

DEPARTMENT OF
Education
STATE OF MAINE

**Maine's Revised
Learning Results:
Parameters for
Essential Instruction**

Science & Technology

Revised Maine Learning Results: Parameters for Essential Instruction 1

The image is a composite graphic for a presentation. At the top left is the Maine Department of Education logo, featuring a gold seal with a figure holding a bow and arrow, surrounded by the text 'DEPARTMENT OF Education STATE OF MAINE'. To the right of the logo is a photograph of a young child's face. Below the logo and child photo are several smaller photographs of diverse students in various educational settings: two young boys looking at the camera, a girl smiling at a desk, a group of students at a computer, a girl with paint on her face, a boy and girl working together at a desk, a girl in a science lab with test tubes, a girl at a computer, and a boy writing at a desk. The central text is overlaid on a dark blue background.

The Maine Department of Education has developed this 30 minute audio supported PowerPoint as a tool for assisting educators throughout Maine to understand the process of the Maine Learning Results review and the content standards for Science and Technology.

Topics Addressed

- What are the Maine Learning Results?
- How were the Maine Learning Results developed?
- How are 2007 Maine Learning Results different from the 1997 Maine Learning Results?

This presentation will answer three questions: “What are the Maine Learning Results and where do they fit into Maine’s broader education policy landscape?”, “How were the Maine Learning Results developed?”, and “How are the 2007 Maine Learning Results different from the 1997 Maine Learning Results?”

Goals and Purposes

- Identify knowledge and skills essential to prepare Maine students for post-secondary education, career, and citizenship
- Express what students should know and be able to do at various checkpoints across a PreK – Diploma continuum
- Define learning appropriate to all students regardless of their specific career and academic plans
- Provide educators and parents with information

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In the broadest sense, The Learning Results: Parameters for Essential Instruction, provides Maine educators with a comprehensive description of the essential knowledge and skills needed to prepare students to succeed in the 21st century. The Learning Results describes a continuum of learning across significant topics. The Maine Learning Results describes a common body of knowledge and skills for ALL Maine students regardless of future career and academic plans. And finally, the Maine Learning Results serves as a tool to inform parents, educators, and the broader community of Maine's expectations for student learning..

Where the Revised MLRs fit in the Overall Framework Ensuring All Students are Post-secondary, Career, and Citizenship Ready

- Parameters for Essential Instruction
- Partnership for 21st Century
- Best Instructional Practices
- Environments for Learning (CH 125)
- Assessments and Graduation Requirements (CH 127)

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Maine's standards document, describes the essential knowledge and skills required for post-secondary education, career, and citizenship in the 21st century. This document is just one part of an educational system that seeks to integrate 21st century standards, effective instructional practices, environments that fostering student learning, and varied assessments and graduation requirements.

MLR Support the Goals Outlined in the Guiding Principles

- Clear and effective communicators
- Self-directed lifelong learners
- Creative and practical problem solvers
- Integrative, informed thinkers
- Responsible citizens

The learning goals described in the Maine Learning Results support students to becoming clear and effective communicators, self-directed lifelong learners, creative and practical problem solvers, integrative, informed thinkers, and responsible citizens, the five goals outlined in the Guiding Principles.

MLR Development Resources

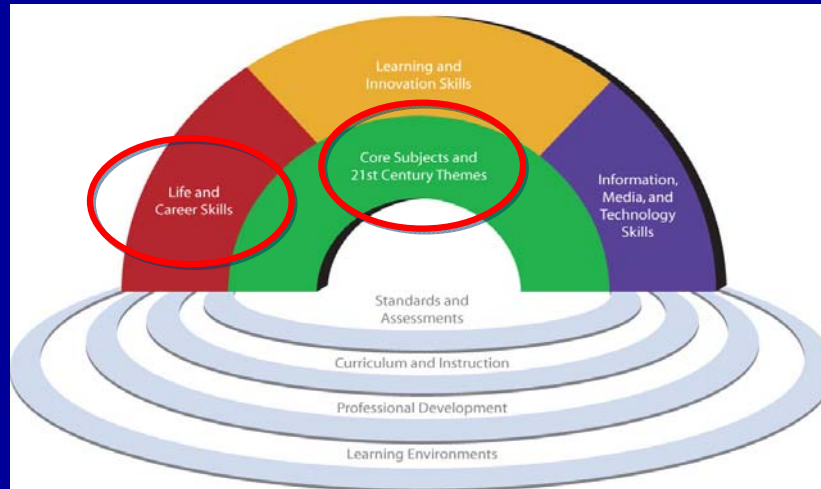
MLR Review Advisory Committee

- Content Area Panels – Maine Educators
- National Consultants
- Research on Learning
- State, National and International Standards
- 21st Century Partnership Framework

The list of content resources described here shows the diversity of resources that serve as a foundation for the knowledge and skills found in the Learning Results: Parameters for Essential Instruction. The list includes the expertise of local teachers, national consultants, standards documents, and research on learning. These resources were referenced and analyzed to ensure that the ideas identified in the Learning Results represent a reliable foundation for student learning in Maine.

Partnership for 21st Century Framework Informs the Revised MLR

www.21stcenturyskills.org



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From the beginning the Maine Learning Results Review process integrated the ideas described in the Partnership for 21st Century Learning Framework. The Maine Learning Results focus on those parts of the Framework related to the Core Subjects and 21st Century Themes, and Life and Career Skills.

More Resources

- External Science and Technology Reviewers
- Review by the International Center for Leadership in Education
- Online Survey
- Business Community

In addition to the resources already described, the review incorporated feedback from nationally respected external reviewers; formal and informal feedback from Maine educators, primarily from comments collected through the online survey; and input from Maine's business community.

How the MLRs Have Changed

- Clearer, more coherent, and more manageable
- More focused and essential
- Structure
- Content

Using this varied input and feedback the Content Panels constructed what many educators have described as clearer, more coherent, and more focused standards. The document is also structurally different. The 2007 Maine Learning Results describes progressions of learning for significant topics across grade spans. In Science and Technology the progressions are described across the PreK-2, 3-5, 6-8, and 9-Diploma grade spans. Overall the 2007 Learning Results differs most from the 1997 Learning Results because it describes deeper knowledge in fewer topics. This is an important step away from inch deep and mile wide standards.

Content Area Overview

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

A. Unifying Themes

1. Systems
2. Models
3. Constancy and Change
4. Scale

B. The Skills and Traits of Scientific Inquiry and Technological Design

1. Skills and Traits of Scientific Inquiry
2. Skills and Traits of Technological Design

C. The Scientific and Technological Enterprise

1. Understandings of Inquiry
2. Understandings about Science and Technology
3. Science, Technology, and Society
4. History and Nature of Science

D. The Physical Setting

1. Universe and Solar System
2. Earth
3. Matter and Energy
4. Force and Motion

E. The Living Environment

1. Biodiversity
2. Ecosystems
3. Cells
4. Heredity and Reproduction
5. Evolution

This view illustrates how Science and Technology is organized. We can see that Science and Technology covers a wide array of interrelated topics. At its highest level, the Content Area is divided into Content Standards. Each Content Standard is a heading identified by a capital letter.

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

A. Unifying Themes

1. Systems
2. Models
3. Constancy and Change
4. Scale

B. The Skills and Traits of Scientific Inquiry and Technological Design

1. Skills and Traits of Scientific Inquiry
2. Skills and Traits of Technological Design

C. The Scientific and Technological Enterprise

1. Understandings of Inquiry
2. Understandings about Science and Technology
3. Science, Technology, and Society
4. History and Nature of Science

D. The Physical Setting

1. Universe and Solar System
2. Earth
3. Matter and Energy
4. Force and Motion

E. The Living Environment

1. Biodiversity
2. Ecosystems
3. Cells
4. Heredity and Reproduction
5. Evolution

In this case, Content Standard A refers to Unifying Themes ,

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

- A. Unifying Themes
 - 1. Systems
 - 2. Models
 - 3. Constancy and Change
 - 4. Scale
- B. The Skills and Traits of Scientific Inquiry and Technological Design**
 - 1. Skills and Traits of Scientific Inquiry
 - 2. Skills and Traits of Technological Design
- C. The Scientific and Technological Enterprise
 - 1. Understandings of Inquiry
 - 2. Understandings about Science and Technology
 - 3. Science, Technology, and Society
 - 4. History and Nature of Science
- D. The Physical Setting
 - 1. Universe and Solar System
 - 2. Earth
 - 3. Matter and Energy
 - 4. Force and Motion
- E. The Living Environment
 - 1. Biodiversity
 - 2. Ecosystems
 - 3. Cells
 - 4. Heredity and Reproduction
 - 5. Evolution

While, Content Standard B refers to the Skills and Traits of Scientific Inquiry and Technological Design...

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

- A. Unifying Themes
 - 1. Systems
 - 2. Models
 - 3. Constancy and Change
 - 4. Scale
- B. The Skills and Traits of Scientific Inquiry and Technological Design
 - 1. Skills and Traits of Scientific Inquiry
 - 2. Skills and Traits of Technological Design
- C. The Scientific and Technological Enterprise**
 - 1. Understandings of Inquiry
 - 2. Understandings about Science and Technology
 - 3. Science, Technology, and Society
 - 4. History and Nature of Science
- D. The Physical Setting
 - 1. Universe and Solar System
 - 2. Earth
 - 3. Matter and Energy
 - 4. Force and Motion
- E. The Living Environment
 - 1. Biodiversity
 - 2. Ecosystems
 - 3. Cells
 - 4. Heredity and Reproduction
 - 5. Evolution

Content Standard C refers to the Scientific and Technological Enterprise ...

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

- A. Unifying Themes
 - 1. Systems
 - 2. Models
 - 3. Constancy and Change
 - 4. Scale
- B. The Skills and Traits of Scientific Inquiry and Technological Design
 - 1. Skills and Traits of Scientific Inquiry
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- C. The Scientific and Technological Enterprise
 - 1. Understandings of Inquiry
 - 2. Understandings about Science and Technology
 - 3. Science, Technology, and Society
 - 4. History and Nature of Science
- D. The Physical Setting
 - 1. Universe and Solar System
 - 2. Earth
 - 3. Matter and Energy
 - 4. Force and Motion
- E. The Living Environment
 - 1. Biodiversity
 - 2. Ecosystems
 - 3. Cells
 - 4. Heredity and Reproduction
 - 5. Evolution

Content Standard D refers to the Physical Setting ...

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

- A. Unifying Themes
 - 1. Systems
 - 2. Models
 - 3. Constancy and Change
 - 4. Scale
- B. The Skills and Traits of Scientific Inquiry and Technological Design
 - 1. Skills and Traits of Scientific Inquiry
 - 2. Skills and Traits of Technological Design
- C. The Scientific and Technological Enterprise
 - 1. Understandings of Inquiry
 - 2. Understandings about Science and Technology
 - 3. Science, Technology, and Society
 - 4. History and Nature of Science
- D. The Physical Setting
 - 1. Universe and Solar System
 - 2. Earth
 - 3. Matter and Energy
 - 4. Force and Motion
- E. The Living Environment
 - 1. Biodiversity
 - 2. Ecosystems
 - 3. Cells
 - 4. Heredity and Reproduction
 - 5. Evolution

And Content Standard E refers to the Living Environment.

Content Area Standards

OUTLINE OF SCIENCE AND TECHNOLOGY STANDARDS AND PERFORMANCE INDICATOR LABELS

- A. Unifying Themes
 - 1. Systems
 - 2. Models
 - 3. Constancy and Change
 - 4. Scale
- B. The Skills and Traits of Scientific Inquiry and Technological Design
 - 1. Skills and Traits of Scientific Inquiry
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 - 1. Understandings of Inquiry
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 - 3. Science, Technology, and Society
 - 4. History and Nature of Science
- D. The Physical Setting
 - 1. Universe and Solar System
 - 2. Earth
 - 3. Matter and Energy
 - 4. Force and Motion
- E. The Living Environment
 - 1. Biodiversity
 - 2. Ecosystems
 - 3. Cells
 - 4. Heredity and Reproduction
 - 5. Evolution

Looking closer at content Standard E – *The Living Environment* – we find the content standard is broken down into Performance Indicators. For instance, Content Standard E, Performance Indicator 1 – or E1, as we will refer to it – shows that the first Performance Indicator of *The Living Environment* is “Biodiversity”. “Biodiversity”, of course, is a fairly broad topic. It needs clarification, because it raises the question, “What knowledge or skills related to biodiversity should a child in fifth grade have? Or eighth grade? Or by the time he or she graduates?”

The Maine Learning Results: Parameters for Essential Instruction provides that clarification.

Grade Spans			
A. <u>Unifying Themes</u> : Students apply the principles of <i>systems, models, constancy and change, and scale</i> in science and technology.			
Systems			
Performance Indicators & Descriptors			
Pre-K-2	3-5	6-8	9-Diploma
<p>Students recognize that parts work together, and make up whole man-made and natural objects.</p> <p>a. Explain that most man-made and natural objects are made of parts.</p> <p>b. Explain that when put together, parts can do things they could not do separately.</p>	<p>Students explain interactions between parts that make up whole man-made and natural things.</p> <p>a. Give examples that show how individual parts of organisms, ecosystems, or man-made structures can influence one another.</p> <p>b. Explain ways that things including organisms, ecosystems, or man-made structures may not work as well (or at all) if a part is missing, broken, worn out, mismatched, or misconnected.</p>	<p>Students describe and apply principles of <i>systems</i> in man-made things, natural things, and processes.</p> <p>a. Explain how individual parts working together in a <i>system</i> (including organisms, Earth systems, solar systems, or man-made structures) can do more than each part individually.</p> <p>b. Explain how the output of one part of a <i>system</i>, including waste products from manufacturing or organisms, can become the input of another part of a <i>system</i>.</p> <p>c. Describe how <i>systems</i> are nested and that <i>systems</i> may be thought of as containing subsystems (as well as being a subsystem of a larger <i>system</i>) and apply the understanding to analyze <i>systems</i>.</p>	<p>Students apply an understanding of <i>systems</i> to explain and analyze man-made and natural phenomena.</p> <p>a. Analyze a system using the principles of boundaries, subsystems, inputs, outputs, feedback, or the system's relation to other <i>systems</i> and design solutions to a <i>system</i> problem.</p> <p>b. Explain and provide examples that illustrate how it may not always be possible to predict the impact of changing some part of a man-made or natural <i>system</i>.</p>

Using Science and Technology Content Standard A, Performance Indicator 1, as an example, here we see page 4 of the Science and Technology section of the Maine Learning Results. This shows us the complete detail of Content Standard A as well as the continuum of Performance Indicators for *Unifying Themes* across four grade spans: Pre-K through grade two; grades three through five; grades six through eight; and grade nine through the awarding of a diploma.

Performance Indicator

A. Unifying Themes: Students apply the principles of *systems, models*, constancy and change, and scale in science and technology.
 A1 Systems

Performance Indicators & Descriptors			
Pre-K-2	3-5	6-8	9-Diploma
<p>Students recognize that parts work together, and make up whole man-made and natural objects.</p> <p>a. Explain that most man-made and natural objects are made of parts.</p> <p>b. Explain that when put together, parts can do things they could not do separately.</p>	<p>Students explain interactions between parts that make up whole man-made and natural things.</p> <p>a. Give examples that show how individual parts of organisms, ecosystems, or man-made structures can influence one another.</p> <p>b. Explain ways that things including organisms, ecosystems, or man-made structures may not work as well (or at all) if a part is missing, broken, worn out, mismatched, or misconnected.</p>	<p>Students describe and apply principles of <i>systems</i> in man-made things, natural things, and processes.</p> <p>a. Explain how individual parts working together in a <i>system</i> (including organisms, Earth systems, solar systems, or man-made structures) can do more than each part individually.</p> <p>b. Explain how the output of one part of a <i>system</i>, including waste products from manufacturing or organisms, can become the input of another part of a <i>system</i>.</p> <p>c. Describe how <i>systems</i> are nested and that <i>systems</i> may be thought of as containing subsystems (as well as being a subsystem of a larger <i>system</i>) and apply the understanding to analyze <i>systems</i>.</p>	<p>Students apply an understanding of <i>systems</i> to explain and analyze man-made and natural phenomena.</p> <p>a. Analyze a system using the principles of boundaries, subsystems, inputs, outputs, feedback, or the system's relation to other <i>systems</i> and design solutions to a <i>system</i> problem.</p> <p>b. Explain and provide examples that illustrate how it may not always be possible to predict the impact of changing some part of a man-made or natural <i>system</i>.</p>
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Looking at the Performance Indicator for grades six through eight, we find that the Performance Indicator within that grade span, indicates that students should be able to describe and apply principles of systems in man-made things, natural things, and processes.

Descriptor

A. Unifying Themes: Students apply the principles of *systems, models*, constancy and change, and scale in science and technology.
 A1 Systems

Performance Indicators & Descriptors			
Pre-K-2	3-5	6-8	9-Diploma
Students recognize that parts work together, and make up whole man-made and natural objects. a. Explain that most man-made and natural objects are made of parts. b. Explain that when put together, parts can do things they could not do separately.	Students explain interactions between parts that make up whole man-made and natural things. a. Give examples that show how individual parts of organisms, ecosystems, or man-made structures can influence one another. b. Explain ways that things including organisms, ecosystems, or man-made structures may not work as well (or at all) if a part is missing, broken, worn out, mismatched, or misconnected.	Students describe and apply principles of <i>systems</i> in man-made things, natural things, and processes. a. Explain how individual parts working together in a <i>system</i> (including organisms, Earth systems, solar systems, or man-made structures) can do more than each part individually. b. Explain how the output of one part of a <i>system</i> , including waste products from manufacturing or organisms, can become the input of another part of a <i>system</i> . c. Describe how <i>systems</i> are nested and that <i>systems</i> may be thought of as containing subsystems (as well as being a subsystem of a larger <i>system</i>) and apply the understanding to analyze <i>systems</i> .	Students apply an understanding of <i>systems</i> to explain and analyze man-made and natural phenomena. a. Analyze a system using the principles of boundaries, subsystems, inputs, outputs, feedback, or the system's relation to other <i>systems</i> and design solutions to a <i>system</i> problem. b. Explain and provide examples that illustrate how it may not always be possible to predict the impact of changing some part of a man-made or natural <i>system</i> .

Descriptors, help to further describe the Performance Indicator. Simply put, Descriptors describe the depth and breath of the knowledge and skills contained in the Performance Indicator.

Greater Clarity with Two Documents

- Maine Department of Education Regulation 132 - *Learning Results: Parameters for Essential Instruction*
- Maine Department of Education Regulation 131 – *The Federal State, and Local Accountability Standards*

In the ten years since the adoption of the 1997 Maine Learning Results, the Maine Department of Education came to realize that greater clarity could be achieved if two documents were created to guide the implementation and assessment of the Maine Learning Results. The Maine Learning Results: Parameters for Essential Instruction, is a technical rule of the Maine Department of Education and, like its predecessor, is organized into eight content areas. The Federal, State, and Local Accountability Standards is a substantive rule of the Maine Department of Education articulates only reading standards of English language arts measured on state assessments in grades 3-8 and grade 11 of the 9-diploma grade span, the mathematics content standards measured on the state assessments in grades 3-8 and measured in grade of the 9-Diploma grade span, and the science content standards D: The Physical Setting and E: The Living Environment measured in grade 5 of the 3-5 grade span, grade 8 of the 6-8 grade span, and grade 11 of the 9-Diploma grade span.

Content Differences between the 2007 and the 1997 MLR

- **For all content areas**
 - Identification of grade level and grade span “big ideas” – the performance indicators
 - Greater depth of knowledge in those content areas
 - Greater alignment to national standards and the body of knowledge on learning

In contrast to the 1997 Maine Learning Results, the 2007 standards identify topics that develop across grade spans, describe a greater depth of student understanding within these Ideas, and provide greater alignment to national standards, and the body of knowledge related to student learning.

Content Differences in Science and Technology

- 13 Standards to 5 Standards
- 254 Performance Indicators to 77 Performance Indicators

The overall organization of the Science and Technology standards in the 2007 Learning Results is considerable different from the 1997 Learning Results. As shown here, the revised Learning Results: Parameters for Essential Instruction includes dramatic decreases in both the number of standards and the number of performance indicators.

Content Differences in Science and Technology

Standard A

Continuum of learning related to the concepts of scale, systems, models, and constancy and change.

In addition to the changes in overall organization the Learning Results: Parameters for Essential Instruction includes a focus on the four major themes of Science and Technology: Systems, Scale, Models, and Constancy and Change. Although one can find both direct and indirect references to these ideas in the 1997 Maine Learning Results they are much more prominent in the revised standards.

Transcending Ideas

“Some important themes pervade science, mathematics, and technology and appear over and over again, whether we are looking at an ancient civilization, the human body, or a comet. They are ideas that transcend disciplinary boundaries and prove fruitful in explanation, in theory, in observation, and in design.”

Science for All Americans

As captured in this quote from Science for All Americans, one understands that the Themes are BIG ideas. The themes are powerful because they cross disciplinary boundaries. They are particularly significant in science and technology because they provide much of the primary structure for organizing the experiences and details of the discipline. The themes are regularly cited in literature as big ideas that students must understand in order to be scientifically literate. By placing the understandings and skills related to the Themes explicitly in our State standards we help to ensure that students will gain important knowledge that will assist them in understanding science and technology as well as other disciplines.

Content Differences in Science and Technology

Standard B

- Scientific inquiry and technological design described separately
- Technological design described Pre-K-Diploma
- Inquiry and Problem Solving, Scientific Reasoning and Communication combined

There are differences between the 1997 and the revised 2007 Standards. For example, Standard B contains performance indicators for scientific inquiry and technological design. The skills Technological Design are described PreK through Diploma and are described separately from the skills of scientific inquiry. In the 2007 Learning Results we also see that scientific communication, reasoning, and problem-solving have been integrated within Standard B.

Content Differences in Science and Technology

Standard C

Implications of Science and Technology is divided into four groups:

1. Understandings of Inquiry,
2. Understandings about Science and Technology,
3. Science, Technology, and Society, and
4. History and Nature of Science.

The ideas formerly found in standard M (Implication of Science and Technology) in the 1997 Learning Results have been reorganized in the 2007 Learning Results. These ideas are collected in a single standard with four performance indicators called The Scientific and Technological Enterprise.

Content Differences in Science and Technology

Standard D

- Energy integrated into The Physical Setting and the Living Environment
- Ideas in Continuity and Change regrouped

The majority of the knowledge and skills related to Standards A through I in the 1997 Learning Results have been reorganized into the last two standards of Learning Results: Parameters for Essential Instruction. The ideas that relate to the Physical Setting are found in Standard D and include some energy concepts and ideas related to the geological portions of the former Continuity and Change standard of the 1997 Learning Results.

Content Differences in Science and Technology

Standard E

- Discrete focus on classification systems to a broader understanding of biodiversity
- Ideas in Continuity and Change regrouped

Much of the biological content found in standards A – I of the 1997 Learning Results can be found in Standard E, The Living Environment, of the 2007 Learning Results: Parameters for Essential Instruction. One significant change in the 2007 Learning Results is a shift which takes the focus off of classification and highlights the concept of biodiversity.

Implications for Work in Schools

- There will be a need for professional development to assist teachers in understanding how to make connects from Standard A to Standards D and E.
- The standards will require schools to have a more comprehensive approach to instruction on technological design.
- The role of technology educators (in traditional PreK-Diploma and CTE Centers) takes on greater significance.
- The organization of the new MLR will require schools to focus more attention on the practice of scientists and engineers.
- School programming will need to offer opportunity to learn for all students related to all performance areas.

There are many implications for work in schools that arise from these new standards. They include a need for professional development opportunities that assist teachers in understanding the connections between the content of standard A and that of standards D and E.

The standards will require schools to have a more comprehensive approach to instruction on technological design.

The role of technology educators (in traditional PreK-Diploma and CTE Centers) takes on greater significance.

The organization of the new Maine Learning Results will require schools to focus more attention on the practice of scientists and engineers.

Finally school programming will need to offer opportunity to learn for all students related to all performance indicators in the Maine Learning Results.

Opportunities for Integration

- Observation skills and the arts
- Biodiversity and geography; nature of science and history
- Data analysis, formulas, statistics, and models; models, proportion, and scale; data collection, measurement, and scientific notation; prediction and mathematical formulas

Multiple opportunities exist to develop connections that can mutually support student learning across content areas. Presented here are potential opportunities for integration with the arts, social studies, and mathematics.

Opportunities for Integration

- Cells, heredity and reproduction and human development; motion and physical movement; science and technology and environmental health
- Research, reading strategies, informational writing, listening and speaking, vocabulary and concept development

Opportunities for integration also exist with Health Education and Physical Education and with English Language Arts.

Career and Education Development

- Lab work
 - A1 Interpersonal Skills
 - A4 Career and Life Roles
- Understanding Science, Technology, Engineering and Mathematics (S.T.E.M.) Career Opportunities
 - B3 Education and Career Information
 - C2 Decision-Making
 - C4 Societal Needs and Changes that Influence Workplace Success

Science and Technology offers logical places to integrate the learning identified in the Career and Education Development Standards. Lab settings are a context for applying the knowledge and skills related to the Interpersonal Skills and Career and Life Roles found in standard A of the Career and Education Development standards. Further, the need to assist students to understand and aspire to STEM related careers also provides opportunities to link science and technology instruction with parts of standards B and C of the Career and Education Development Standards.

Cross Content Connections

www.maine.gov/education/lres/pei/cross_content.pdf

You can access more information about the Cross Content connections at the Maine Department of Education web address shown here.

Content Resources in Science and Technology

- Project 2061
 - Benchmarks for Science Literacy
 - The Atlas for Science Literacy
 - Science for All Americans
- National Science Education Standards
- Standards for Technological Literacy
- Partnership for 21st Century Skills

<http://www.maine.gov/education/lres/scitech/>

The Maine Learning Results do not stand alone as an instructional resource. The ideas contained in Learning Results: Parameters for Essential Instruction reflect the input of the Dr. James Rutherford, the national consultant who worked with our State, science education research, and national standards. It was neither possible nor permissible to include all the explanation contained in these resources within the Maine Learning Results. It is extremely important that teachers reference the national standards documents and relevant research when and where they require additional understanding of the intent of the Science and Technology portion of the Learning Results.

Timeline 2007 - 2009

- **June 2007** – Maine Department of Education Regulation 131 adopted by the Legislature and signed by the Governor.
- **October 2007** – Maine Department of Education Regulation 132 approved by the State Board of Education. Revised Maine Learning Results: *Parameters for Essential Instruction* effective as of October 22, 2007.
- **Spring 2009** – MEA and MHSA are aligned to the 2007 Maine Learning Results

Chapter 131 and Chapter 132 have been effective since 2007. Schools can and should create curriculum and programming to align with and support the Learning Results: Parameters for Essential Instruction. The Maine Educational Assessment and Maine High School Assessment will be aligned to the 2007 Learning Results for the Spring of 2009 testing.

For More Information Contact . . .

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<http://www.maine.gov/education/lres/pei/index.html>

You can download a complete copy of the Maine Learning Results: Parameters for Essential Instruction from the Department of Education website. For more information about the Science and Technology Standards contact Anita Bernhardt at the Maine Department of Education. Thank you.