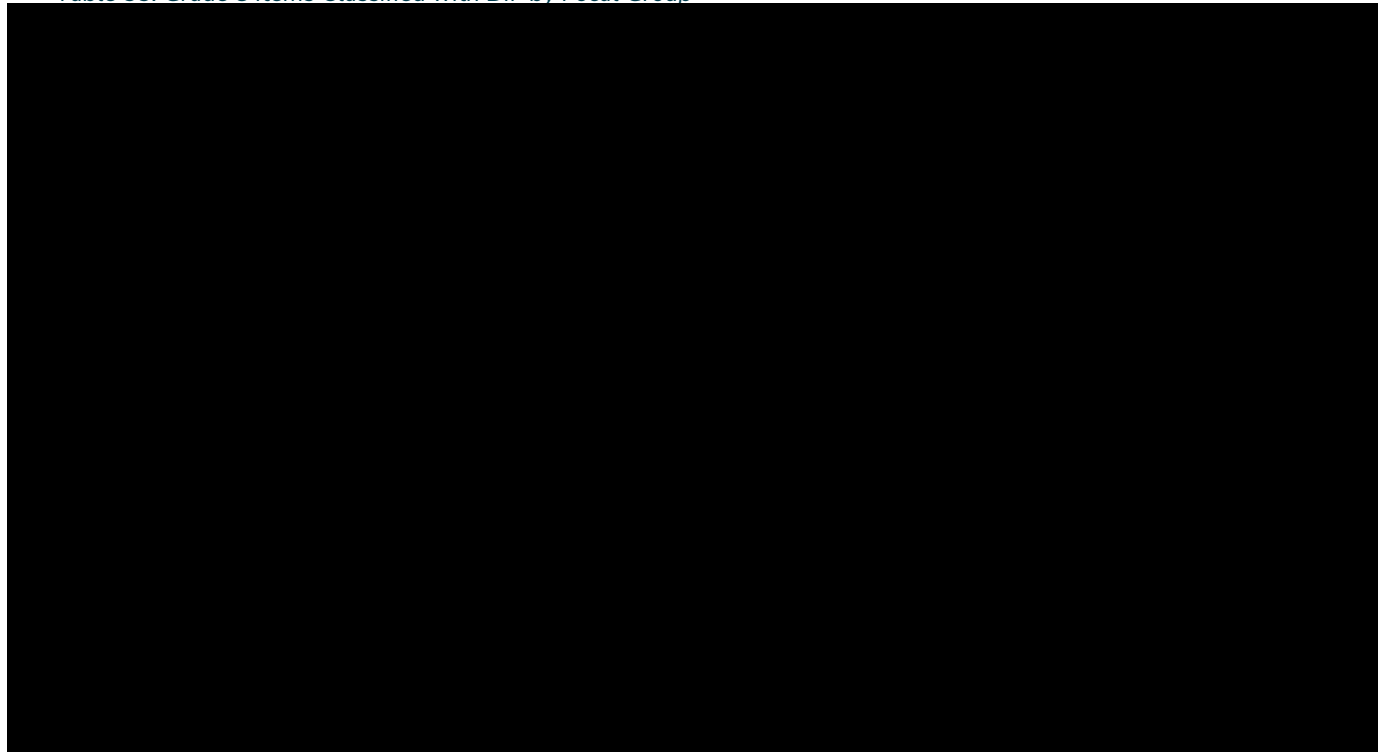


## Appendix L. Differential Item Functioning Results

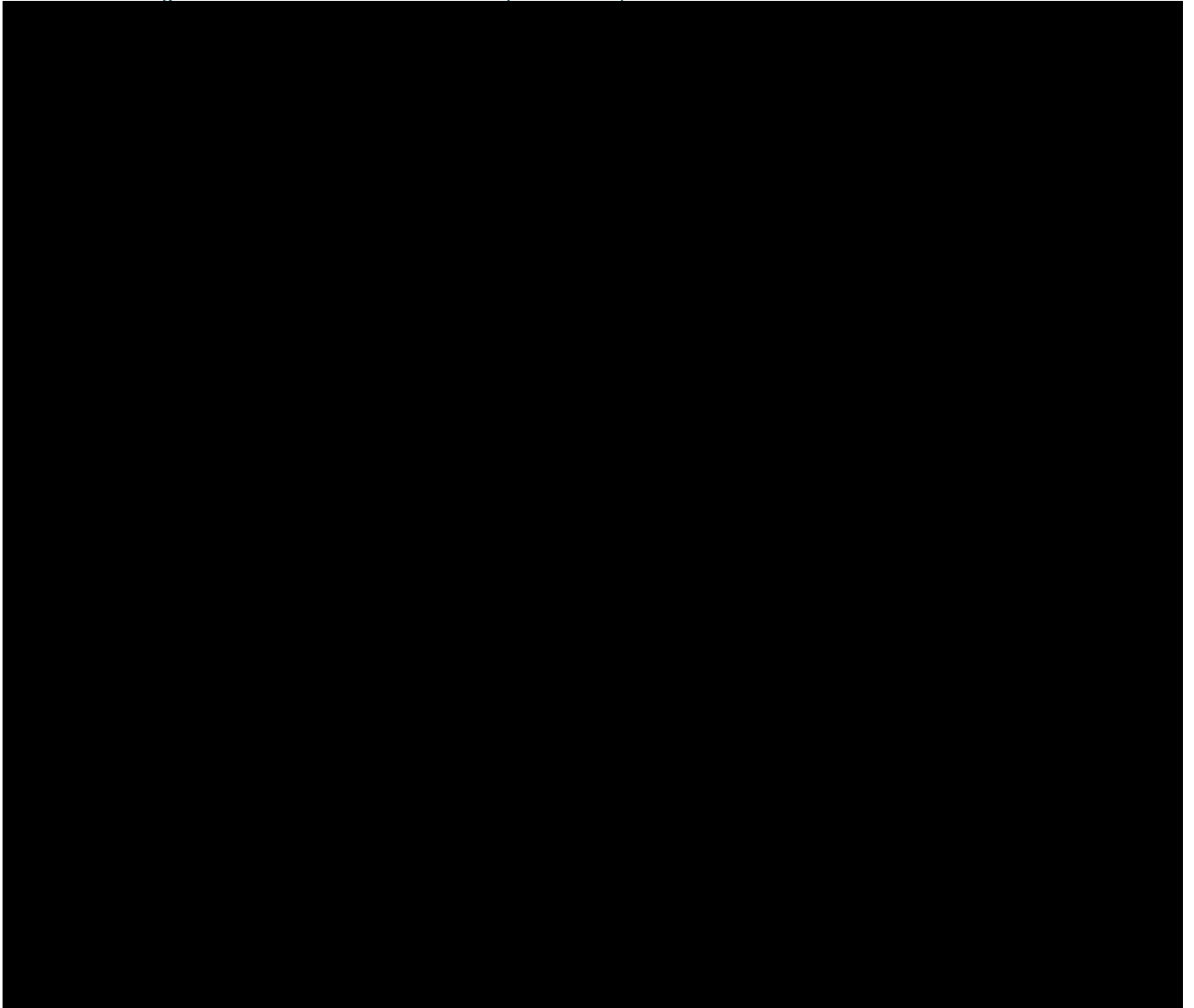
*Table 54. Grade 5 Items Classified with DIF by Focal Group*



*Table 55. Grade 8 Items Classified with DIF by Focal Group*

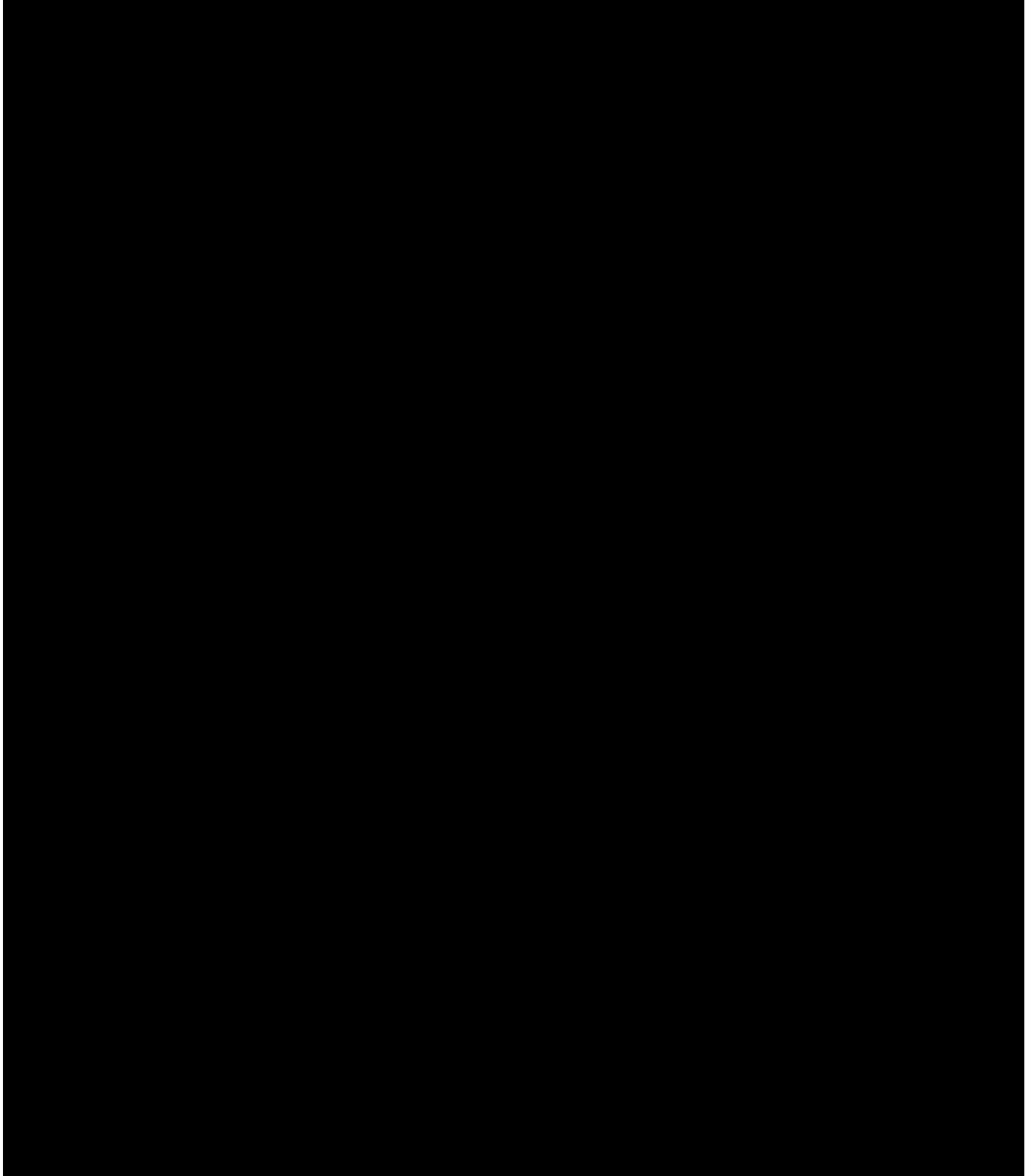


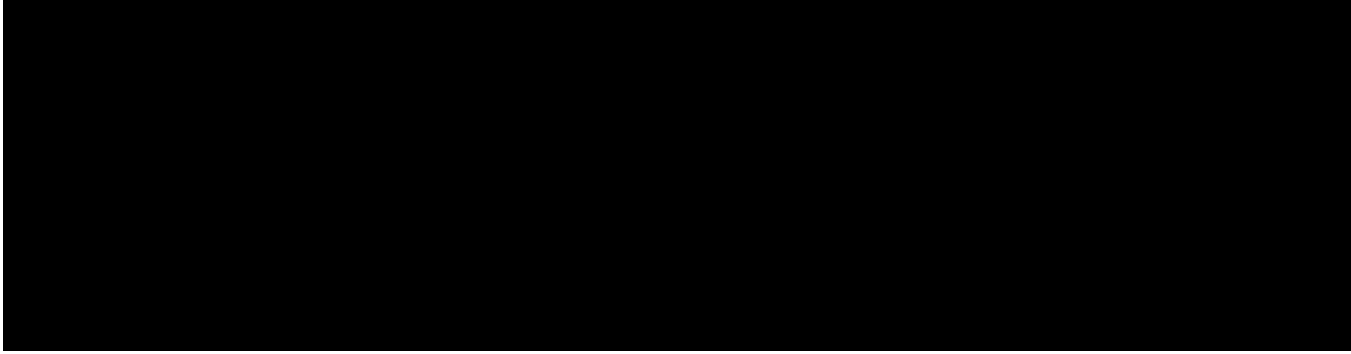
*Table 56. High School Items Classified with DIF by Focal Group*



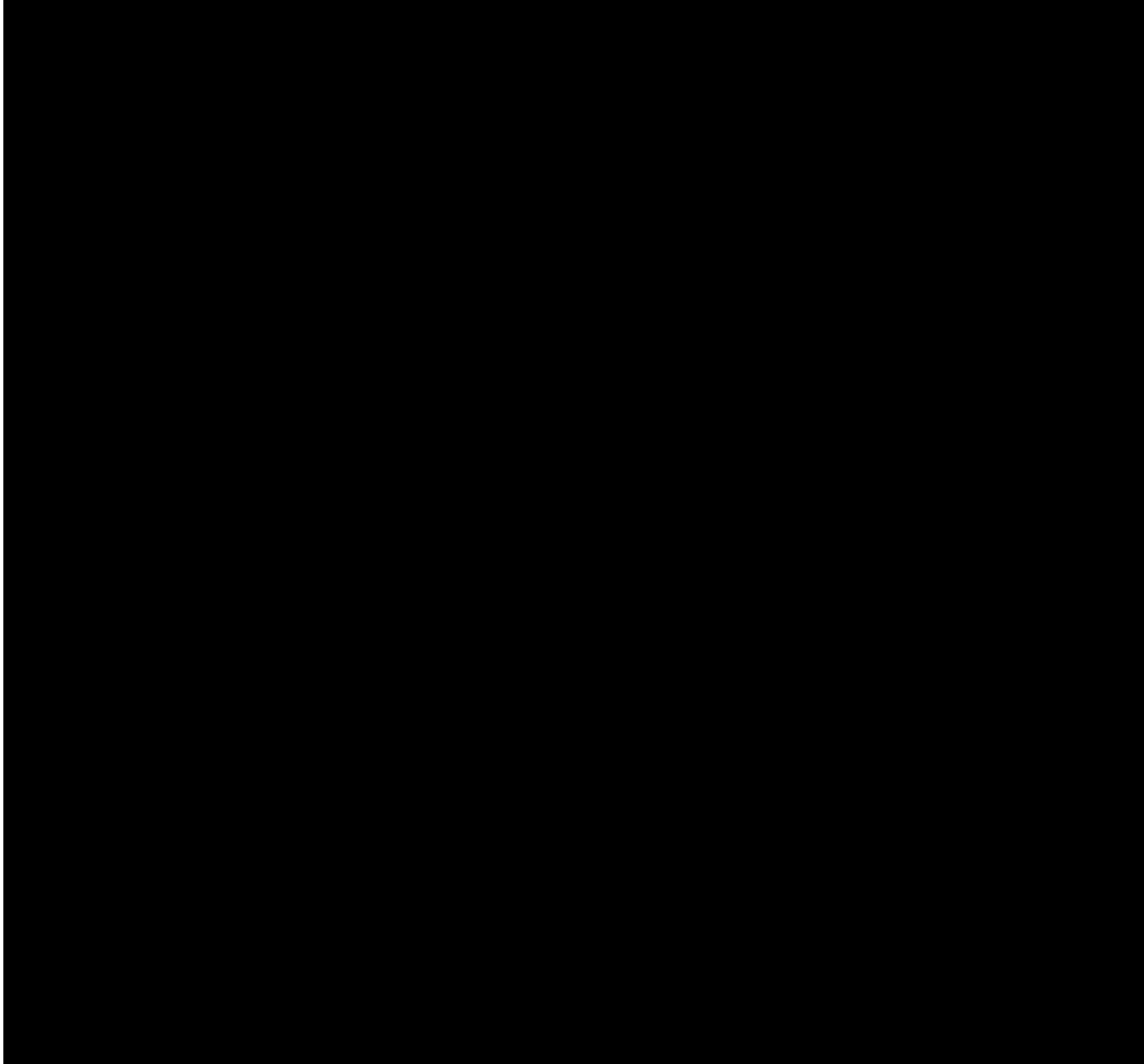
## Appendix M. Item Response Theory Parameters

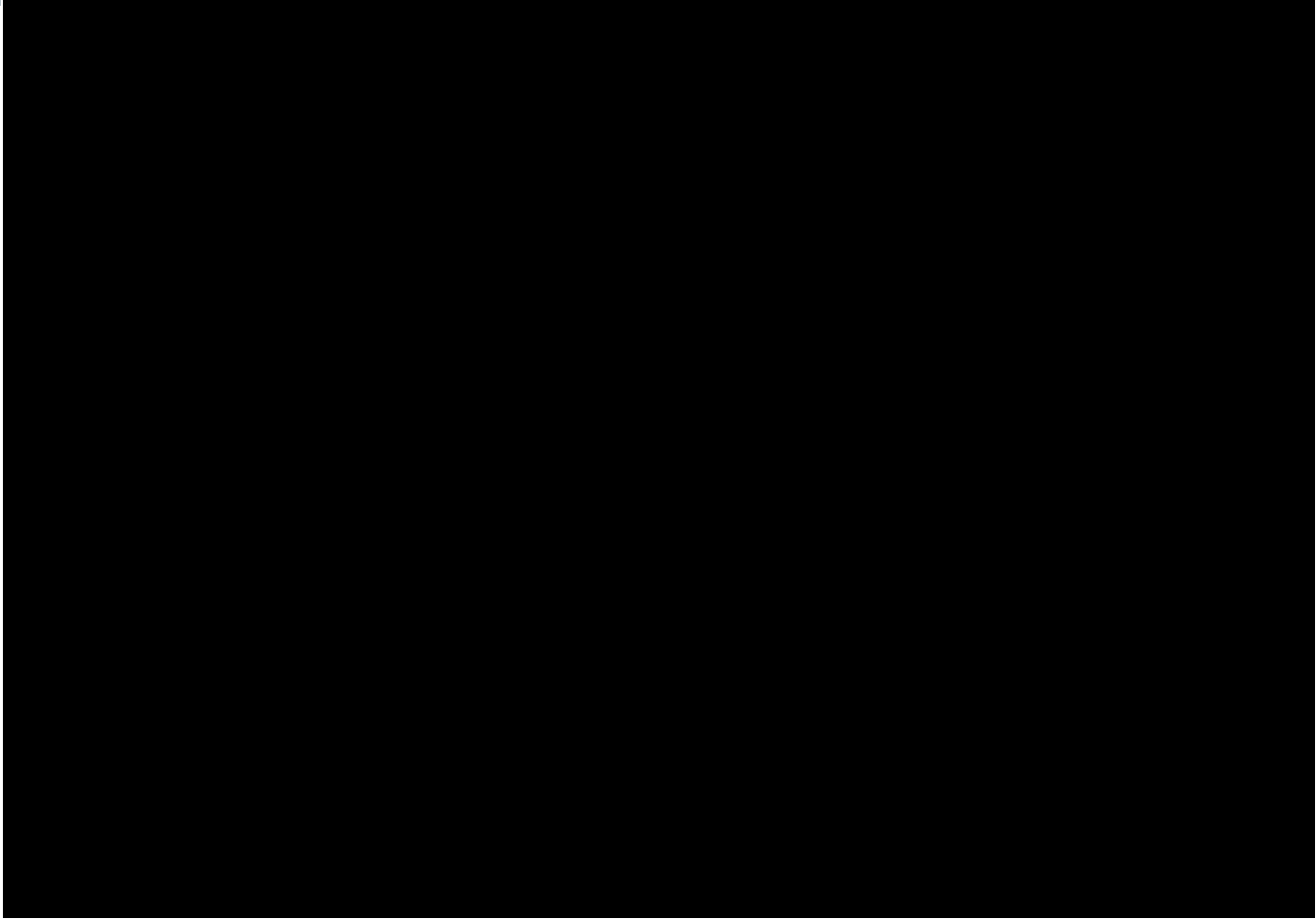
*Table 57. Grade 5 IRT Parameters*



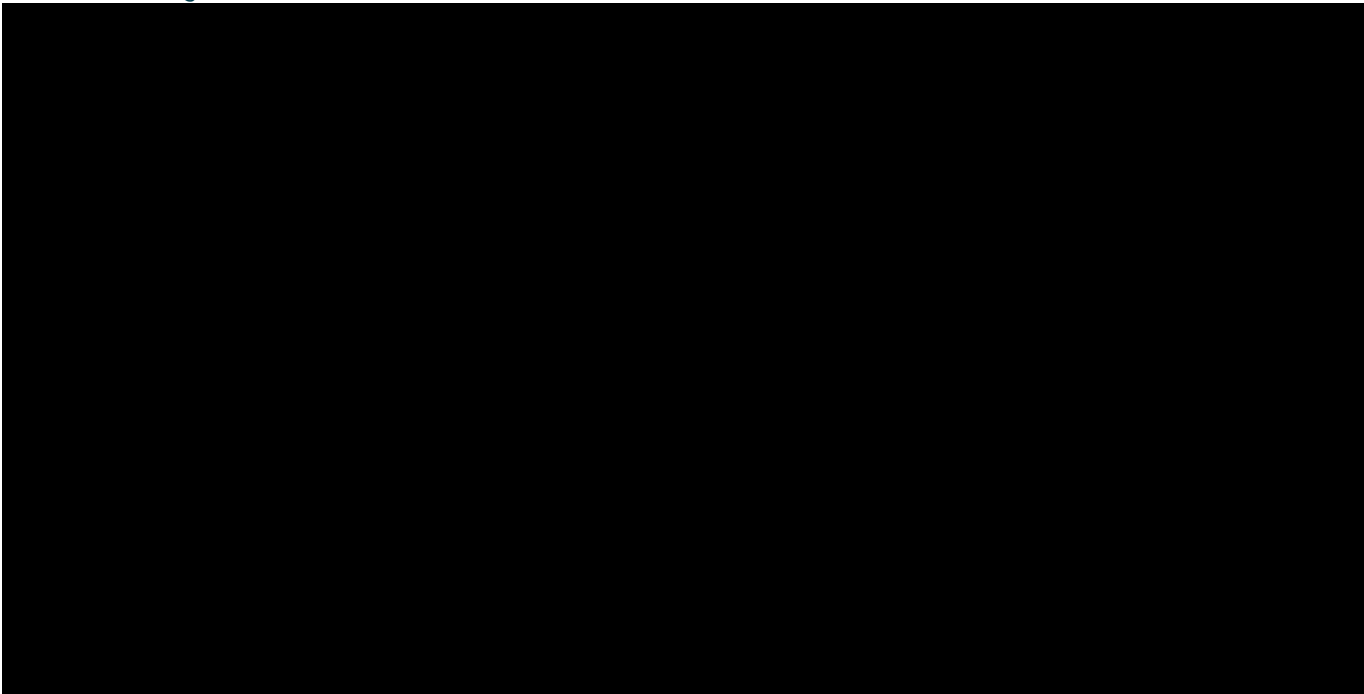


*Table 58. Grade 8 IRT Parameters*

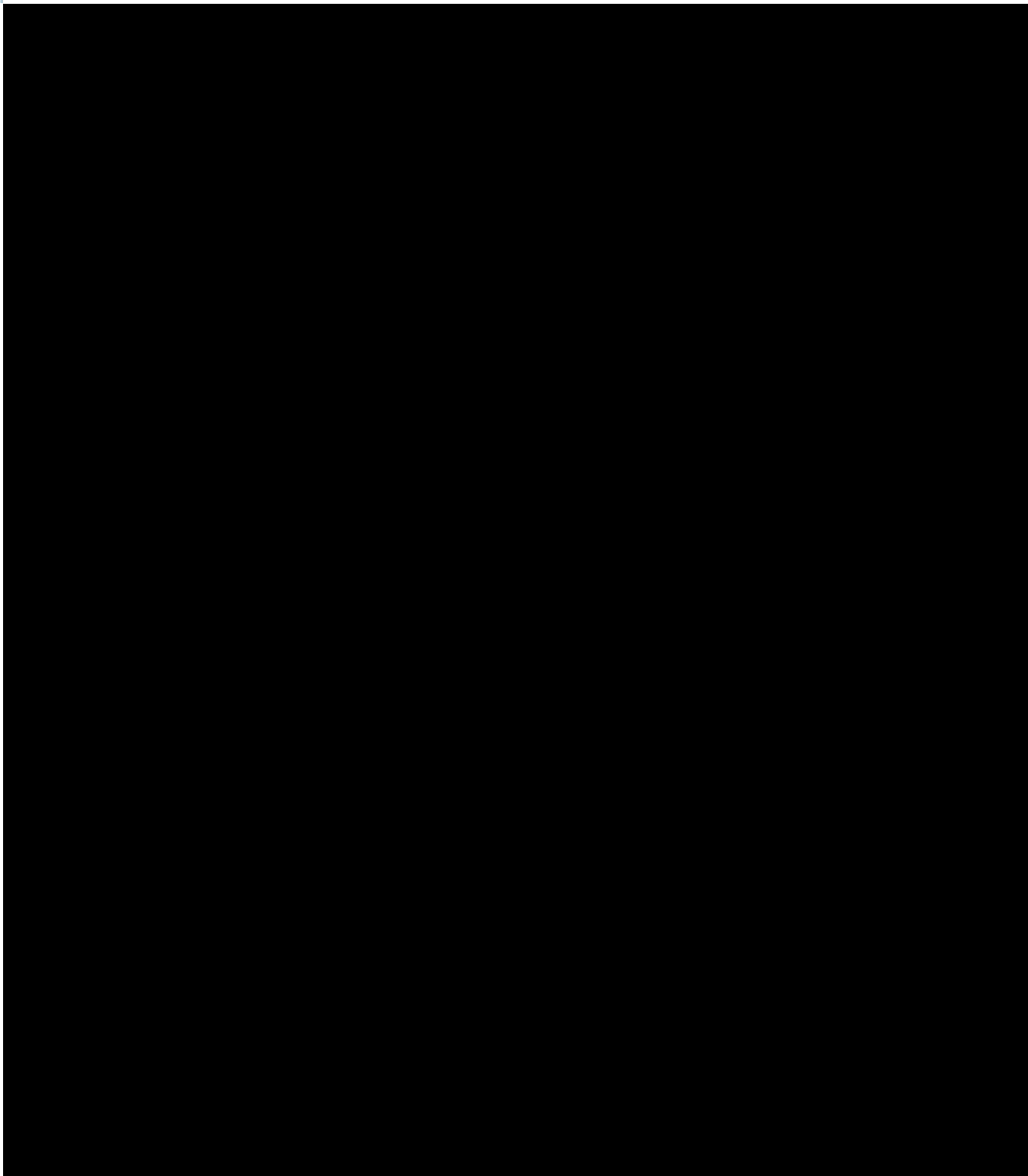




*Table 59. High School IRT Parameters*







## Appendix N. Assessment IRT Curves

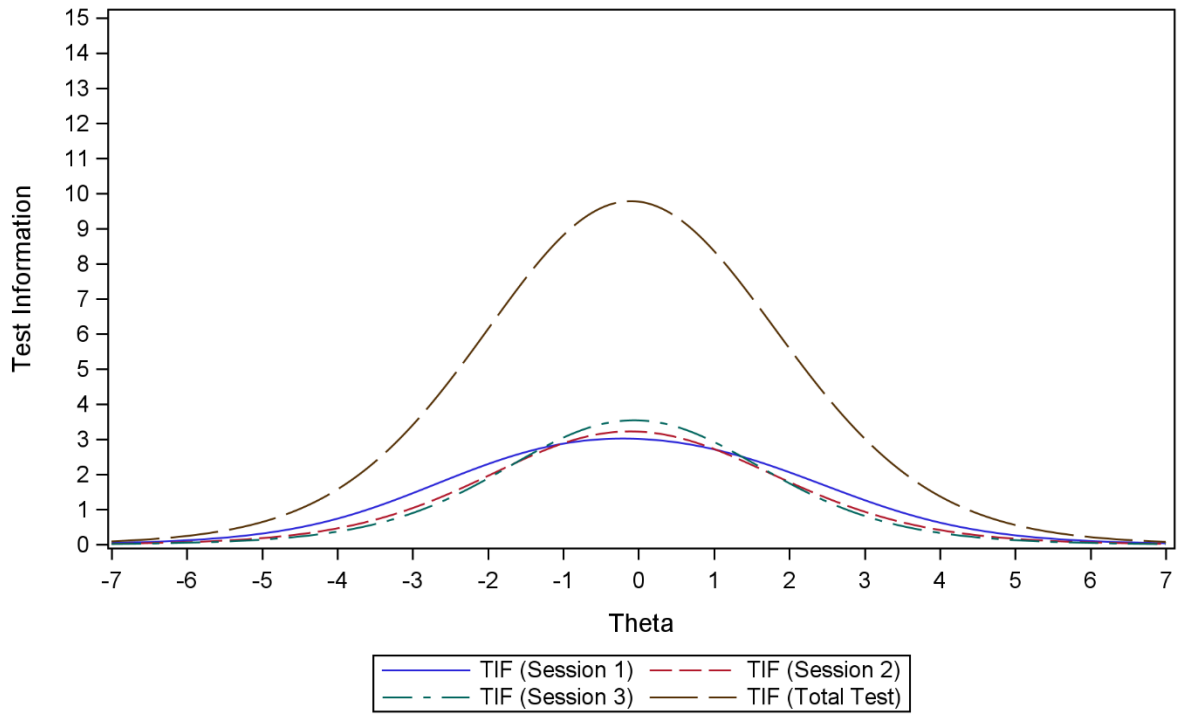


Figure 11. Grade 5 Test Information Function

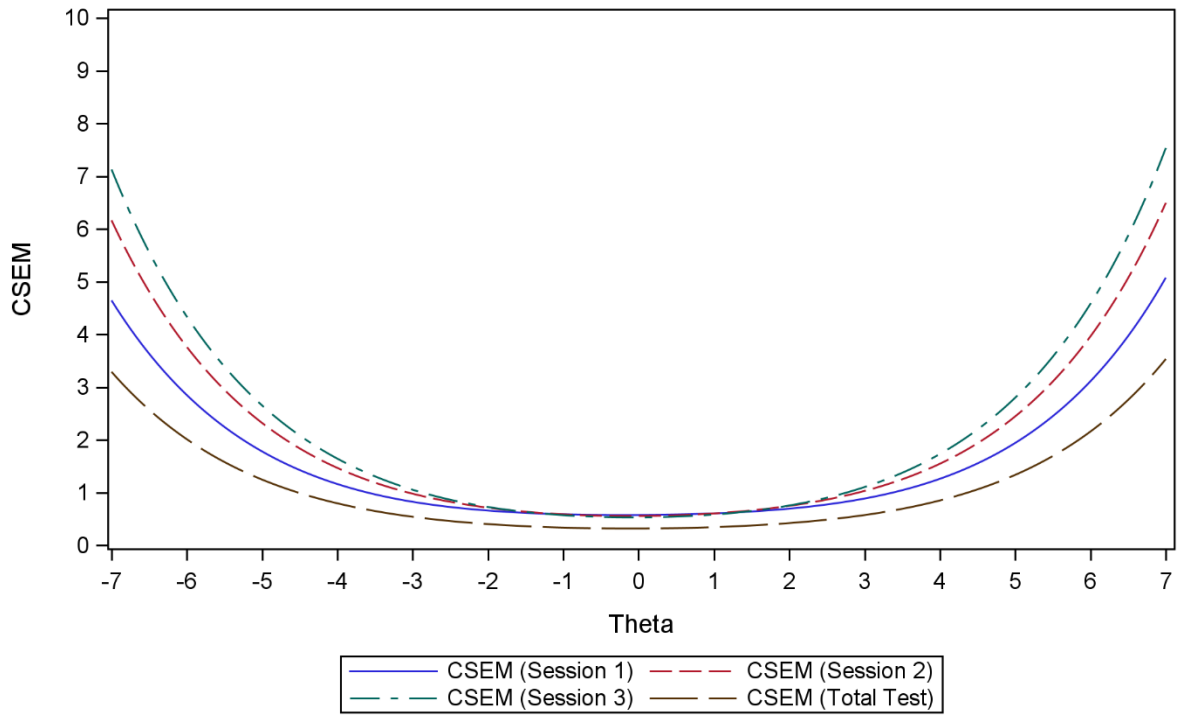


Figure 12. Grade 5 Conditional Standard Error of Measurement

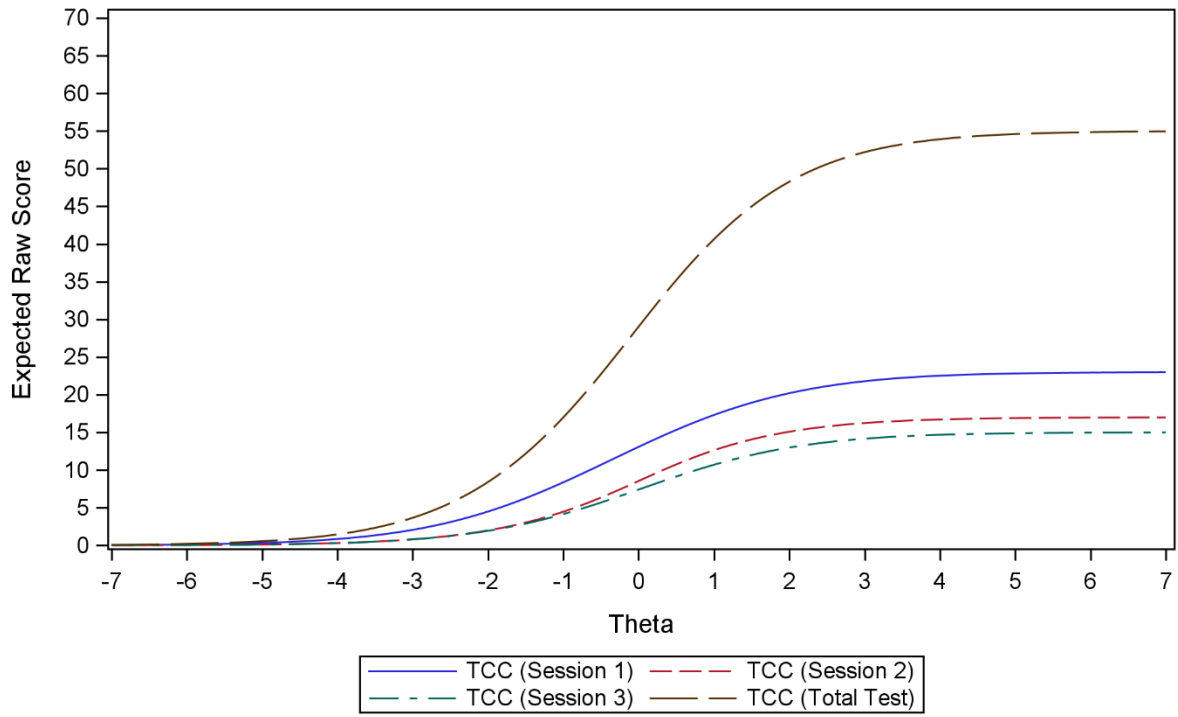


Figure 13. Grade 8 Test Characteristic Curve

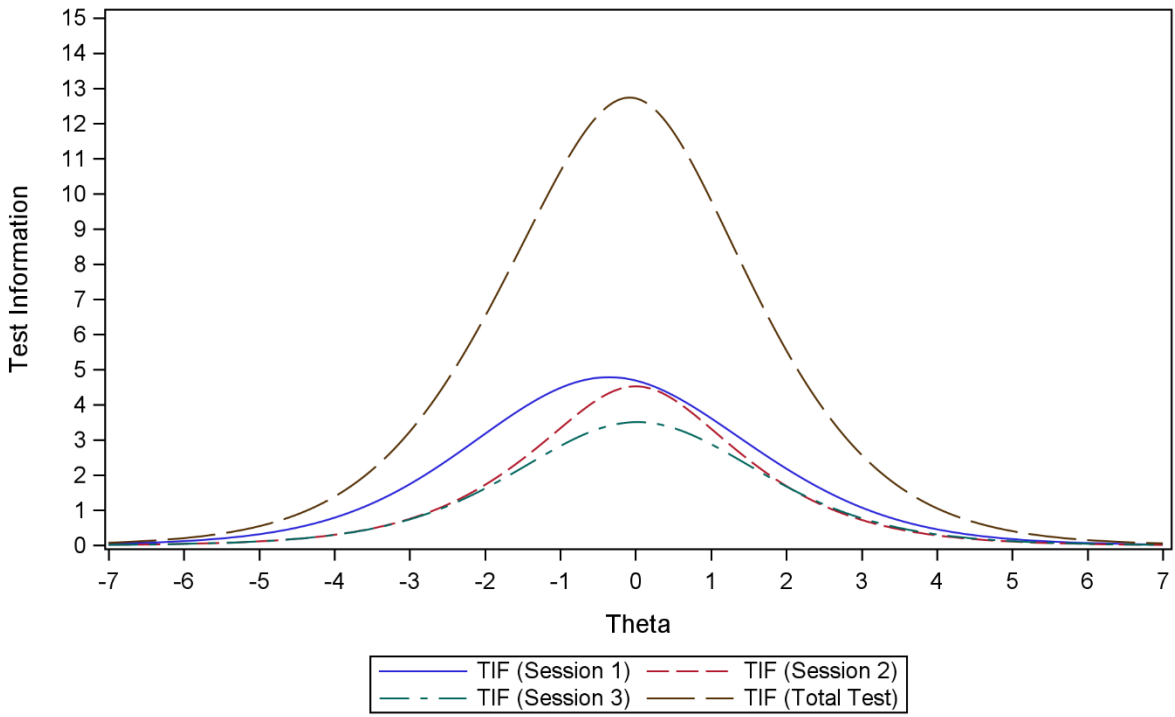


Figure 14. Grade 8 Test Information Function

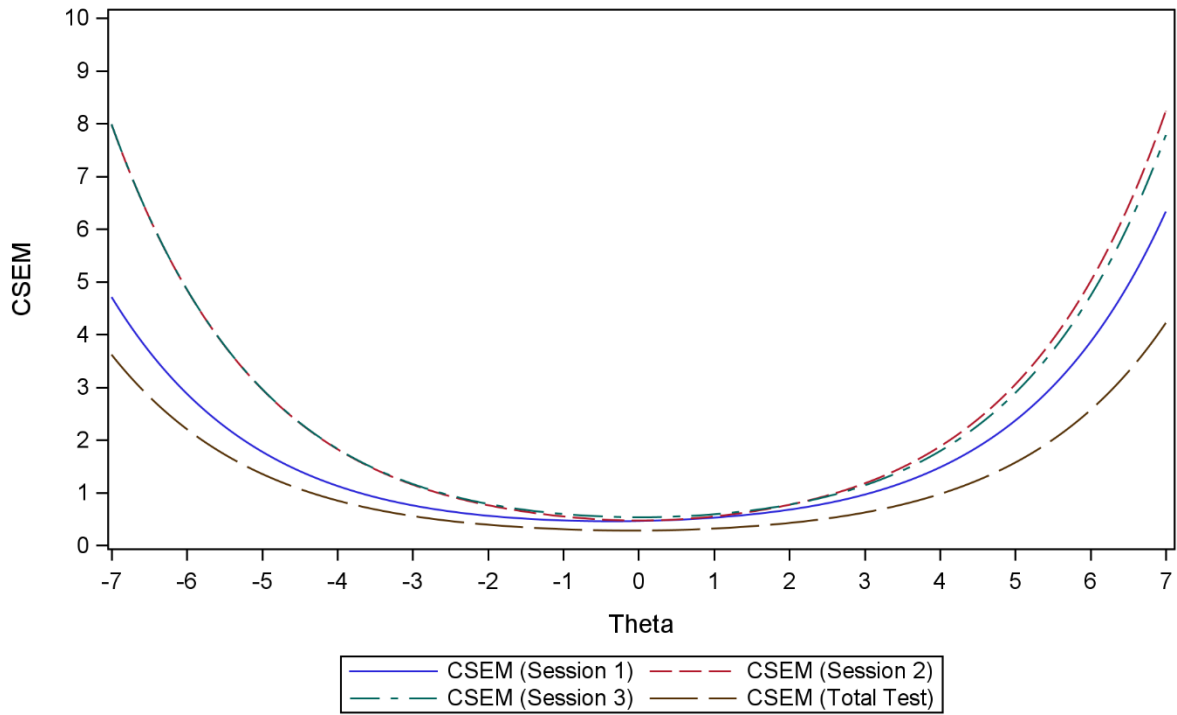


Figure 15. Grade 8 Conditional Standard Error of Measurement

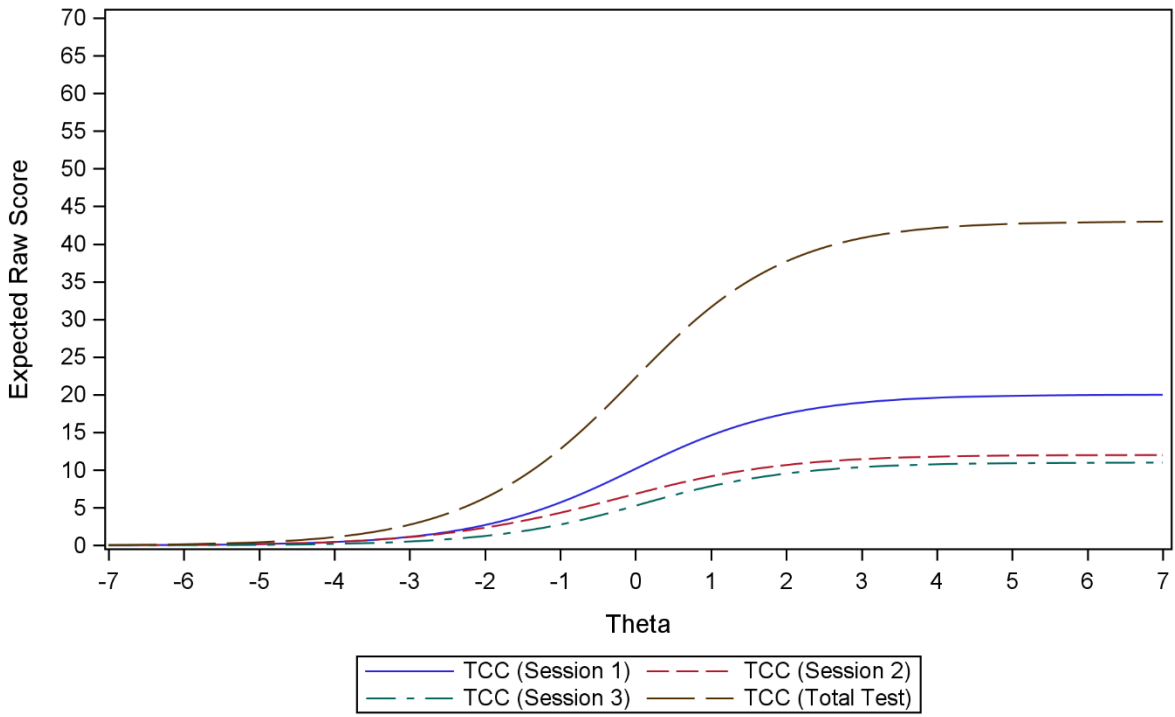


Figure 16. High School Test Characteristic Curve

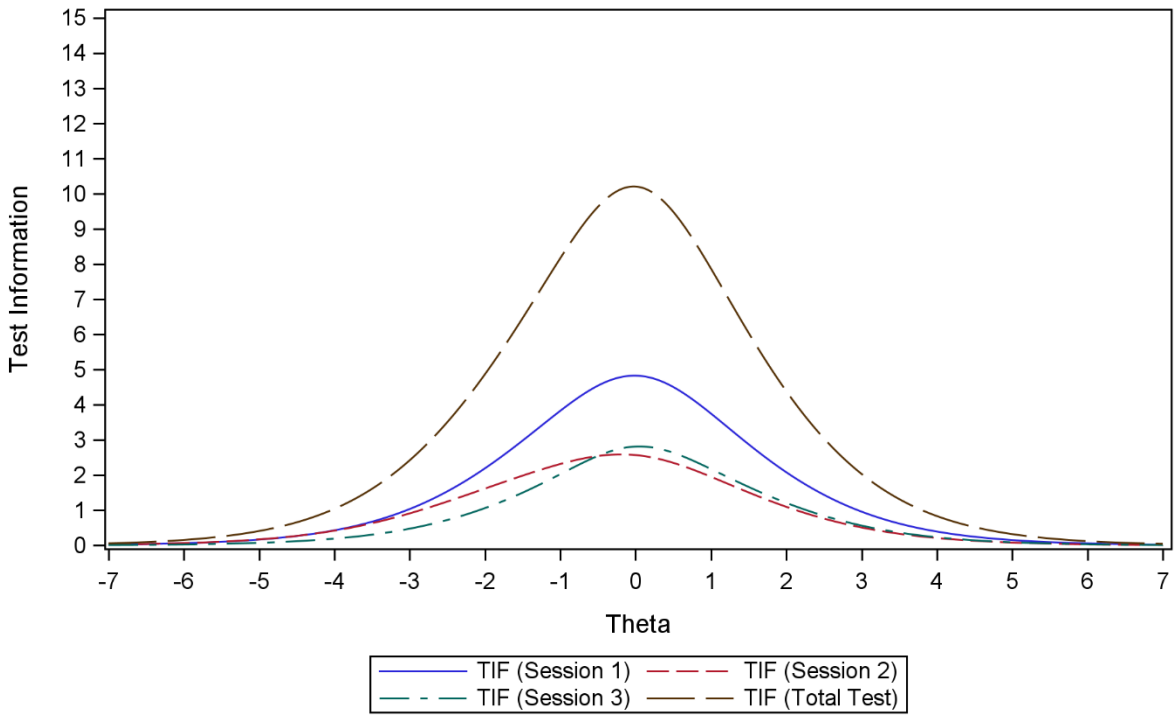


Figure 17. High School Test Information Function



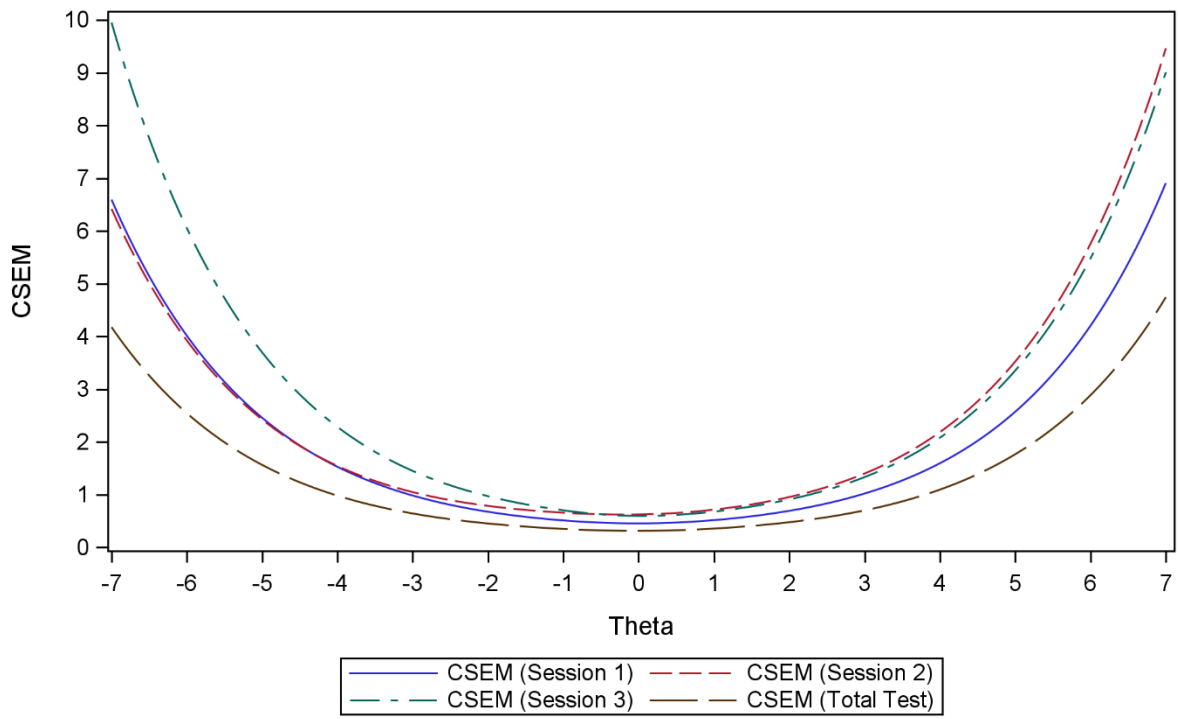


Figure 18. High School Conditional Standard Error of Measurement



## Appendix O. Raw to Scale Score Tables

Table 60. Grade 5 Raw-to-Scaled Score Look-Up Table

Raw Score	Scaled Score	Scaled Score CSEM
0	6	7
1	6	7
2	12	5
3	15	4
4	18	4
5	20	3
6	21	3
7	23	3
8	24	3
9	25	2
10	27	2
11	28	2
12	29	2
13	30	2
14	30	2
15	31	2
16	32	2
17	33	2
18	34	2
19	35	2
20	36	2
21	36	2
22	37	2

Raw Score	Scaled Score	Scaled Score CSEM
23	38	2
24	39	2
25	39	2
26	40	2
27	41	2
28	42	2
29	43	2
30	43	2
31	44	2
32	45	2
33	46	2
34	47	2
35	48	2
36	49	2
37	50	2
38	51	3
39	53	3
40	54	3
41	56	3
42	58	4
43	62	5
44	67	7
45	80	15



Table 61. Grade 8 Raw-to-Scaled Score Look-Up Table

Raw Score	Scaled Score	Scaled Score CSEM
0	3	8
1	3	8
2	3	8
3	3	8
4	3	8
5	7	7
6	11	6
7	14	6
8	17	6
9	19	5
10	21	5
11	23	5
12	25	5
13	27	5
14	29	5
15	31	4
16	33	4
17	34	4
18	36	4
19	38	4
20	39	4
21	41	4
22	42	4
23	44	4
24	45	4
25	47	4

Raw Score	Scaled Score	Scaled Score CSEM
26	48	4
27	50	4
28	51	4
29	53	4
30	54	4
31	56	4
32	57	4
33	59	4
34	61	4
35	62	4
36	64	5
37	66	5
38	68	5
39	70	5
40	72	5
41	75	5
42	77	6
43	80	6
44	83	6
45	87	7
46	90	8
47	90	8
48	90	8
49	90	8
50	90	8



Table 62. High School Raw-to-Scaled Score Look-Up Table

Raw Score	Scaled Score	Scaled Score CSEM
0	4	8
1	4	8
2	10	5
3	14	4
4	16	4
5	18	3
6	20	3
7	21	3
8	23	3
9	24	3
10	25	2
11	26	2
12	27	2
13	28	2
14	29	2
15	30	2
16	31	2
17	31	2
18	32	2
19	33	2
20	34	2
21	34	2
22	35	2
23	36	2
24	36	2
25	37	2
26	38	2
27	38	2

Raw Score	Scaled Score	Scaled Score CSEM
28	39	2
29	40	2
30	40	2
31	41	2
32	42	2
33	43	2
34	43	2
35	44	2
36	45	2
37	46	2
38	47	2
39	48	2
40	48	2
41	49	2
42	50	2
43	52	2
44	53	3
45	54	3
46	55	3
47	57	3
48	58	3
49	60	3
50	62	4
51	65	4
52	68	5
53	72	6
54	78	8
55	90	14

## Appendix P. Score Distributions

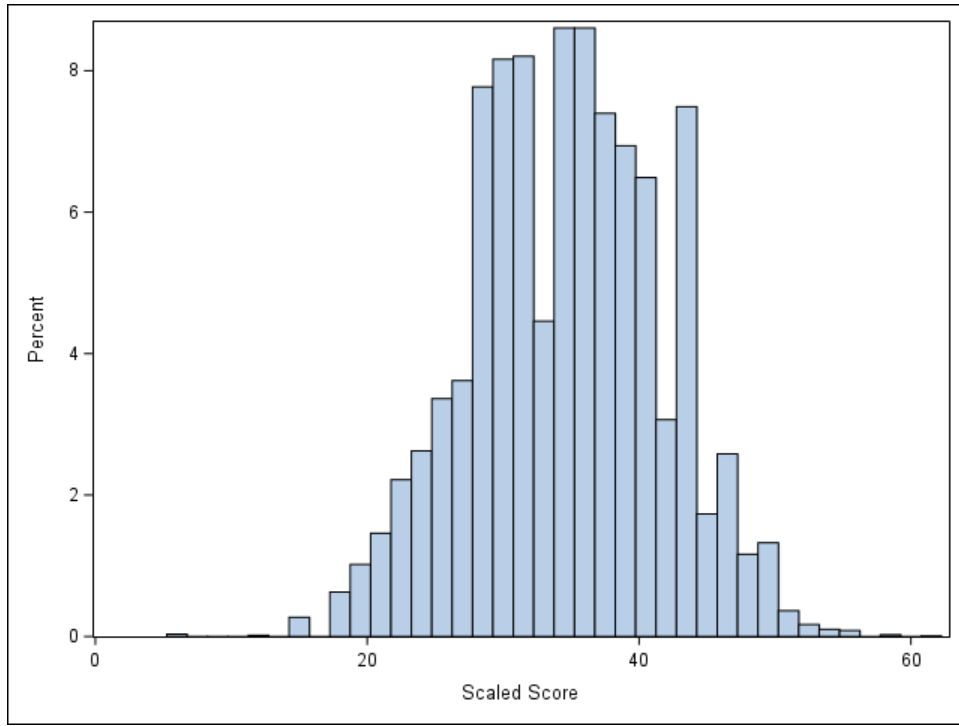


Figure 19. Grade 5 Scaled Score Distribution

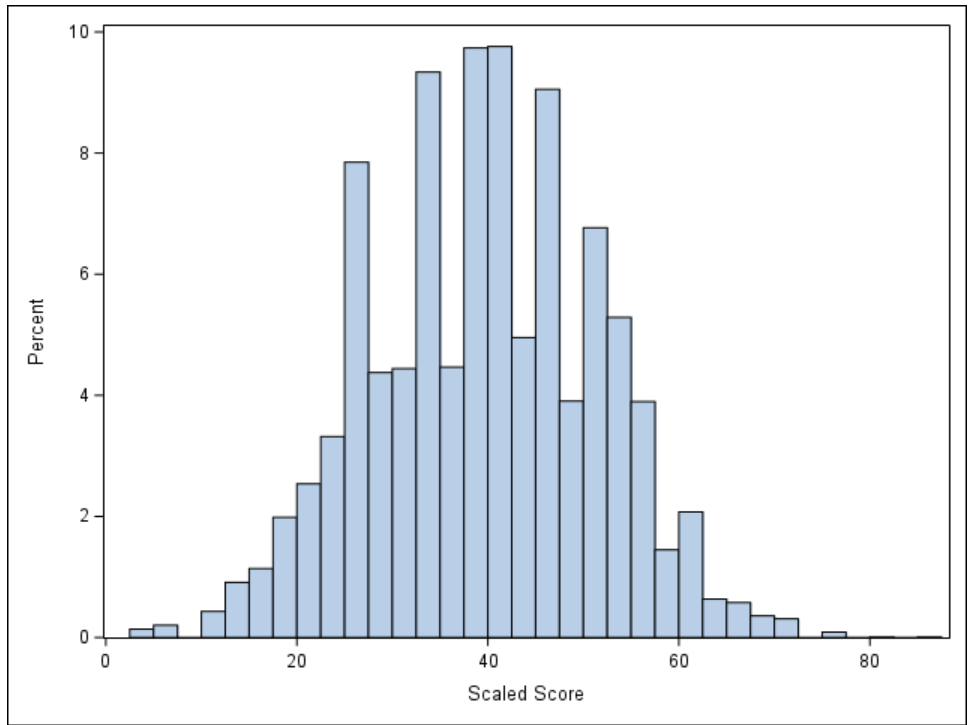


Figure 20. Grade 8 Scaled Score Distribution

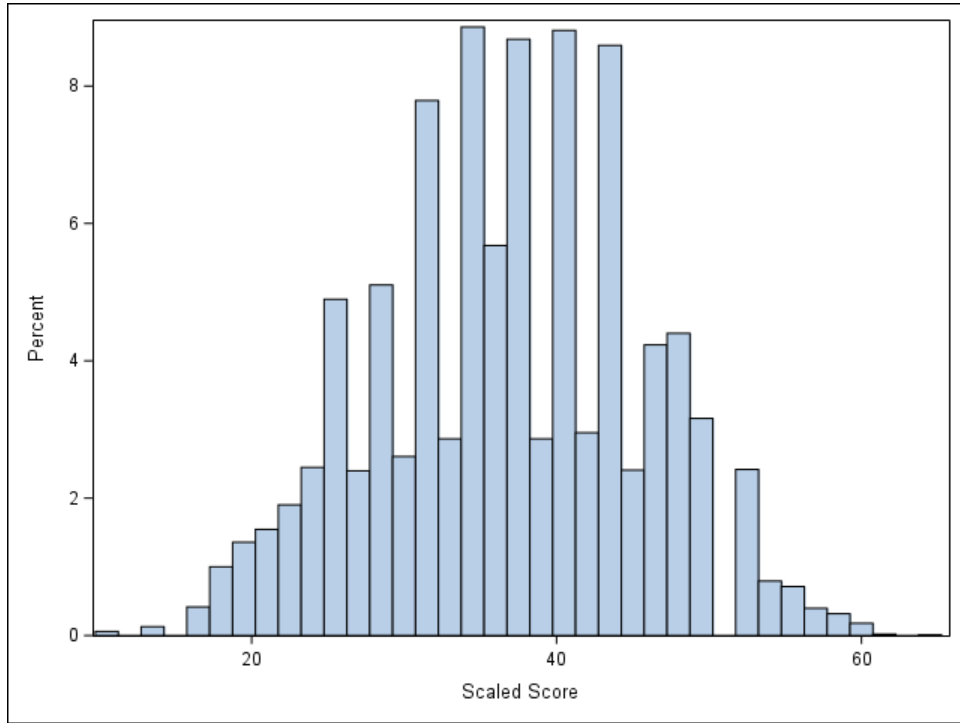


Figure 21. High School Scaled Score Distribution



## Appendix Q. Reliability

Table 63. Grade 5 Subgroup Reliabilities

Group	N	Maximum	Mean	Std. Dev.	Alpha	SEM
All Students	11,774	43	19.37	8.01	0.85	3.06
Male	5,958	43	19.50	8.22	0.86	3.05
Female	5,811	41	19.24	7.79	0.84	3.06
Hispanic or Latino	306	38	18.21	7.62	0.84	3.08
American Indian or Alaskan Native	93	34	17.26	6.94	0.80	3.13
Asian	163	40	21.22	7.91	0.85	3.02
Black or African American	511	38	13.88	6.85	0.82	2.90
Native Hawaiian or Other Pacific Islander	7	N/A	N/A	N/A	N/A	N/A
White	10,278	43	19.69	7.99	0.85	3.06
Two or More Races	411	38	18.75	7.70	0.84	3.03
Currently Receiving EL Services	435	34	11.86	5.63	0.75	2.84
English-Speaking Students	11,334	43	19.66	7.95	0.85	3.06
Students with an IEP	2,465	40	13.92	6.96	0.82	2.94
IEP: All Other Students	9,304	43	20.81	7.64	0.83	3.08
Economically Disadvantaged Students	4,643	41	16.74	7.43	0.83	3.04
SES: All Other Students	7,126	43	21.08	7.91	0.84	3.06
Migrant Students	7	N/A	N/A	N/A	N/A	N/A
Migrant: All Other Students	11,762	43	19.37	8.01	0.85	3.06
Plan 504	607	40	20.17	7.79	0.84	3.07
Plan 504: All Other Students	11,162	43	19.33	8.02	0.85	3.06





Table 64. Grade 8 Subgroup Reliabilities

Group	N	Maximum	Mean	Std. Dev	Alpha	SEM
All Students	12,294	45	20.54	7.15	0.81	3.10
Male	6,366	45	20.57	7.35	0.82	3.09
Female	5,926	41	20.51	6.93	0.80	3.11
Hispanic or Latino	339	39	18.75	6.96	0.81	3.06
American Indian or Alaskan Native	103	35	17.48	5.99	0.74	3.05
Asian	192	40	24.08	7.92	0.85	3.11
Black or African American	438	37	15.62	5.97	0.75	2.99
Native Hawaiian or Other Pacific Islander	10	N/A	N/A	N/A	N/A	N/A
White	10,810	45	20.80	7.11	0.81	3.10
Two or More Races	400	40	19.66	6.63	0.78	3.11
Currently Receiving EL Services	305	29	13.02	4.36	0.56	2.85
English-Speaking Students	11,987	45	20.74	7.10	0.81	3.10
Students with an IEP	2,330	42	15.30	5.91	0.75	2.95
IEP: All Other Students	9,962	45	21.77	6.85	0.79	3.12
Economically Disadvantaged Students	4,341	42	18.21	6.61	0.79	3.07
SES: All Other Students	7,951	45	21.82	7.11	0.81	3.11
Migrant Students	8	N/A	N/A	N/A	N/A	N/A
Migrant: All Other Students	12,284	45	20.55	7.15	0.81	3.10
Plan 504	804	43	20.71	6.72	0.79	3.11
Plan 504: All Other Students	11,488	45	20.53	7.18	0.82	3.10



Table 65. High School Subgroup Reliabilities

Group	N	Maximum	Mean	Std. Dev.	Alpha	SEM
All Students	10,091	51	24.83	10.85	0.91	3.27
Male	5,241	51	24.50	11.36	0.92	3.26
Female	4,846	50	25.18	10.27	0.90	3.28
Hispanic or Latino	276	44	22.08	10.34	0.90	3.27
American Indian or Alaskan Native	91	45	21.98	10.90	0.91	3.25
Asian	203	49	26.88	11.14	0.91	3.27
Black or African American	367	44	16.46	9.11	0.88	3.14
Native Hawaiian or Other Pacific Islander	8	N/A	N/A	N/A	N/A	N/A
White	8,932	51	25.23	10.77	0.91	3.27
Two or More Races	210	45	25.24	10.72	0.91	3.30
Currently Receiving EL Services	217	38	12.58	6.73	0.82	2.88
English-Speaking Students	9,870	51	25.10	10.77	0.91	3.28
Students with an IEP	1,427	51	16.89	9.03	0.88	3.13
IEP: All Other Students	8,660	50	26.14	10.56	0.90	3.28
Economically Disadvantaged Students	2,777	48	21.97	10.14	0.90	3.28
SES: All Other Students	7,310	51	25.92	10.91	0.91	3.27
Migrant Students	10	N/A	N/A	N/A	N/A	N/A
Migrant: All Other Students	10,077	51	24.83	10.85	0.91	3.27
Plan 504	799	50	24.59	10.65	0.91	3.29
Plan 504: All Other Students	9,288	51	24.85	10.87	0.91	3.27



# Appendix R. Student Questionnaires

## Grade 5

(Document begins on next page.)

## STUDENT QUESTIONNAIRE SESSION 4

**This session has fifteen multiple-choice questions.**

**Choose the best answer for each multiple-choice question. During only this session, you may ask for help.**

### Background

1. Which of the following best describes how you rate yourself as a student overall?
  - (A) very good
  - (B) good
  - (C) fair
  - (D) poor
2. During the school day, how much time do you spend using a computer?
  - (A) none
  - (B) less than one hour
  - (C) one to two hours
  - (D) more than two hours
3. How much homework do you do on school nights?
  - (A) none
  - (B) less than one hour
  - (C) one to two hours
  - (D) more than two hours

————— **Science** —————

4. Which of the following best describes how you rate yourself as a student in science?
- (A) very good
  - (B) good
  - (C) fair
  - (D) poor
5. How well do the questions that you have just been given on this MEA test match what you have learned in school about science?
- (A) The questions on the test match what I have learned in science class.
  - (B) They match some of what I have learned.
  - (C) They match just a little of what I have learned.
  - (D) There is no match.
6. How difficult was this science test?
- (A) more difficult than my regular schoolwork
  - (B) about the same as my regular schoolwork
  - (C) easier than my regular schoolwork
7. How often do you do science in class?
- (A) every day
  - (B) a few times a week
  - (C) once a week
  - (D) a few times a month

- 8.** Which statement best describes how you learn science?
- (A) I read a textbook and answer questions, and/or take notes and do assignments.
  - (B) I work in groups to design and conduct experiments.
  - (C) I do a combination of A and B, mostly A.
  - (D) I do a combination of A and B, mostly B.
- 9.** How often do you make observations and collect data in science class?
- (A) a few times a week
  - (B) a few times a month
  - (C) once a month
  - (D) never or almost never
- 10.** How often do you go outside for lessons during the school day?
- (A) a few times a week
  - (B) a few times a month
  - (C) once a month
  - (D) never or almost never
- 11.** Do you think you would like to have a job that is related to SCIENCE when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.

- 12.** Do you think you would like to have a job that is related to **MATH** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 13.** Do you think you would like to have a job that is related to **TECHNOLOGY** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 14.** Do you think you would like to have a job that is related to **ENGINEERING** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 15.** Do you think you would like to have a job that is related to **COMPUTER SCIENCE** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.





## Grade 8

(Document begins on next page.)



## STUDENT QUESTIONNAIRE SESSION 4

**This session has sixteen multiple-choice questions.**

**Choose the best answer for each multiple-choice question. During only this session, you may ask for help.**

### Background

1. Which of the following best describes how you rate yourself as a student overall?
  - (A) very good
  - (B) good
  - (C) fair
  - (D) poor
2. During a typical school day, how much time do you spend using a computer?
  - (A) none
  - (B) less than one hour
  - (C) one to two hours
  - (D) more than two hours
3. How much homework do you do on a typical school night?
  - (A) none
  - (B) less than one hour
  - (C) one to two hours
  - (D) more than two hours

**Science**

4. Which of the following best describes how you rate yourself as a student in science?
- (A) very good
  - (B) good
  - (C) fair
  - (D) poor
5. How well do the questions that you have just been given on this MEA test match what you have learned in school about science?
- (A) The questions on the test match what I have learned in science class.
  - (B) They match some of what I have learned.
  - (C) They match just a little of what I have learned.
  - (D) There is no match.
6. How difficult was this science test?
- (A) more difficult than my regular schoolwork
  - (B) about the same as my regular schoolwork
  - (C) easier than my regular schoolwork
7. Which statement best describes how often and how long your science class meets?
- (A) We meet every day for 45 minutes to an hour.
  - (B) We meet on alternate days for 80 to 90 minutes.
  - (C) We meet every day for 45 minutes, plus a longer lab period each week.
  - (D) We have a flexible schedule depending on the activities.

- 8.** Which statement best describes how you learn science?
- (A) I read a textbook and answer questions and/or take notes and do assignments.
  - (B) I work in groups to design and conduct experiments.
  - (C) I do a combination of A and B, mostly A.
  - (D) I do a combination of A and B, mostly B.
- 9.** How often do you make observations and collect data in science class?
- (A) a few times a week
  - (B) a few times a month
  - (C) once a month
  - (D) never or almost never
- 10.** How do you feel about the following statement?  
*"My knowledge of science will be useful to me as an adult."*
- (A) strongly agree
  - (B) agree
  - (C) disagree
  - (D) strongly disagree
- 11.** Which courses do you plan to take before you graduate from high school?
- (A) earth and space science and/or biology
  - (B) the course(s) described in A, plus chemistry
  - (C) the course(s) described in B, plus physics
  - (D) a life science and physical science class

- 12.** Do you think you would like to have a job that is related to **SCIENCE** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 13.** Do you think you would like to have a job that is related to **MATH** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 14.** Do you think you would like to have a job that is related to **TECHNOLOGY** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 15.** Do you think you would like to have a job that is related to **ENGINEERING** when you grow up?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.

**16.** Do you think you would like to have a job that is related to COMPUTER SCIENCE when you grow up?

- (A) Yes, I'm very interested.
- (B) Yes, I have some interest.
- (C) I might be interested if I knew more about this type of job.
- (D) No, I'm not interested.
- (E) No, this type of job is too hard.





## High School

(Document begins on next page.)

## STUDENT QUESTIONNAIRE SESSION 4

**This session has twenty multiple-choice questions.**

**Choose the best answer for each multiple-choice question. During only this session, you may ask for help.**

**Questions 1 through 11 are about science only. Choose the option that applies to you.**

1. Which of the following best describes how you rate yourself as a student overall?
  - (A) very good
  - (B) good
  - (C) fair
  - (D) poor
2. How well do the questions that you have just been given on this MEA test match what you have learned in school about science?
  - (A) The questions on the test match what I have learned in science class.
  - (B) They match some of what I have learned.
  - (C) They match just a little of what I have learned.
  - (D) There is no match.
3. How difficult was this science test?
  - (A) more difficult than my regular schoolwork
  - (B) about the same as my regular schoolwork
  - (C) easier than my regular schoolwork
4. How often do you utilize science and engineering practices in science class?
  - (A) a few times a week
  - (B) a few times a month
  - (C) almost never
  - (D) what are science and engineering practices?

5. How do you feel about the following statement?  
*"My knowledge of science will be useful to me as an adult."*
- (A) strongly agree
  - (B) agree
  - (C) disagree
  - (D) strongly disagree
6. What best describes your ninth-grade science class?
- (A) earth/space science
  - (B) physical science
  - (C) engineering and physical science
  - (D) physics
7. Do you think you would like to have a job that is related to SCIENCE?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
8. Do you think you would like to have a job that is related to MATH?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.



- 9.** Do you think you would like to have a job that is related to TECHNOLOGY?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 10.** Do you think you would like to have a job that is related to ENGINEERING?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.
- 11.** Do you think you would like to have a job that is related to COMPUTER SCIENCE?
- (A) Yes, I'm very interested.
  - (B) Yes, I have some interest.
  - (C) I might be interested if I knew more about this type of job.
  - (D) No, I'm not interested.
  - (E) No, this type of job is too hard.

**For questions 12-15, choose all of the options that apply to you.**

**12.** Select the Mathematics courses you have taken before 9th grade or have taken or currently are taking during high school (grades 9-12) and identify if they were/are Honors or AP courses.

	Before 9th Grade	9th-12th Grade	AP-Honors
<b>a</b> Pre-Algebra	(A)	(B)	(C)
<b>b</b> Algebra I	(A)	(B)	(C)
<b>c</b> Geometry	(A)	(B)	(C)
<b>d</b> Algebra II	(A)	(B)	(C)
<b>e</b> Integrated Math Program	(A)	(B)	(C)
<b>f</b> Trigonometry	(A)	(B)	(C)
<b>g</b> Pre-Calculus	(A)	(B)	(C)
<b>h</b> Calculus	(A)	(B)	(C)
<b>i</b> Statistics	(A)	(B)	(C)
<b>j</b> Other mathematics courses	(A)	(B)	(C)

**13.** Select the English/Language arts courses you have taken before 9th grade or have taken or currently are taking during high school (grades 9-12) and identify if they were/are Honors or AP courses.

	Before 9th Grade	9th-12th Grade	AP-Honors
<b>a</b> English/Language Arts	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>b</b> Journalism	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>c</b> Creative Writing	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>d</b> Composition/Writing	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>e</b> American Literature	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>f</b> British Literature	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>g</b> World Literature	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>h</b> Communications	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>i</b> Public Speaking	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>j</b> English as a Second Language	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)

**14.** Select the Science courses you have taken before 9th grade or have taken or currently are taking during high school (grades 9-12) and identify if they were/are Honors or AP courses.

	Before 9th Grade	9th-12th Grade	AP-Honors
<b>a</b> Environmental, Earth, or Space Science	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>b</b> Biology	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>c</b> Chemistry	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>d</b> Physics	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)
<b>e</b> Other science course	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)

**15.** Select the average grade for all courses you have already taken in each subject.

	A	B	C	D	E/F
<b>a</b> Mathematics	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)	<input type="radio"/> (D)	<input type="radio"/> (E)
<b>b</b> English and Language Arts	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)	<input type="radio"/> (D)	<input type="radio"/> (E)
<b>c</b> Science	<input type="radio"/> (A)	<input type="radio"/> (B)	<input type="radio"/> (C)	<input type="radio"/> (D)	<input type="radio"/> (E)

**For questions 16-20, choose only one answer.**

- 16.** Do you plan to enroll in an educational program the year after high school graduation?
- (A) Yes, a four-year college.
  - (B) Yes, a two-year community/vocational or technical school.
  - (C) Yes, through military enlistment.
  - (D) Yes, but I am not sure yet.
  - (E) No, I am not planning to attend an educational program the year after my high school graduation.

**17.** What is the highest level of education you plan to complete beyond high school?

- (A) specialized training or certificate program
- (B) two-year associate of arts or science degree (AA, AAS, or AS)
- (C) bachelor's degree (BA or BS)
- (D) graduate degree (MA, MBA, MS, PhD, JD, MD, or DVM)
- (E) other
- (F) undecided

**18.** Indicate the highest level of education completed by your parents or guardians.

- (A) less than high school
- (B) high school graduate or GED
- (C) some college
- (D) associate or two-year degree
- (E) bachelor's or four-year degree
- (F) some graduate or professional school
- (G) graduate or professional degree

**19.** How important to you is your score on this science test you just completed?

- (A) extremely important
- (B) important
- (C) somewhat important
- (D) not very important

**20.** How important to you is your score on the SAT?

- (A) extremely important
- (B) important
- (C) somewhat important
- (D) not very important
- (E) not applicable



## Appendix S. Questionnaire Data

### Difficulty of the Assessment

All students were asked how difficult the content of the assessment was compared to their classroom instruction.

Question: How difficult was this science test?

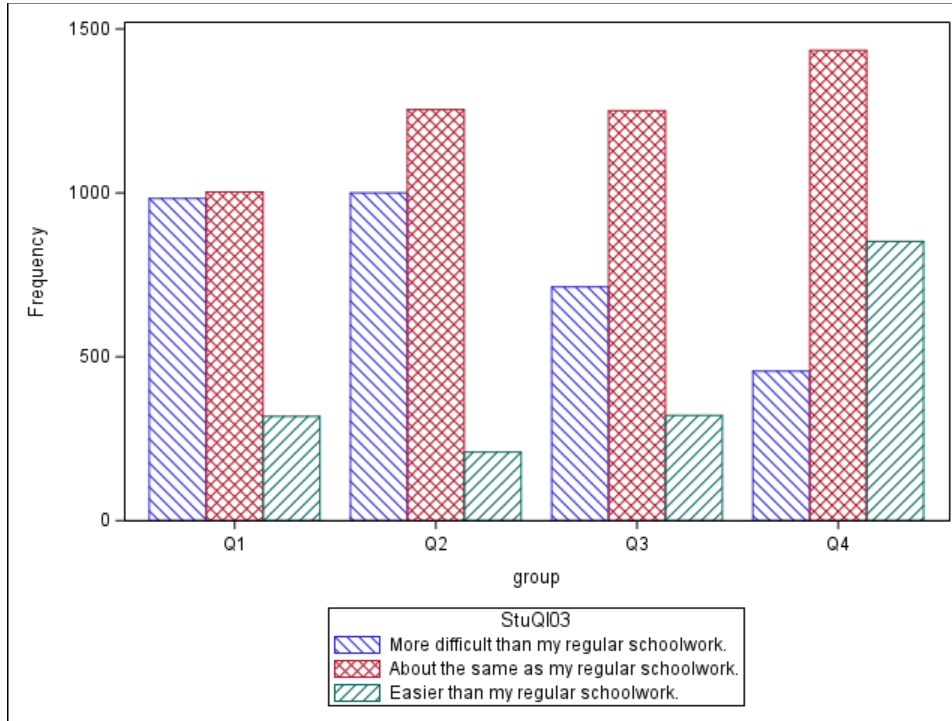


Figure 22. Grade 5 Difficulty of the Assessment

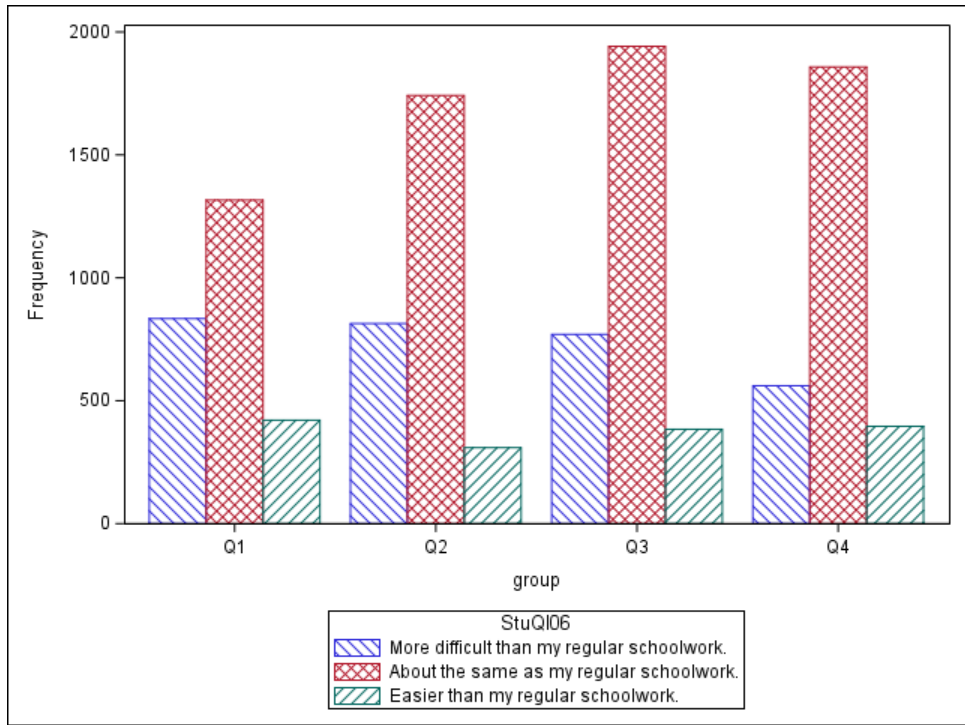


Figure 23. Grade 8 Difficulty of the Assessment

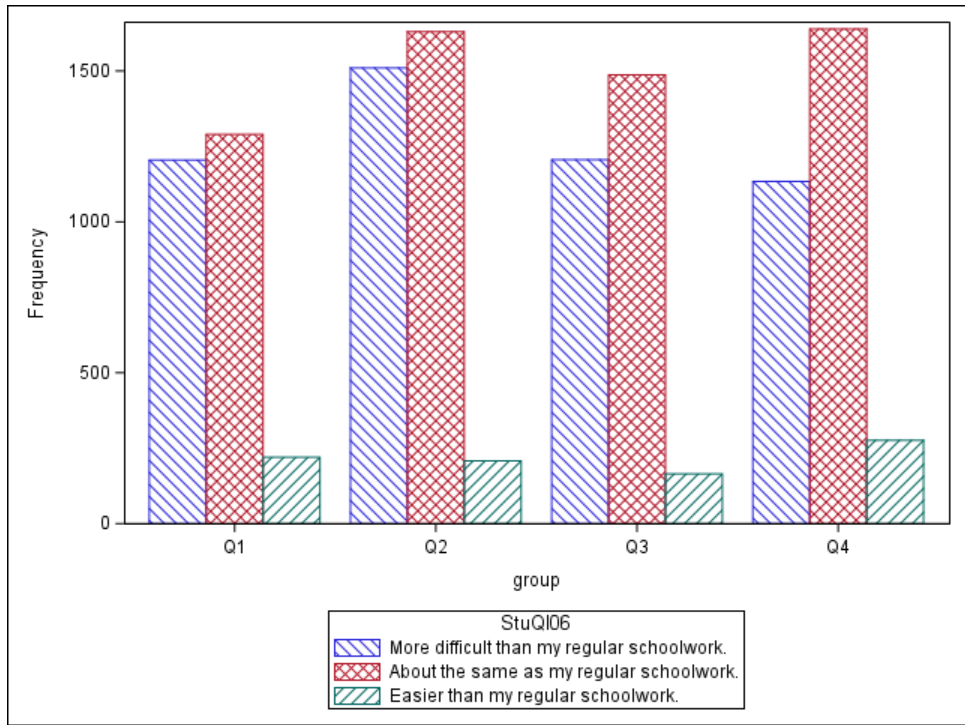


Figure 24. High School Difficulty of the Assessment

For all three grades, most students indicated that the Maine Science Assessment was about the same difficulty as their regular schoolwork. In general, the lower performing students indicated that the Maine Science Assessment was more difficult than their regular schoolwork while higher performing students were more likely to indicate the assessment was easier than their regular schoolwork.



## Frequency of Science Class

Students in grades 5 and 8 were asked how frequently they received science instruction. Note that the wording of this question varied by grade.

Grade 5 Question: How often do you do science in class?

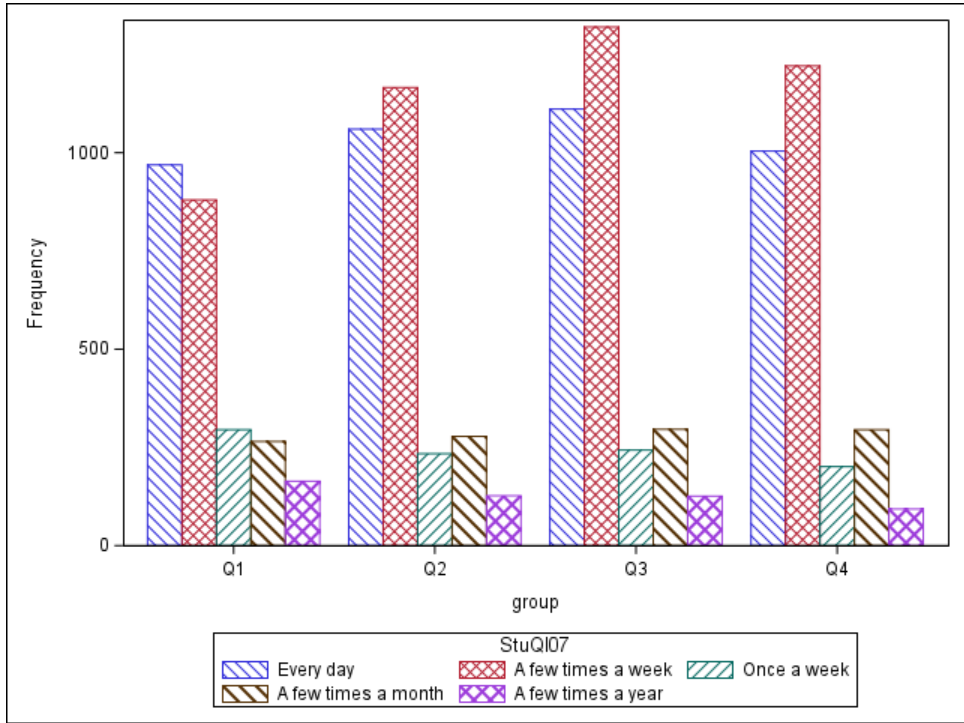


Figure 25. Grade 5 Frequency of Science Class

Grade 8 Question: Which statement best describes how often and how long your science class meets?

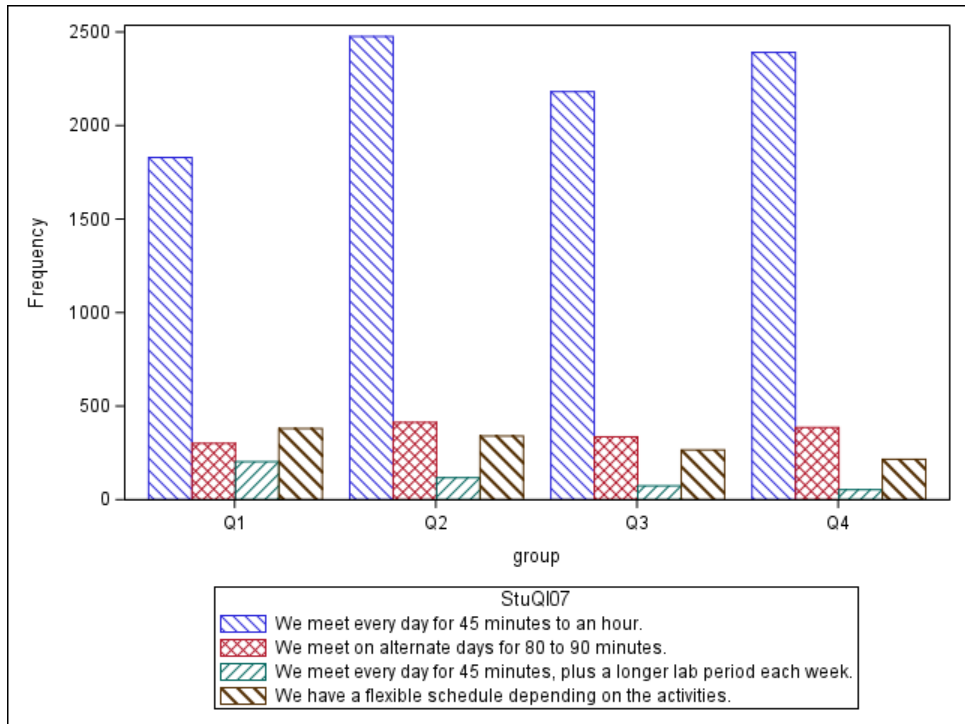


Figure 26. Grade 8 Frequency of Science Class

## Utilization of SEPs

High school students were asked how frequently engineering practices were incorporated into their instruction. Figure 27 provides the result by performance quartile.

Question: How often do you utilize science and engineering practices in science class?

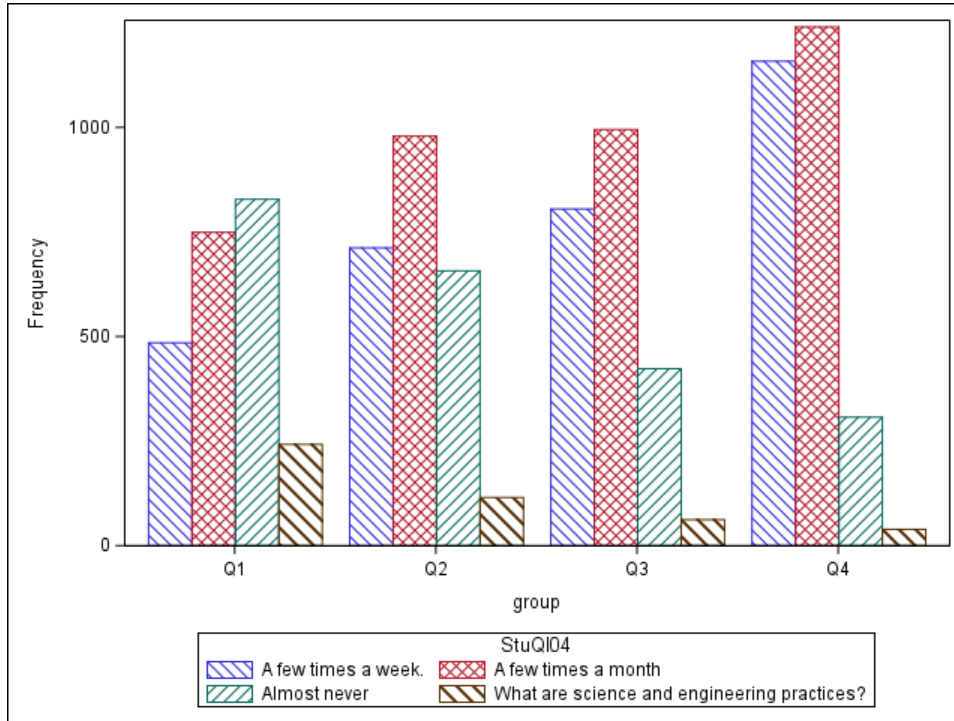


Figure 27. High School How Science and Engineering Are Utilized

## How Science Is Learned

Students in grades 5 and 8 were asked how they learn science. Figure 28 and Figure 29 provide the results by performance quartile.

Question: Which statement best describes how you learn science?

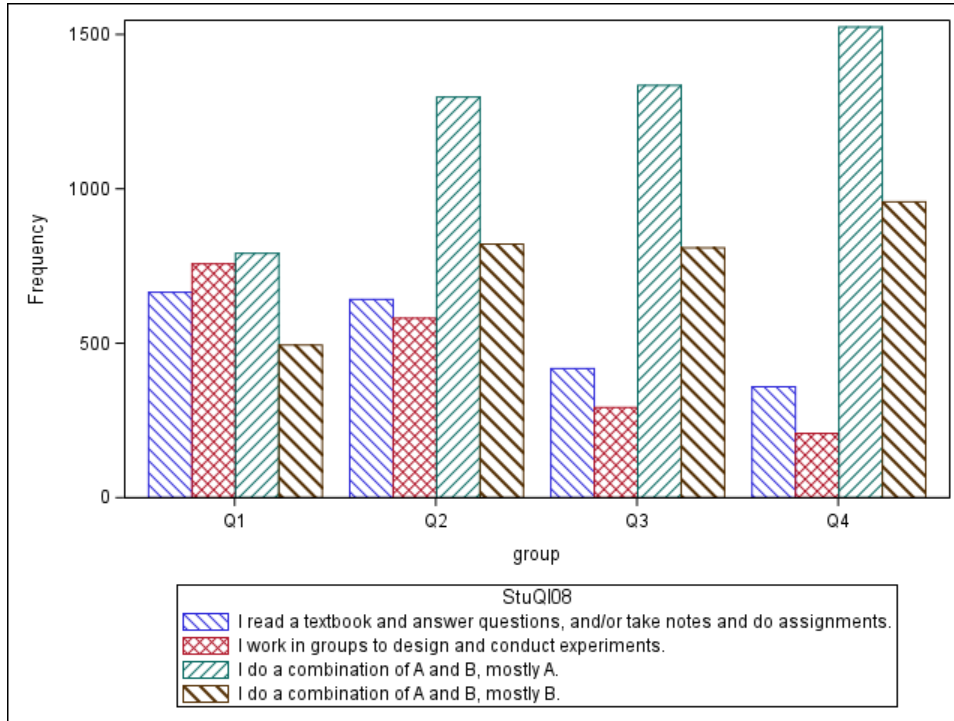


Figure 28. Grade 5 How Science Is Learned

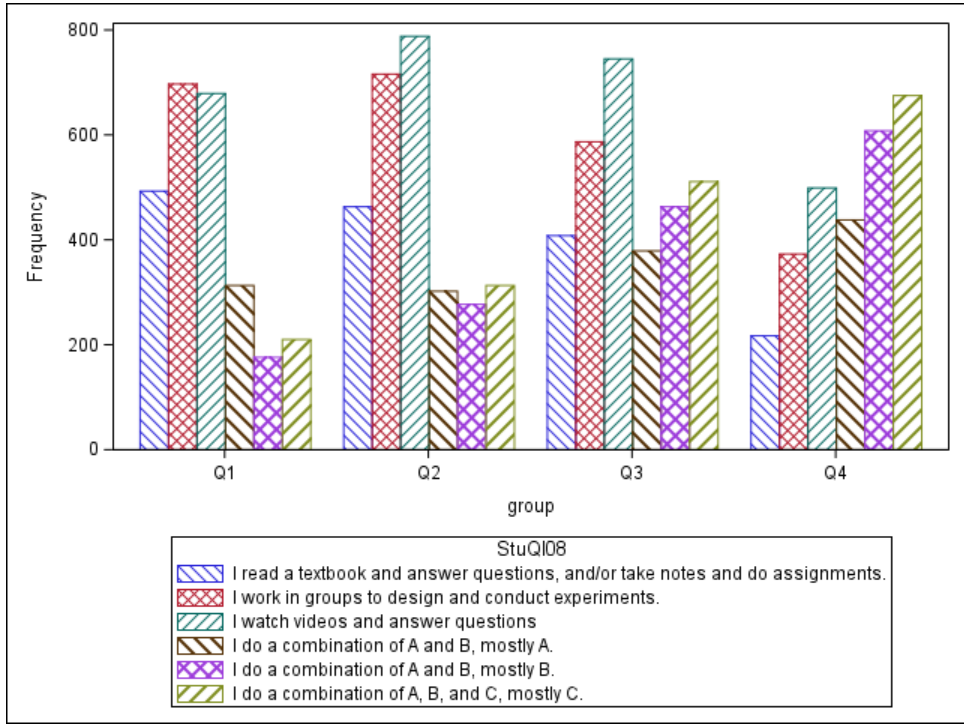


Figure 29. Grade 8 How Science Is Learned

## Score Importance

High school students were asked how important the Maine Science Assessment score was to them. Figure 30 provides the result by performance quartile.

How important to you is your score on this science test you just completed?

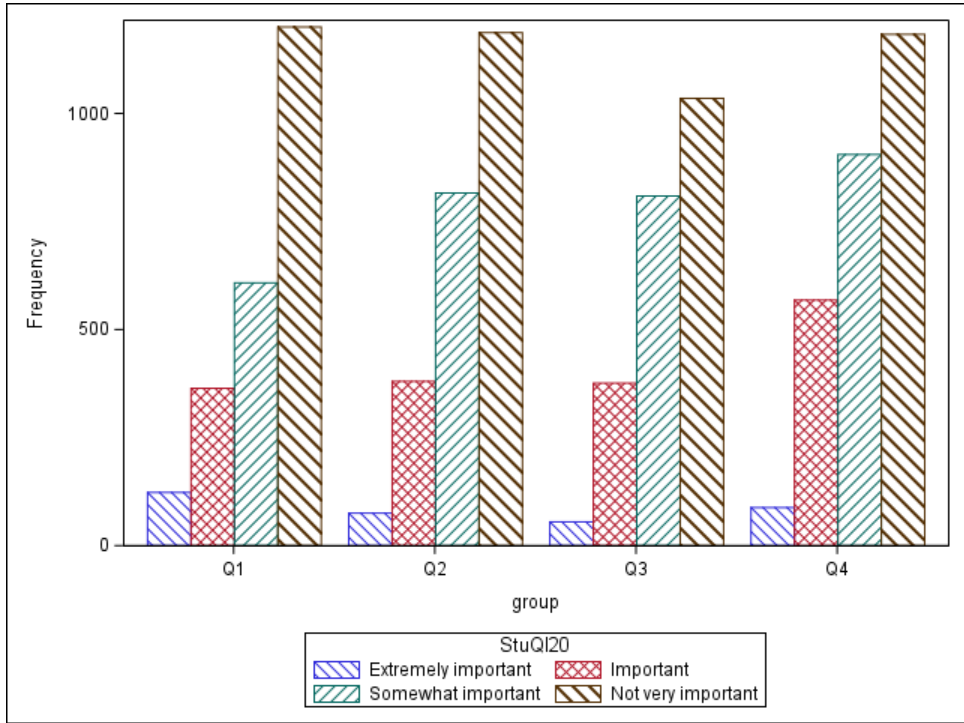


Figure 30. High School Score Importance

# Appendix T. Contributing States Item Development Processes

## Item Development Processes from Science Exchange Contributing State A

Contributing State A contributed items to New Meridian’s Science Exchange in all science disciplines for Grades 3–8 and life science items for high school. The stimuli for the Contributing State A assessment are anchored on a scientific phenomenon described by text, images, tables, graphs, models, and graphic organizers created by the contributing state’s vendor. Phenomena and bundles were chosen to represent the breadth of assessable science content. As part of the item development plan, all performance expectations were aligned to at least one standalone item or to an item in an item set or task. After studying the science standards of Contributing State A, the content lead generated lists of bundled and associated phenomena for item sets and tasks. When identifying a phenomenon, the content lead considered

- the emphasis of each performance expectation as described in the clarification statements for each performance expectation;
- whether a proposed phenomenon was rich enough to support the required number of items, including overage; and
- whether the phenomenon fit with the “PE bundles” developed earlier to provide meaningful, three-dimensional assessment of performance expectations.

Phenomena were chosen to represent the breadth of content described by Contributing State A’s state standards. The process of determining phenomena and associated bundles was iterative and included the identification of phenomena that could be assessed with a particular bundle as well as the understanding of the need to assess as many PEs as possible in the field test.

Sets were purposefully designated as item sets or tasks, and the designation of the set (whether item or task) influenced the selection of phenomena. The tasks were based on stimuli that allowed students to delve deeply into a topic and were made up of items that built upon each other and often led to a culminating extended-response (ER) item. The items in a task could require a specific order, and information in one item could be used to build upon in subsequent items.

## Outline and Stimuli Development for Contributing State A

Contributing State A’s vendor used both experienced internal and external science assessment editors to develop the phenomena-based stimuli for item sets and tasks. Before the editors began the process, the vendor’s content lead trained them on the process of conducting an effective internet search for science articles on Contributing State A DOE’s objectives, including training in universal design and bias and sensitivity issues. To support the outline development process, writers were given the state standards for Contributing State A. They were also provided specific item set or task templates that described the PE bundle to be written to in addition to the point value, item types, and dimensional alignment of each of the items in the set and whether the dimensions of the bundled PEs



could be mixed or matched. The outline contained space for writers to enter the primary sources they used in researching their phenomenon and in writing their stimulus, space for the writers to include a draft of the stimulus and its supporting data, and space to describe each item and its metadata. Writers submitted their item outlines to the editors, who finalized the item set and task outlines before submitting them to the content lead and manager for senior review. After this review, the outlines were submitted to the DOE for Contributing State A.

## Item Writing and Review Process for Contributing State A

The vendor for Contributing State A employed a cadre of item writers for the grades 3–8 assessment. All writers were approved by the DOE of Contributing State A before they engaged in any item development activities. As the first step in the item writing process, the vendor content lead provided a webinar training to all writers.

In the training, writers were provided context for the assessment, including DOE expectations, the science standards of Contributing State A, and a review of best practices for item development. The item writers were provided the approved item topics and drafts of the stimuli and item outlines that provided explanations of the phenomena underlying the tasks and item sets. Item writers were also provided with alignment to the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas of the science standards for Contributing State A and guidance on how each item set or task should be developed.

The use of item sets and task overviews allowed the vendor to provide direction for the items developed during the development cycle. For standalone development, item writers were provided with assignments that indicated the number of items to write to each performance expectation as well as the specific dimensions to align to for each item. The item writing assignments for each set or task also specified the set type, the item types and number of items to be written, and potential item stems to be used for each item. Significant attention was devoted to understanding how to write TE items and scoring guides for CR and ER items.

Although all the writers were science writers with experience in writing three-dimensional items, the vendor gave instructions in basic assessment item writing principles. Writers were instructed to make certain that the vocabulary and context of the items were grade level appropriate, to ensure that the distractors were incorrect but plausible, and to avoid cueing and outliers in the items.

The vendor hosted an online training for writers that included information regarding universal design and bias/sensitivity. A variety of items were presented and reviewed using universal design and bias/sensitivity lenses. The vendor provided training and feedback to the writers throughout the development cycle as the DOE of Contributing State A and their vendor gained a clearer understanding of how the stimuli, items, and sets worked together.

The vendor provided additional training to a subset of editors outlining the specific responsibilities for those who served as editors for the grades 3–8 assessment. Items went through two rounds of content editing that examined characteristics of items, including alignment to the dimensions of the performance expectations of the state standards for Contributing State A, content accuracy, cognitive complexity, and quality of distractors. Items then went through one round of proofreading, which focused on grammar, usage, and consistent style of graphics, and a final round of review before being submitted to the DOE of Contributing State A for their first round of review.





## Content and Bias Review for Items from Contributing State A

After the completion of item development, the vendor coordinated face-to-face content and bias review meetings. The meetings were led by facilitators from the DOE of Contributing State A and from their vendor. Participants included current classroom teachers, retired teachers, content specialists, and school administrators. For the content and bias review meeting, participants completed nondisclosure agreements as part of the activities. The recruitment process, conducted by DOE staff of Contributing State A, also included participants from regions across the state. Participants represent the population of students served in Contributing State A—including special education, English learners, and students with disabilities—as well as the diverse geographic and demographic composition of the state. Because the content and bias review meeting took place over five days, committee members could not participate every day of the meeting. As a result, the vendor and the DOE separated the meeting into two parts and had participants attend the meeting in the first half of the week or the second half of the week. Consequently, most of the individual participants did not review or discuss every item, although every item was reviewed by a committee. Table 66 and Table 67 provide the demographic characteristics of the review committees.

Table 66. Educator Representation in the 2018–2019 Content and Bias Reviews for HS Biology Items

	Characteristic	Number of Participants
Role	Classroom Teacher	9
	Content/Curriculum Specialist	0
	School Administrator	0
	Other Staff	2
	ELL Teacher	0
	Special Education Teacher	0
	Special Ed Teacher—Gifted	0
	Visually Impaired or Hearing-Impaired Teacher	1
Race	Black or African American	2
	Asian	0
	Hispanic/Latino	1
	White	7
Gender	Male	3
	Female	7
<b>Total Participants</b>		<b>10</b>

Note: As teachers may fulfill multiple roles, representation of roles exceeds number of total participants.



Table 67. Educator Representation in the 2017–2018 Content and Bias Reviews for Grade 5 and Middle School (MS) Items

	Characteristic	Number of Participants by Grade Level				
		03	04	05	06–08	
					Group A	Group B
Role	Classroom Teacher	7	8	4	10	10
	Content/Curriculum Specialist	0	1	1	1	1
	Instructional Lead	0	0	0	1	0
	School Administrator	0	1	0	0	0
	Other Staff	2	0	0	1	0
	ELL Teacher	1	1	1	0	0
	Language Immersion Teacher	0	0	0	0	1
	Special Education Teacher	1	0	0	1	0
	Special Education Teacher–Gifted	1	0	0	0	0
	Visually Impaired or Hearing-Impaired Teacher	0	1	0	1	1
Race	Black or African American	1	2	3	2	3
	Asian	0	1	1	0	0
	Hispanic/Latino	0	1	0	1	0
	White	7	6	2	7	8
Gender	Male	2	2	1	2	1
	Female	7	8	6	9	10
<b>Total Participants</b>		<b>9</b>	<b>10</b>	<b>7</b>	<b>11</b>	<b>11</b>

The committee members individually reviewed PE, SEP, DCI, and CCC alignment for each item and recorded the degree of alignment for each dimension and overall alignment on a worksheet on a scale of 0 (not aligned) to 3 (well-aligned) as they referred to Contributing State A’s state standards. An item was considered to have a high degree of alignment if it aligned to the bullet listed in the PE. An item was considered to have a lower degree of alignment if it aligned to another bullet listed in the learning progression for that SEP or CCC. Committee members also recorded whether the science for each item was accurate and whether each item was free of bias. Areas of concern included opportunity and access, portrayal of groups represented, protecting privacy, and avoiding offensive content.

After the review of each item, each member voted on whether to accept, accept with edits, or reject each item.