New Meridian

Maine Science Assessment
Released Items (2022)

Grade 8

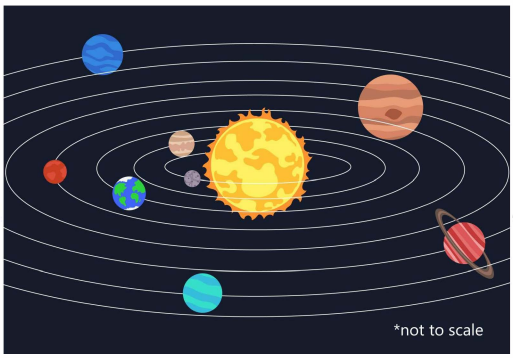
Included in this document are items and their associated stimuli that were operationally administered on the Maine Science Assessment. The stimulus is on the left and the item is on the right, consistent with how the information is presented online in ADAM.
For each item, the correct answer is provided, along with the Next Generation Science Standards (NGSS) to which it aligns. This includes the disciplinary core idea (DCI), science and engineering practice (SEP), and cross-cutting concept (CCC). In some cases, one of these dimensions may not apply.

A note on achievement levels: An achievement level of either Well Below State Expectations, Below State Expectations, At State Expectations, or Above State Expectations is associated with the earned scaled score for entire assessment for each student. For example, for the Grade 8 assessment, a scaled score of 42 would be associated with the achievement level of At State Expectations.

Each of these released items has an achievement level listed with it. This simply represents where in the range of required student knowledge, skills, and abilities that particular item fell. It can be used as an example of what a student performing at that particular level can do. However, it is the sum of the performance of the student on the entirety of the assessment that determines their achievement level, not their ability to correctly answer one particular item.

Gravity and the Solar System

Chris and Velma are learning about the solar system and using diagrams such as this one to make claims about whether gravity has a role in the orbit of planets around the Sun.



1. Chris claims that gravity has no effect on how the planets orbit the Sun. Velma argues against this claim and states that gravity is an essential part of how the planets orbit the Sun.

Part A

Which claim correctly describes the effect of gravity on the orbit of planets around the Sun?

A	Gravity has no effect on how the planets orbit the Sun.
B	Gravity is an essential part of how the planets orbit the Sun.

1 point for Part A correct

Part B

Which statements support the correct claim about the effect of gravity on the planets' orbit around the Sun? Select all that apply.

A	Due to the Sun's rotation, objects in our solar system are kept in orbit around the Sun.
B	Due to the Sun's enormous mass, objects in the solar system are kept in orbit around the Sun.
C	Due to relative distance to the Sun, objects in the solar system are kept in orbit around the Sun.
D	Due to relative distance to the Sun, objects in our solar system require additional forces to remain in orbit around the Sun.

1 point for Part B correct (both correct options chosen)

Standards Alignment
Discipline: Earth and Space Science
NGSS Topic: Space Systems

DCI: ESS1.B
The solar system consists of the Sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the Sun by its gravitational pull on them.

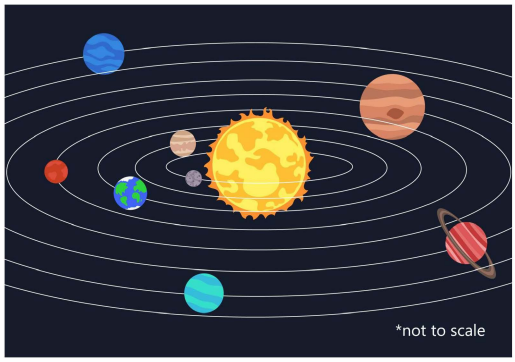
SEP7: Engaging in argument from evidence

CCC4: Systems and system models

Achievement Level: 2 points = Above State Expectations

Gravity and the Solar System

Chris and Velma are learning about the solar system and using diagrams such as this one to make claims about whether gravity has a role in the orbit of planets around the Sun.



2. **As Chris considers the role of gravity in the orbit of planets around the Sun, he notices that the diagram is labeled as not drawn to scale. Which statements support the diagram as not drawn to scale? Select** all **that apply.**

A	The relative sizes of the planets vary more than what is shown.
B	The relative size of the Sun is too large compared to the planets.
C	The relative number of planets in our solar system is more than what is shown.
D	The relative distances between the orbits of the planets vary more than what is shown.

1 point for both correct answers

Standards Alignment

Discipline: Earth and Space Science
NGSS Topic: Space Systems

DCI: ESS1.B
The solar system consists of the Sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the Sun by its gravitational pull on them.

SEP4: Analyzing and Interpreting Data

CCC4: Systems and System Models

Achievement Level: Above State Expectations

Running

Yasir is a member of her school's running team. One day at practice, she runs a mile and then has to stop because not only do her muscles hurt, but she is tired and out of breath. As her teammates pass her by, they do not look tired or sore. Later, she asks what she could be doing differently. Her teammate suggests to Yasir that she eat healthy foods and drink plenty of water, and during runs to use proper breathing techniques.

3. Yasir asks her teammate why good breathing techniques will help her to run longer. Her teammate claims that steady breathing while running provides oxygen to the muscles.

Is this body system working directly in the process of breathing while running? Select Yes or No for each body system.

	Yes	No
Circulatory system	◉	○
Digestive system	○	◉
Excretory system	○	◉
Muscular system	◉	○
Nervous system	◉	○
Respiratory system	◉	○

2 points for all 6 correct systems

1 point for 3-5 correct systems

0 points for 0-2 correct systems

Standards Alignment
Discipline: Life Science
NGSS Topic: Structure Function, and Information Processing

DCI: LS1.A
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

No SEP

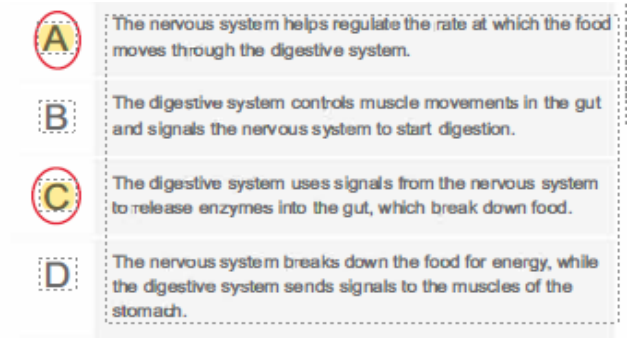
CCC4: Systems and system models

Achievement Level:
1 point = Well Below State Expectations
2 points = Above State Expectations

Running

Yasir is a member of her school's running team. One day at practice, she runs a mile and then has to stop because not only do her muscles hurt, but she is tired and out of breath. As her teammates pass her by, they do not look tired or sore. Later, she asks what she could be doing differently. Her teammate suggests to Yasir that she eat healthy foods and drink plenty of water, and during runs to use proper breathing techniques.

4. On the morning before her next practice, Yasir decides to use the advice of her teammate and eats a large breakfast of eggs, fruit, and toast for energy. As she eats, she wonders how the food moves through her body. Yasir thinks that her nervous system and digestive system are working together to process the food. Which two statements support this claim? Select two statements.



1 point for both correct answers

Standards Alignment
Discipline: Life Science
NGSS Topic: Structure, Function, and Information Processing

DCI: LS1.A
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

No SEP

CCC4: Systems and system models

Achievement Level: At State Expectations

Running

Yasir is a member of her school's running team. One day at practice, she runs a mile and then has to stop because not only do her muscles hurt, but she is tired and out of breath. As her teammates pass her by, they do not look tired or sore. Later, she asks what she could be doing differently. Her teammate suggests to Yasir that she eat healthy foods and drink plenty of water, and during runs to use proper breathing techniques.

5. On the day of her competition, Yasir is able to finish her run without her muscles hurting. She wonders what else she can do to improve her running. She thinks about the different body systems that work together. Yasir makes the claim that the circulatory system is important in maintaining endurance.

Which three statements support her claim? Select **three** statements.

1 point for all three correct statements

- A — It sends signals to all parts of the body by working with the nervous system.
- B — It pumps blood to the body by working with the heart and with the muscular system.
- C — It supplies oxygen and nutrients to the body by working with the respiratory system.
- D — It carries waste and carbon dioxide out of the body by working with the excretory system.
- E — It helps to digest food and send nutrients to the body by interacting with the digestive system.

Standards Alignment
Discipline: Life Science
NGSS Topic: Structure Function, and Information Processing

DCI: LS1.A
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

SEP6: Constructing Explanations and Designing Solutions

CCC4: Systems and system models

Achievement Level: Above State Expectations

Running

Yasir is a member of her school's running team. One day at practice, she runs a mile and then has to stop because not only do her muscles hurt, but she is tired and out of breath. As her teammates pass her by, they do not look tired or sore. Later, she asks what she could be doing differently. Her teammate suggests to Yasir that she eat healthy foods and drink plenty of water, and during runs to use proper breathing techniques.

6. On one of Yasir's runs, she encounters a large hill. As she runs up the hill, she realizes that she is breathing heavily and beginning to sweat.

How does sweating enable Yasir to run better?

2 points possible, can earn partial credit

See next page for rubric.

Standards Alignment
Discipline: Life Science
NGSS Topic: Structure Function, and Information Processing

DCI: LS1.A
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

SEP6: Constructing Explanations and Designing Solutions

CCC4: Systems and system models

Achievement Level:
1 point = Well Below State Expectations
2 points = Above State Expectations

Points	Qualities of the Student Response
2	The response must identify a complete understand that sweating can cool the body down or gets rid of waste. Short explanation of how sweating enables Yasir to run better is expected. **Example student response:** Sweating cools the body down by providing moisture to the surface of the body which evaporates and transfers heat away from the body to the air.
1	The response demonstrates a partial understanding of the prompt. The response identifies one example (cools the body down or gets ride of waste) without explaining how.
0	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.

Running

Yasir is a member of her school's running team. One day at practice, she runs a mile and then has to stop because not only do her muscles hurt, but she is tired and out of breath. As her teammates pass her by, they do not look tired or sore. Later, she asks what she could be doing differently. Her teammate suggests to Yasir that she eat healthy foods and drink plenty of water, and during runs to use proper breathing techniques.

7. Why is it important for Yasir's body systems to function together while running?

1 point

A. They work together to maintain the same amount of oxygen throughout her entire run.

B. They work together to maintain stability and balance to provide enough oxygen to her muscles while running.

C. They work together to tell the nervous system to send signals to the body in order to speed the production of energy.

D. They work together to create energy and stability by providing enough carbon dioxide to her muscles while running.

Standards Alignment
Discipline: Life Science
NGSS Topic: Structure Function, and Information Processing

DCI: LS1.A
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

No SEP

CCC4: Systems and system models

Achievement Level: At State Expectations