LOUISIANA DEPARTMENT OF EDUCATION

Office of Assessments, Analytics, and Accountability

LEAP Released Item Guide for Science Grade 7

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Purpose

The LEAP released item guide is intended to be used as an instructional tool and not to predict performance on the summative test. These items are meant to help teachers better understand how the achievement level descriptors are used in creating assessment questions.

How to Use and Not Use

The recommendations and cautions that follow are meant to help teachers better understand the achievement level descriptors and help administrators better understand what should and should not be done with the released items.

How to Use

- Learn how achievement level descriptors work with the dimensions in an item;
- Provide guidance when selecting assessment items in terms of rigor, content, and item types

How Not to Use

- Avoid prioritizing the PEs used in the released items because they do not represent all of the content eligible for the operational test;
- Avoid limiting instructional strategies to the released items (creating instructional sets using only the PEs found in the document);
- Do not use only the stimulus materials provided in the released items for classroom instruction;
- Avoid creating assessment items that mirror the released items;
- Avoid designing instructional tasks and sets based on only one PE.

Assessment Design

Supporting Science Instruction

The LEAP tests will assess students' understanding of the LSS for Science, reflecting the multiple dimensions of the standards.

Apply content knowledge and skills (Disciplinary Core Idea, DCI)

On the LEAP test, students answer questions which require content knowledge and skills aligned to PE bundles (groupings of PEs) and the corresponding DCIs.

Investigate, evaluate, and reason scientifically (Science and Engineering Practice, SEP)

On the LEAP test, students do more than answer recall questions about science; they apply the practices, or behaviors, of scientists and engineers to investigate each real-world phenomenon and design solutions to problems.

Connect ideas across disciplines (Crosscutting Concept, CCC)

On the LEAP test, sets of questions assess student application of knowledge across the domains of science for a comprehensive picture of student readiness for their next grade or course in science.

Set Based Design

The grade 7 tests include item sets, task sets, and standalone items.

Item Sets

Item sets consist of four items that have a common stimulus. There are two one-point items and two two-point items in each item set on the LEAP test. For three of the item sets, one of the two-point items will be a Constructed Response item. In the released item sets, there may be more than four items or fewer than four items with a common stimulus.

Task Sets

Task sets consist of five items that have a common stimulus. There are two one-point items, two two-point items, and one nine-point Extended Response item. In the released task sets, there may be more than five items or fewer than five items with a common stimulus.

Standalone Items

Standalone items are one-point or two-point items that do not share a stimulus with other items.

Achievement-Level Definitions

Achievement-level definitions briefly describe the expectations for student performance at each of Louisiana's five achievement levels:

- Advanced: Students performing at this level have **exceeded** college and career readiness expectations and are well prepared for the next level of study in this content area.
- Mastery: Students performing at this level have **met** college and career readiness expectations and are prepared for the next level of study in this content area.
- Basic: Students performing at this level have **nearly met** college and career readiness expectations and may need additional support to be fully prepared for the next level of study in this content area.
- Approaching Basic: Students performing at this level have **partially met** college and career readiness expectations and will need much support to be prepared for the next level of study in this content area.
- Unsatisfactory: Students performing at this level have **not yet met** the college and career readiness expectations and will need extensive support to be prepared for the next level of study in this content area.

Achievement Level Descriptors

Achievement Level Descriptors (ALDs) indicate what a typical student at each level should be able to demonstrate based on his or her command of grade-level standards. ALDs are written for the three assessment reporting categories. Access the ALDs on the Assessment Resources Webpage for a breakdown of the knowledge, skills, and practices associated with each achievement level.

Released Items

This section includes released test items. With each item, item set, and task set, is a table containing alignment information and the answer key, where possible. Additionally, analyses of the multi-dimensional alignment, achievement level descriptor, rationales for answers, and rubrics for CRs and ERs are included with the items. An asterisk (*) denotes correct answer(s).

The achievement level descriptor provides information about how students who answer the item correctly are performing.

For example, an item is aligned to the SEP and DCI for 7-MS-PS3-4:

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
7-MS-PS3-4: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. CCC: SPQ SEP: 3	Predict the effects of experimental error on the results of an investigation and/or refine an investigation to determine the relationships among energy transferred, type of matter, mass, and change in average kinetic energy of particles as measured by the temperature of the sample.	Plan an investigation to determine relationships among energy transferred, type of matter, mass, and change in average kinetic energy of the particles as measured by the temperature of the sample.	Classify variables in an investigation about the relationships among factors (including energy transferred, type of matter, mass, and change in average kinetic energy of particles as measured by the temperature of the sample) as independent, dependent, or constant.	Organize the steps to an investigation about the effects of different factors on the average kinetic energy of a sample.

Identifies the performance level of students who answer the question correctly.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 3 or higher. The student can compare solutions for human activities on the environment and biodiversity.

In some countries, human developments have been built in animals' migration patterns or habitats. In Costa Rica, where monkeys are native, monkeys use electrical wires to navigate through towns, and they are sometimes electrocuted in the process.

Which suggestion is the **best** possible solution to this problem?

D. Insulate power lines and cover transformers.*

Identifies how the item aligns to the dimensions.

Released Items:
Standalone Items
Item Set: El Niño
Item Set: Marathon Runner

Standalone Items

Item Type	PE	DCI	SEP	CCC	Points	Achievement Level
TPI	7-MS-LS1-3	MS.LS1D.a	7. ARG	SYS	2	3
MC	7-MS-PS3-4	MS.PS3B.b		SPQ	1	4

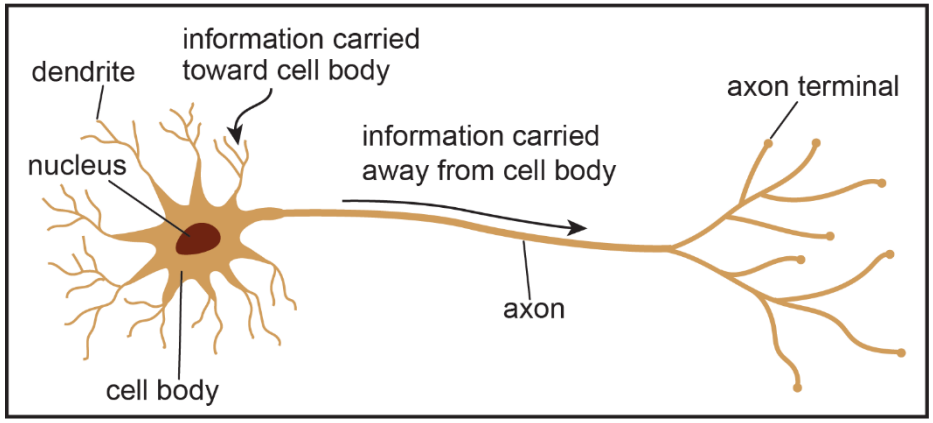
SEP = blue; DCI = orange; CCC = green An asterisk (*) denotes correct answer(s).

Two-Part Independent Item
Performance Expectation
7-MS-LS1-3 Use an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Use the information and your knowledge of science to answer the questions.

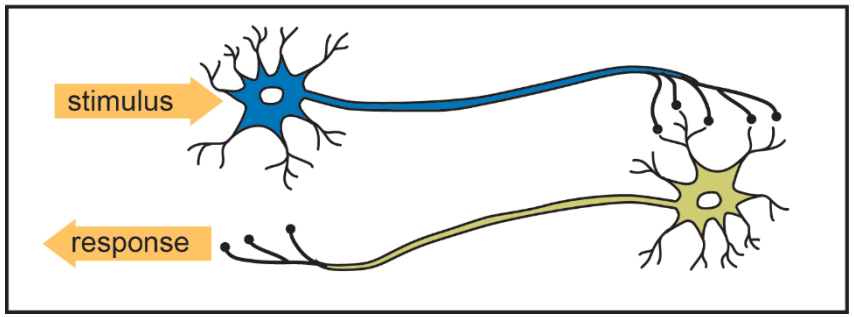
A neuron is a nerve cell. Neurons use dendrites and axon terminals to send information from one neuron to another. Figure 1 shows the structure of a neuron.

Figure 1. Neuron Structure



Neurons carry information in one direction. One set of neurons carries information from a stimulus to the brain. The other set of neurons carries response information away from the brain. Figure 2 shows neurons sending information to and from the spinal cord.

Figure 2. Signal Movement



Part A	Part B
A student touches an ice cube. Select from the drop-down menus to correctly complete the sentence describing how a signal about the temperature of the ice cube is received and processed by the brain. The [ ] of a neuron in the hand sends information to the [ ] of a different neuron. cell body dendrite axon terminal	Which statement describes evidence showing that neurons are a specialized subsystem within a body system that performs a particular function? A. A dendrite is a specialized cell type that sends signals to the brain. B. A neuron is made up of dendrites and axon terminals. C. The spinal cord receives and sends signals through a single type of cell. D. Neurons connect to tissues such as the spinal cord to send signals to the brain.*

Multi-Dimensional Alignment: The item requires the student to apply the science and engineering practice of engaging in argumentation and knowledge of how the body is composed of cells to demonstrate an understanding of systems and system models.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 3 or higher. The student can describe the evidence that supports an argument about the interactions of systems within the human body.

Scoring

Part A

The axon terminal of a neuron in the hand sends information to the dendrite of a different neuron.

Part B

Which statement describes evidence showing that neurons are a specialized subsystem within a body system that performs a particular function?

D. Neurons connect to tissues such as the spinal cord to send signals to the brain.*

Rationales

Part A

Response	Rationale
The **axon terminal** of a neuron in the hand sends information to the **dendrite** of a different neuron.	Correct.
The **cell body** of a neuron in the hand sends information to the **axon terminal** of a different neuron.	The cell body's function is to hold the nucleus and other important organelles.
The **dendrite** of a neuron in the hand sends information to the **cell body** of a different neuron.	The dendrite's function is to receive the signal from another neuron.
The **axon terminal** of a neuron in the hand sends information to the **cell body** of a different neuron.	The dendrite receives the information from another neuron.

Part B

A. A dendrite sends information from one neuron to another.
B. Neurons are made of dendrites, a nucleus, a cell body, an axon, and an axon terminal.
C. The spinal cord uses multiple types of cells, each with a different function.
D. Correct.

Multiple Choice
Performance Expectation
7-MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

Use the information and your knowledge of science to answer the question.

Students wanted to demonstrate conservation of energy during heat transfer. They combined 100 mL of water at 50°C and 200 mL of water at 30°C in a metal pot. They predicted that the final temperature would be 37°C, but it was several degrees lower.

Which statement explains why their prediction was incorrect?

A. The students did not wait long enough to take the final temperature.
B. Heat was transferred from the water to the surroundings.*
C. The students did not take into account the heat capacity of water.
D. The cooler water had more effect on the final temperature than the warmer water.

Multi-Dimensional Alignment: The item requires the student to apply knowledge of the relationships among energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of a sample to demonstrate an understanding of scale, proportion, and quantity.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can describe the relationships among energy transferred, type of matter, mass, and change in average kinetic energy of the particles as measured by the temperature of the sample.

Students wanted to demonstrate conservation of energy during heat transfer. They combined 100 mL of water at 50°C and 200 mL of water at 30°C in a metal pot. They predicted that the final temperature would be 37°C, but it was several degrees lower.

Which statement explains why their prediction was incorrect?

B. Heat was transferred from the water to the surroundings.

Rationales
A. The final temperature is determined by the conservation of energy.
B. Correct.
C. The heat capacities of the two samples are the same.
D. The two samples have equal effects on the temperature.

Item Set: El Niño

Item Type	PE	DCI	SEP	CCC	Points	Achievement Level
MS	7-MS-ESS2-6	MS.ESS2D.a	2. MOD		1	2
MS	7-MS-ESS3-5	MS.ESS3D.a	1. Q/P		1	4
TEI	7-MS-ESS2-6	MS.ESS2D.a	2. MOD		2	4
CR	7-MS-ESS2-6	MS.ESS2D.a		S/C	2	5

SEP = blue; DCI = orange; CCC = green An asterisk (*) denotes correct answer(s).

Use the information about El Niño and your knowledge of science to answer the questions.

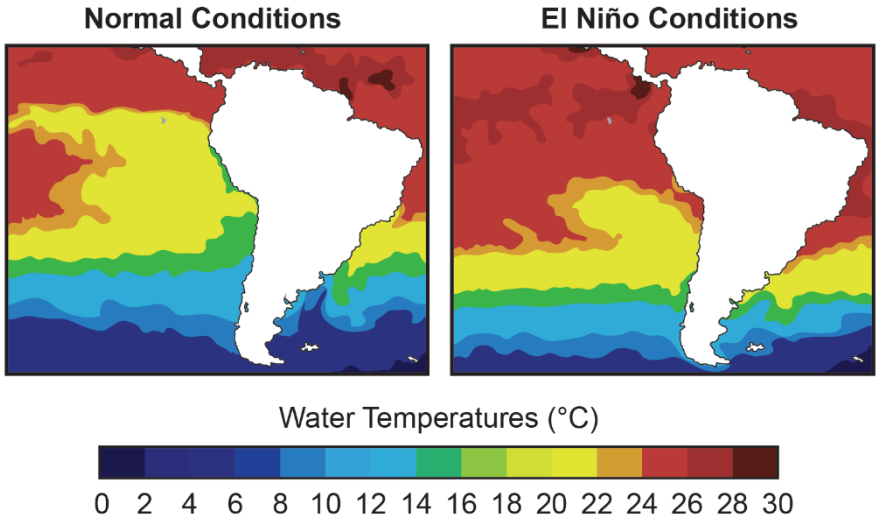
El Niño

Energy is transferred to all of Earth's systems as solar radiation reaches Earth. Earth's systems include the oceans and the atmosphere. The atmosphere moves in different patterns, depending on latitude. The prevailing winds in the tropics tend to blow from east to west, due to the Coriolis effect. This effect is caused by Earth's rotation. Sailing ships have used these "trade winds" to sail from Europe to the Americas as well as from the Americas to Asia. The trade winds vary in strength from year to year.

The trade winds move warm surface water westward in the Pacific Ocean. The surface currents then draw water away from North and South America. This causes cool water to rise along the western coasts of North and South America. Near Indonesia, the opposite pattern occurs. The result is warm, moist air in the western Pacific and cool, dry air in the eastern Pacific.

In some years, the trade winds are weak. The climate reverses when warm water stays on the West Coast of the Americas. This shift in climate brings rain to the western Pacific coast and drought to parts of Asia. This pattern is referred to as El Niño. El Niño can also affect weather beyond the Pacific coast. Extreme El Niño events can cause serious drought and flooding problems in places such as Texas, in the United States, and Mongolia, in Asia. When ocean temperatures are cooler than normal, the opposite effect happens on land. This is known as La Niña. Map 1 shows the difference in surface ocean temperatures between a normal year and an El Niño year.

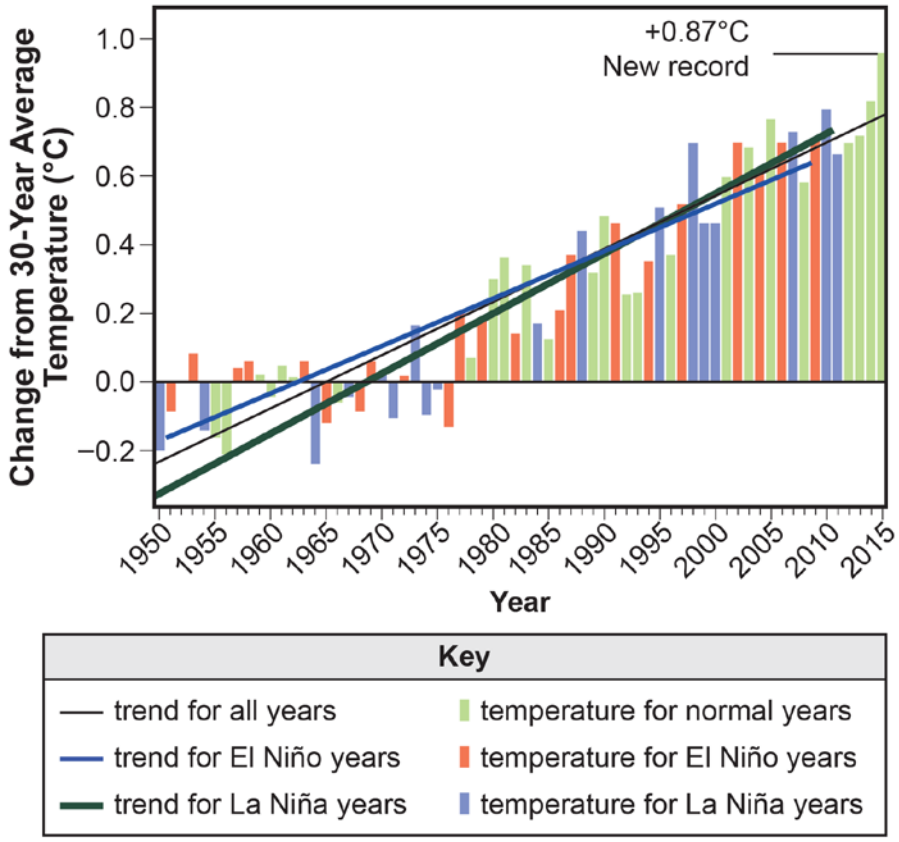
Map 1. Comparison of Normal to El Niño Conditions in the Pacific Ocean



Source: NOAA.

Scientists study how El Niño can affect global temperatures. One question scientists have been studying is whether global climate change is making the effects of El Niño worse. Scientists have applied different mathematical climate models to the problem, with mixed results. Some models showed a connection between rising temperatures and strong El Niño years, and others did not. Graph 1 shows the difference between annual global temperatures and the average temperatures for the years 1950–2015. The overall trends for all years (black line) and El Niño years (blue line) are also shown. El Niño–year temperatures are shown as orange bars.

Graph 1. Annual and Average Global Temperatures over Time



Source: NASA Goddard.

Multiple Select
Performance Expectation
7-MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth causes patterns of atmospheric and oceanic circulation that determine regional climates.

Students are developing a computer model to study the El Niño effect in the Pacific. Which pieces of information should the students include in their model?

Select the two correct answers.

A. the directions of deep ocean currents
B. the temperatures at coastal landforms
C. the directions of surface ocean currents*
D. the temperatures of deep ocean currents
E. the amounts of moisture in air masses over the Pacific*

Multi-Dimensional Alignment: While effectively applying the science practice of developing and using models, the student demonstrates knowledge of how unequal heating and rotation of the Earth determine regional climates.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 2 or higher. The student can use a model to identify factors that determine regional climates.

Students are developing a computer model to study the El Niño effect in the Pacific. Which pieces of information should the students include in their model?

Select the two correct answers.

C. the directions of surface ocean currents*
E. the amounts of moisture in air masses over the Pacific*

Rationales
A. The directions of deep ocean currents always move water away from the equator and away from the poles.
B. The temperatures of coastal landforms are influenced by the energy received by the Sun.
C. Correct.
D. The temperatures of deep ocean currents are consistently near freezing, and variation is small.
E. Correct.

Multiple Select
Performance Expectation
7-MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Scientists have observed that concentrations of greenhouse gases in the atmosphere have been increasing.

Which questions could scientists investigate to **best** determine why greenhouse gas concentrations in the atmosphere have been increasing?

Select the **three** correct answers.

A. Which greenhouse gas has the highest concentration in the atmosphere?*****
B. Where are greenhouse gas concentrations at the highest levels on Earth?*
C. How many trees does it take to absorb fifty tons of carbon dioxide in one year?
D. When did concentrations of greenhouse gases in the atmosphere start to rise?*****
E. How have changes in greenhouse gas concentrations affected global temperatures?

Multi-Dimensional Alignment: While effectively applying the science practice of asking questions and clarifying evidence, the student demonstrates knowledge of the factors that have caused the rise in global temperatures over the past century.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can ask questions about data presented in tables, graphs, and maps to clarify evidence of the factors in global temperatures.

Which questions could scientists investigate to **best** determine why greenhouse gas concentrations in the atmosphere have been increasing?

Select the **three** correct answers.

A. Which greenhouse gas has the highest concentration in the atmosphere?*****
B. Where are greenhouse gas concentrations at the highest levels on Earth?*
D. When did concentrations of greenhouse gases in the atmosphere start to rise?*****

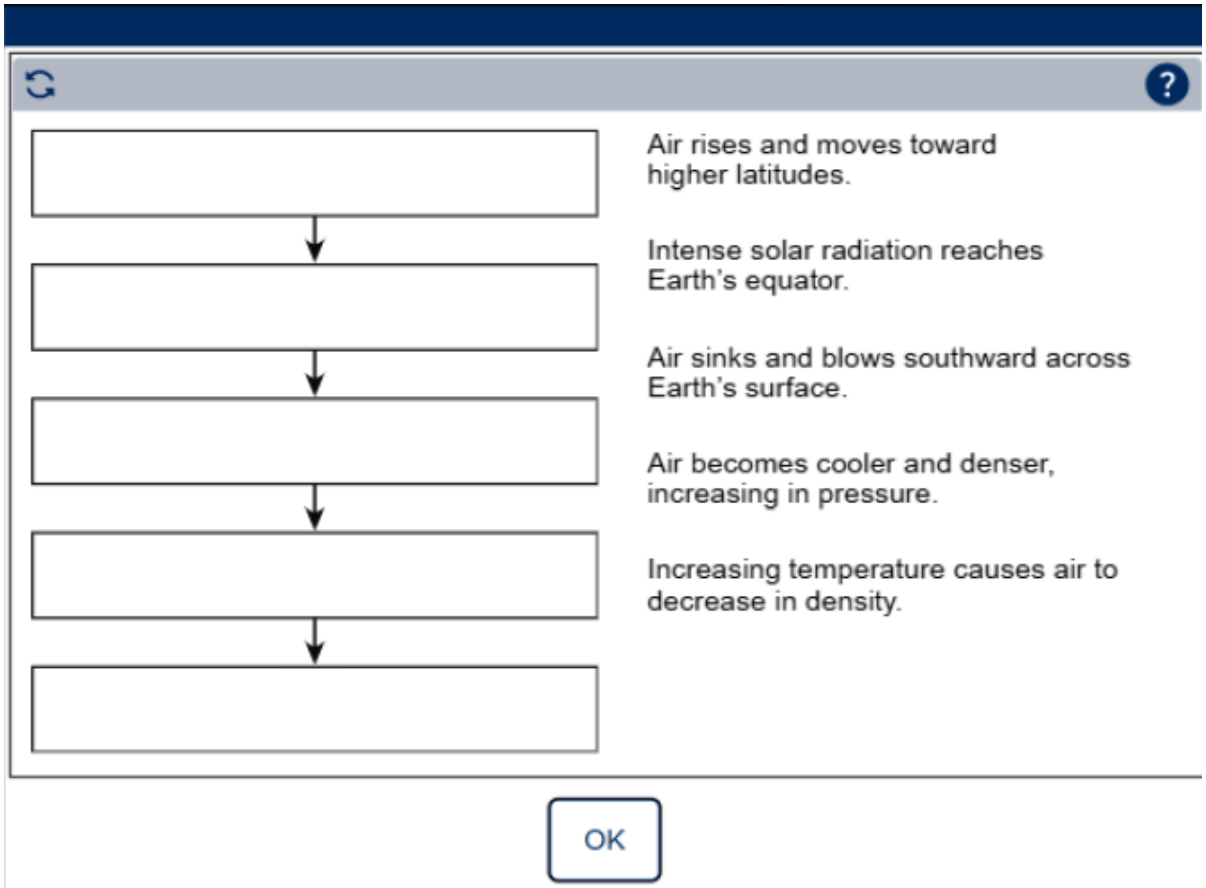
Rationales

A. Correct.
B. Correct.
C. This question will answer how much trees reduce greenhouse gas concentrations instead of why greenhouse gas concentrations are increasing.
D. Correct.
E. Data are given that show that an increase in greenhouse gas concentrations increases temperatures.

Technology-Enhanced Item
Performance Expectation
7-MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth causes patterns of atmospheric and oceanic circulation that determine regional climates.

A student is developing a model to explain how wind patterns observed in the northern tropics occur.

Drag the statements into the correct order to describe how the student should construct the model.

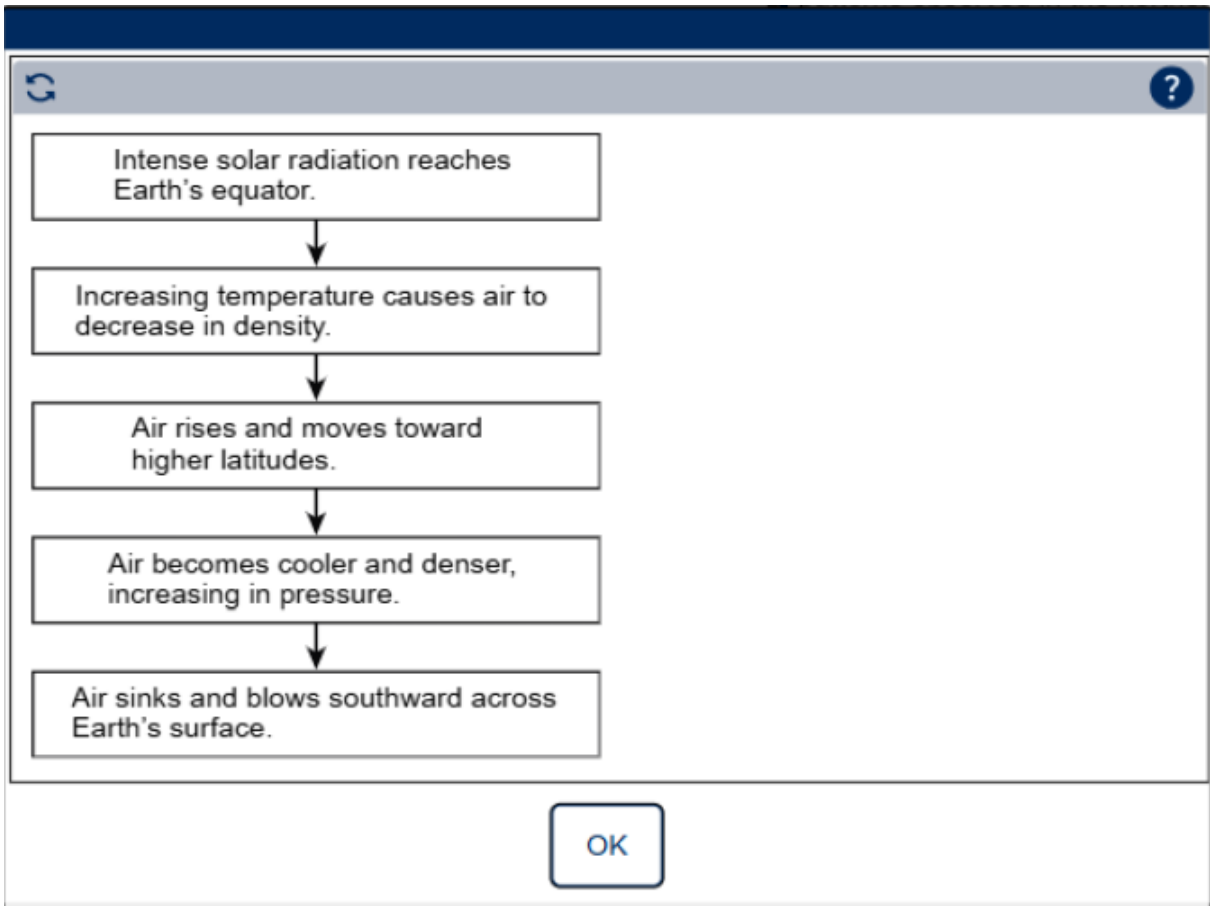


Multi-Dimensional Alignment: While effectively applying the science practice of developing and using models, the student demonstrates knowledge of how unequal heating and rotation of the Earth determine regional climates.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can develop and/or use a model to describe how unequal heating and rotation of the Earth determine regional climates.

Scoring

Drag the statements into the correct order to describe how the student should construct the model.



Rationales

Response	Rationale
Intense solar radiation reaches Earth's equator. Increasing temperature causes air to decrease in density. Air rises and moves toward higher latitudes. Air becomes cooler and denser, increasing in pressure. Air sinks and blows southward across Earth's surface.	Correct.
Intense solar radiation reaches Earth's equator. Air rises and moves toward higher latitudes. Increasing temperature causes air to decrease in density. Air becomes cooler and denser, increasing in pressure. Air sinks and blows southward across Earth's surface.	A difference in air density causes the movement of air, so it must occur before air rising and moving toward higher latitudes.
Intense solar radiation reaches Earth's equator. Air sinks and blows southward across Earth's surface. Air rises and moves toward higher latitudes. Air becomes cooler and denser, increasing in pressure. Increasing temperature causes air to decrease in density.	A change in air density and air pressure occurs before air sinks and blows across Earth's surface.
Intense solar radiation reaches Earth's equator. Increasing temperature causes air to decrease in density. Air rises and moves toward higher latitudes. Air sinks and blows southward across Earth's surface. Air becomes cooler and denser, increasing in pressure.	An increase in pressure causes air to sink and blow across Earth's surface.
Air rises and moves toward higher latitudes. Increasing temperature causes air to decrease in density. Intense solar radiation reaches Earth's equator. Air becomes cooler and denser, increasing in pressure. Air sinks and blows southward across Earth's surface.	Intense solar radiation must reach Earth's equator to increase temperatures, decreasing the density of the air.

Constructed Response
Performance Expectation
7-MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth causes patterns of atmospheric and oceanic circulation that determine regional climates.

Scientists theorize that changes in global climate may change the effects of El Niño. However, they are uncertain about whether the changes will increase the effects of El Niño.

Part A

Explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast.

Part B

Explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.

Multi-Dimensional Alignment: The item requires the student to apply knowledge of how unequal heating and rotation of the Earth causes regional climates to demonstrate an understanding of systems.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 5 or higher. The student can describe how unequal heating and rotation of the Earth cause patterns of atmospheric and ocean circulation that determine regional climates.

Scientists theorize that changes in global climate may change the effects of El Niño. However, they are uncertain about whether the changes will increase the effects of El Niño.

Part A
Explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast.

Part B
Explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.

Scoring Information	
Score	Description
2	Student's response correctly explains how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast and correctly explains how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.
1	Student's response correctly explains how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast but does not correctly explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas. OR Student's response does not correctly explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast but correctly explains how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.
0	Student's response does not correctly explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast and does not correctly explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.

Examples include:

Scoring Notes	Examples
Explanation of how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast (1 point)	• A long drought makes land less able to absorb heavy rains from an El Niño year. OR • Warmer air temperatures mean heavier rain during an El Niño year.
Explanation of how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas (1 point)	• Higher global temperatures mean more dry plant material that is vulnerable to fire.

Accept other reasonable answers.

Student Responses (CR)

Part A

Explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast.

Part B

Explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas.

Response 1

Part A

This will warms up and stays on the west coast, and brings in a lot of rain, also can effect weather beyond the pacific coast. More rain will cause severe flooding in the west coast.

Part B

It will heat up the temp to dry out all the grass and plants and trees to cause a fire when it happened by lightning or something else. It will be very dry, so it will easily catch on fire.

Score: 2

This response earns a 2. It accurately explains how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast : "This will warms up and stays on the west coast, and brings in a lot of rain." The response accurately explains how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas : "It will heat up the temp to dry out all the grass and plants and trees to cause a fire when it happened by lightning or something else."

Response 2

Part A

A global warming related drought could influence the El nino effect when severely flooding could change the temperature of the wind and water and cause more flooding elsewhere.

Part B

If a global warming-related drought were to happen during fires caused by El nino the heat could make everything dry and fuel the fires with hot wind.

Score: 1

This response earns a 1. It does not accurately explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast : "A global warming related drought could influence the El nino effect when severely flooding could change the temperature of the wind and water and cause more flooding elsewhere." The response accurately explains how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas : "If a global warming-related drought were to happen during fires cause by El nino the heat could make everything dry and fuel the fires with hot wind."

Response 3

Part A

Based off evidence global warming-related droughts would not be good from the El Nino effect. The temperatures would rise up and the it will start to get hot. Than people would be sweating and they would try their best to try to find and help quench their thirst. Now if you had a severe flooding in the West Coast than everything would be extra wet. Cars would be filled with water and homes would be destroyed based off of how high the flooding had gotten to. If the flooding had gotten to about 7 feet than it would be a problem and if people were warned about the flooding being at least 5 feet high than they should start to pack up and evacuate. So, that is what would happen if El Nino caused a drought and a flooding on the West Coast.

Part B

Based off the information, if fires were caused by a El Nino drought in Texas then things would be bad. The reason things would be ba dis because if a fire starts in a drought than they would be able to have a hard time to take it out because when there is a drought usually where the drought is it is very hot because there is no water. If you dont have enough water for the drought than the drought will calm down but than it will only get bigger and bigger and start to damage way more things because you didn't have enough water to take out the fire that was caused by a drought from El Nino.

Score: 0

This response earns a 0. It does not accurately explain how global warming–related drought could influence the effects of El Niño if severe flooding occurs on the West Coast. The response does not accurately explain how global warming–related drought could influence the effects of El Niño if fires are caused by an El Niño–related drought in Texas .

Task Set: Marathon Runner

Item Type	PE	DCI	SEP	CCC	Points	Achievement Level
MS	7-MS-LS1-6	MS.PS3D.a		E/M	1	3
MC	7-MS-LS1-7	MS.LS1C.c	2. MOD		1	4
TEI	7-MS-LS1-7	MS.LS1C.b	2. MOD		2	2
TPD	7-MS-LS1-7	MS.LS1C.b		E/M	2	4
ER	7-MS-LS1-7	MS.LS1C.c	2. MOD	E/M	9#	4

SEP = blue; DCI = orange; CCC = green An asterisk (*) denotes correct answer(s).

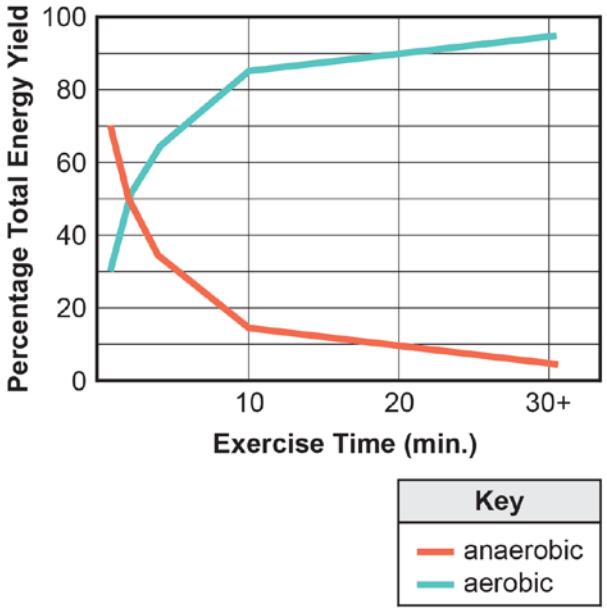
#Although the ER in the Task Set is reduced to 6 points beginning in 2025-2026, this set will remain as a 9-point ER.

Use the information about marathon runners and your knowledge of science to answer the questions.

Marathon Runners

Long-distance runners and bicyclists use large amounts of energy during races. The source of this energy comes from the foods that these athletes eat. One concern of long-distance athletes is extreme muscle fatigue and cramping. Carbohydrate-rich foods contain many molecules that the body can store as energy sources for muscle cells to reduce this fatigue. Graph 1 shows how athletes mostly exert energy through aerobic respiration after the first few minutes of a race.

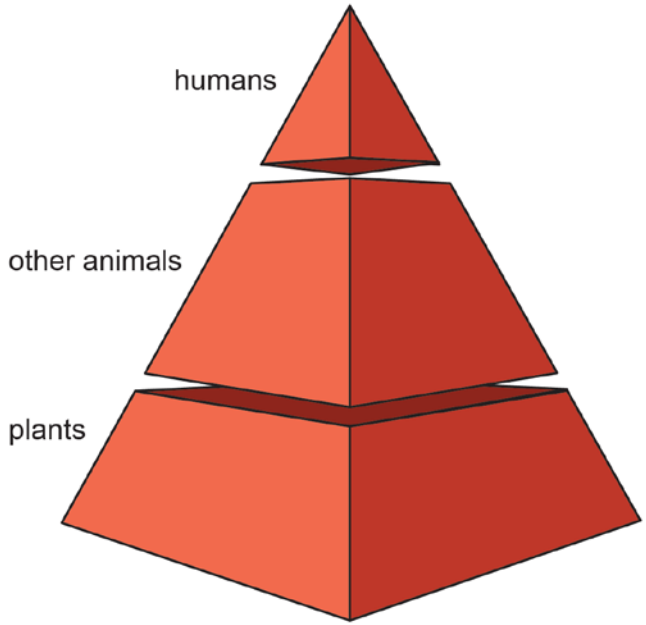
Graph 1. Percentage of Aerobic vs. Anaerobic Energy for Various Exercise Times



Source: Astrand et al., 1977, McGraw Hill.

Athletes often consume carbohydrate-rich sports drinks during a race to help reduce muscle fatigue. An athlete's body may still switch over to anaerobic respiration after long periods of exertion. This most often occurs near the end of a race when athletes sprint toward the finish. This is when athletes are most prone to extreme muscle fatigue and cramping.

Multiple Select
Performance Expectation
7-MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

The energy pyramid diagram shows a model of energy flow to humans.  	Which statements **best** explain how energy from the Sun is transferred to a runner to provide energy for a race? Select the **two** correct answers. A. Runners consume plants after photosynthesis occurs.* B. Runners consume plants before photosynthesis occurs. C. Runners consume animals that have consumed plants.* D. Runners consume animals that have not consumed plants. E. Runners absorb sunlight directly.

Multi-Dimensional Alignment: While effectively applying the science practice of constructing an explanation, the student demonstrates knowledge of the role of photosynthesis and cellular respiration in organisms.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 3 or higher. The student can support an explanation about photosynthesis/cellular respiration in organisms.

Which statements best explain how energy from the Sun is transferred to a runner to provide energy for a race?

Select the two correct answers.

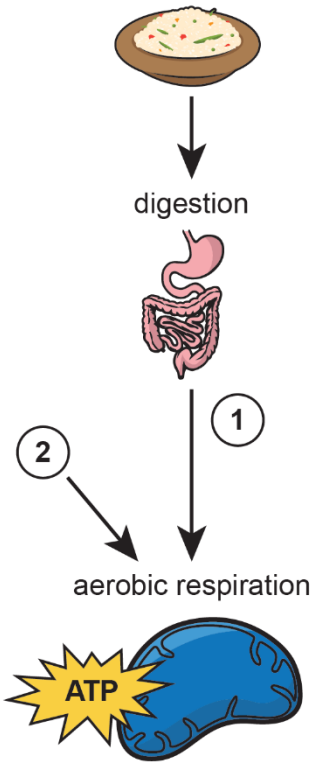
A. Runners consume plants after photosynthesis occurs. *

C. Runners consume animals that have consumed plants. *

Rationales

A. Correct.
B. Photosynthesis is necessary for the plant to produce the sugars a runner needs.
C. Correct.
D. All energy that moves through different trophic levels begins with the Sun.
E. Energy comes from the breakdown of food.

Multiple Choice
Performance Expectation
7-MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

The model shows what happens when a marathon runner eats dinner before a race.  	Which phrase describes the labels that should be added to positions 1 and 2 to **best** complete the model? A. starch for position 1 and carbon dioxide for position 2 B. oxygen for position 1 and carbon dioxide for position 2 C. glucose for position 1 and oxygen for position 2***** D. glucose for position 1 and carbon dioxide for position 2

Multi-Dimensional Alignment: While effectively applying the science practice of developing and using models, the student demonstrates knowledge of how food is rearranged through chemical reactions forming new molecules that support growth.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can use a model to describe how food is rearranged through chemical reactions forming new molecules that support growth.

Which phrase describes the labels that should be added to positions 1 and 2 to best complete the model?

C. glucose for position 1 and oxygen for position 2*

Rationales

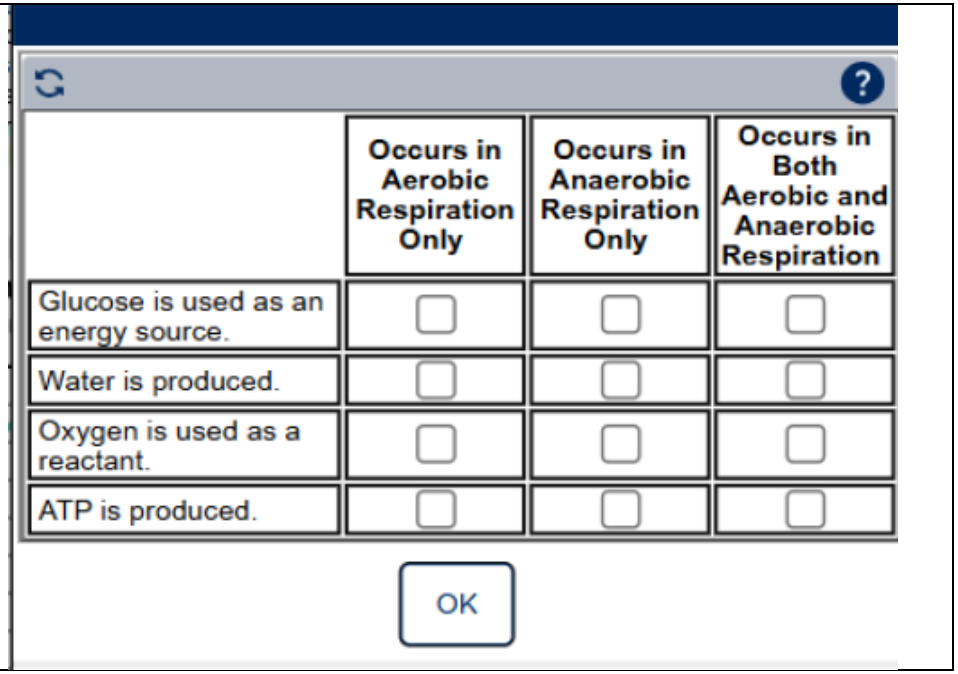
A. Starch is broken down into glucose during digestion.
B. Digestion breaks food down into simple sugar.
C. Correct.
D. Aerobic respiration requires oxygen.

Technology-Enhanced Item
Performance Expectation
7-MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

Use the information in Graph 1 to answer the question.

Select the correct box to indicate whether the energy or matter described occurs in aerobic respiration only, anaerobic respiration only, or in both aerobic and anaerobic respiration.

Select one box per row.



	Occurs in Aerobic Respiration Only	Occurs in Anaerobic Respiration Only	Occurs in Both Aerobic and Anaerobic Respiration
Glucose is used as an energy source.	☐	☐	☐
Water is produced.	☐	☐	☐
Oxygen is used as a reactant.	☐	☐	☐
ATP is produced.	☐	☐	☐

OK

Multi-Dimensional Alignment: While effectively applying the science practice of developing and using a model, the student demonstrates knowledge of how food is rearranged through chemical reactions forming new molecules that support growth.

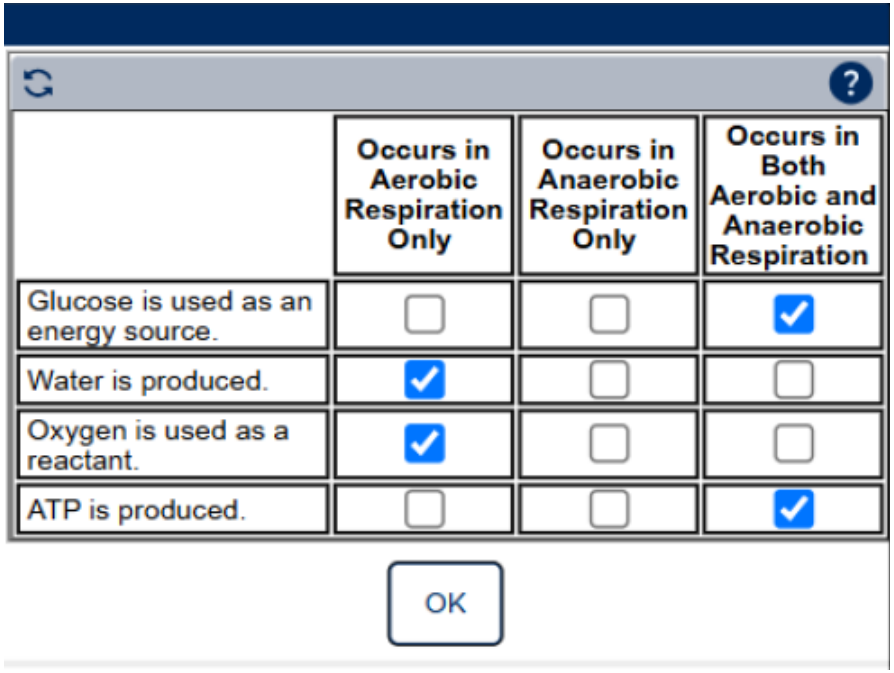
Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 2 or higher. The student can use a model to identify the changes that occur as a result of chemical reactions as food moves through an organism.

Scoring

Use the information in Graph 1 to answer the question.

Select the correct box to indicate whether the energy or matter described occurs in aerobic respiration only, anaerobic respiration only, or in both aerobic and anaerobic respiration.

Select one box per row.



	Occurs in Aerobic Respiration Only	Occurs in Anaerobic Respiration Only	Occurs in Both Aerobic and Anaerobic Respiration
Glucose is used as an energy source.	☐	☐	☑
Water is produced.	☑	☐	☐
Oxygen is used as a reactant.	☑	☐	☐
ATP is produced.	☐	☐	☑

OK

Rationales

Response	Rationale
Occurs in Both Aerobic and Anaerobic Respiration; Occurs in Aerobic Respiration Only; Occurs in Aerobic Respiration Only; Occurs in Both Aerobic and Anaerobic Respiration	Correct.
Occurs in Anaerobic Respiration Only; Occurs in Aerobic Respiration Only; Occurs in Aerobic Respiration Only; Occurs in Both Aerobic and Anaerobic Respiration	Glucose is used in both aerobic and anaerobic respiration.
Occurs in Both Aerobic and Anaerobic Respiration; Occurs in Both Aerobic and Anaerobic Respiration; Occurs in Aerobic Respiration Only; Occurs in Both Aerobic and Anaerobic Respiration	Water is produced only in aerobic respiration.
Occurs in Both Aerobic and Anaerobic Respiration; Occurs in Aerobic Respiration Only; Occurs in Anaerobic Respiration Only; Occurs in Both Aerobic and Anaerobic Respiration	Oxygen is used as a reactant only in aerobic respiration.
Occurs in Both Aerobic and Anaerobic Respiration; Occurs in Aerobic Respiration Only; Occurs in Aerobic Respiration Only; Occurs in Aerobic Respiration only	ATP is produced in both aerobic and anaerobic respiration.

Two-Part Dependent
Performance Expectation
7-MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

The table shows the different foods available to a marathon runner before running a race.

Food	Organic Compounds	Digestion End Products	Rate of Digestion
steak	protein, fat	protein building blocks, fat building blocks	very slow
lettuce	small amounts of carbohydrate and protein	protein building blocks, glucose	fast
pasta	starch, small amounts of protein	protein building blocks, glucose	slow
banana	carbohydrate	glucose	very fast
candy bar	glucose, fat	glucose, fat building blocks	medium

Part A

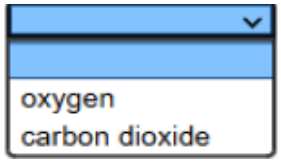
During the first two minutes of the race, the runner's body will use both anaerobic and aerobic processes to release energy from simple sugars. Which food should the athlete consume just before the race starts, for the most easily accessible source of simple sugars?

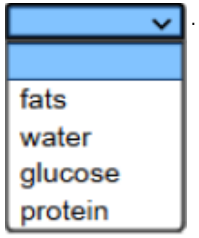
A. steak
B. lettuce
C. pasta
D. banana*

Part B

Select the correct answer from each drop-down menu that **best** supports the answer to in Part A.

The breakdown of simple sugars in the food selected in Part A produces [ ] and [ ].





Multi-Dimensional Alignment: The item requires the student to apply knowledge of the changes that occur as food is rearranged through chemical reactions forming new molecules to demonstrate an understanding of energy and matter.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism.

Scoring

Part A

During the first two minutes of the race, the runner's body will use both anaerobic and aerobic processes to release energy from simple sugars. Which food should the athlete consume just before the race starts, for the most easily accessible source of simple sugars?

D. banana*

Part B

The breakdown of simple sugars in the food selected in Part A produces [carbon dioxide] and [water].

Rationales

Part A

A. Steak has very few carbohydrates that would be broken down into glucose.
B. Lettuce has less glucose than bananas.
C. Pasta has starch which needs to be broken down into glucose, slowing the rate of digestion.
D. Correct.

Part B

Response	Rationale
carbon dioxide; water	Correct.
carbon dioxide; fats	The organic compound of banana is primarily carbohydrates that break down into glucose.
oxygen; glucose	The breakdown of glucose produces carbon dioxide.
oxygen; protein	The organic compound of banana is primarily carbohydrates that break down into glucose.

Extended Response
Performance Expectation
7-MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

As you respond to Part A, Part B, and Part C, follow the directions below.

- Address all of the instructions in each prompt.
- Use evidence from the information provided and your own knowledge of science to support your responses.

Part A

Marathon runners regularly eat foods that are rich in complex carbohydrates. Explain why runners include these foods in their diets.

In your answer:

- Identify the product that is formed from the complex carbohydrates that provides energy for the body.
- Describe how this product provides energy for the body.
- Describe how athletes use this energy during a race.

Part B

Use the information in Graph 1 to answer the question.

Describe how an athlete's body uses the energy stored by the body 30 minutes into a race.

In your answer:

- Identify the main type of respiration used by the athlete's muscles 30 minutes into the race.
- Identify one piece of evidence that helps identify the main type of respiration used by the athlete's muscles.
- Describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Part C

To have an opportunity to win a race, runners regularly need to sprint at the end of a race. When sprinting, the runners' bodies switch from aerobic respiration to anaerobic respiration. Explain the cause of the switch from aerobic to anaerobic respiration as the runners sprint. Be sure to explain how this switch in type of respiration affects the energy level of the runner.

In your answer:

- Explain what causes the switch from aerobic to anaerobic respiration when the runner is sprinting.
- Describe how the type of respiration affects the amount of energy produced for the muscle cells.
- Describe how the amount of energy produced for the muscle cells affects the performance level of the runner.

Multi-Dimensional Alignment: The item requires the student to apply the science and engineering practices of developing and/or using a model and knowledge of how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy to demonstrate an understanding of energy and matter.

Achievement Level Descriptor: Students who answer this item correctly are performing at a level of 4 or higher. The student can develop and/or complete a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism.

Part A

Marathon runners regularly eat foods that are rich in complex carbohydrates. Explain why runners include these foods in their diets.

In your answer:

- Identify the product that is formed from the complex carbohydrates that provides energy for the body.
- Describe how this product provides energy for the body.
- Describe how athletes use this energy during a race.

Part B

Use the information in Graph 1 to answer the question.

Describe how an athlete's body uses the energy stored by the body 30 minutes into a race.

In your answer:

- Identify the main type of respiration used by the athlete's muscles 30 minutes into the race.
- Identify one piece of evidence that helps identify the main type of respiration used by the athlete's muscles.
- Describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Part C

To have an opportunity to win a race, runners regularly need to sprint at the end of a race. When sprinting, the runners' bodies switch from aerobic respiration to anaerobic respiration. Explain the cause of the switch from aerobic to anaerobic respiration as the runners sprint. Be sure to explain how this switch in type of respiration affects the energy level of the runner.

In your answer:

- Explain what causes the switch from aerobic to anaerobic respiration when the runner is sprinting.
- Describe how the type of respiration affects the amount of energy produced for the muscle cells.
- Describe how the amount of energy produced for the muscle cells affects the performance level of the runner.

Score Points

PART A (0–3 points maximum)

- 1 point for correctly identifying the product that is formed from the complex carbohydrates that provides energy for the body
- 1 point for correctly describing how the product provides energy for the body
- 1 point for correctly describing how athletes use this energy during a race

PART B (0–3 points maximum)

- 1 point for correctly identifying the main type of respiration used by the athlete's muscles 30 minutes into the race
- 1 point for correctly identifying one piece of evidence that helps identify the main type of respiration used by the athlete's muscles
- 1 point for correctly describing one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race

PART C (0–3 points maximum)

- 1 point for correctly explaining what causes the switch from aerobic to anaerobic respiration when the runner is sprinting
- 1 point for correctly describing how the type of respiration affects the amount of energy produced for the muscle cells
- 1 point for correctly describing how the amount of energy produced for the muscle cells affects the performance level of a runner

Score Information

Scoring Notes	Examples
Part A	
Identification of the product that is formed from the complex carbohydrates that provides energy for the body (1 point)	• Glucose is the product formed from breaking down complex carbohydrates that provides energy for the body.
Description of how the product provides energy for the body (1 point)	• Glucose molecules will be broken down further through respiration to release energy stored in the molecules.
Description of how athletes use this energy during a race (1 point)	• Energy released from the glucose will be used to power muscles to move.

Scoring Notes	Examples
Part B	
Identification of the main type of respiration used by the athlete's muscles 30 minutes into the race (1 point)	• The muscles are using aerobic (with oxygen) respiration 30 minutes into the race.
Identification of one piece of evidence that helps identify the main type of respiration used by the athlete's muscles (1 point)	• About 95% of the energy comes from aerobic respiration 30 minutes into the race.
Description of one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race (1 point)	• Aerobic respiration uses oxygen and/or produces carbon dioxide, and anerobic respiration does not use oxygen and/or does not produce carbon dioxide.

Scoring Notes	Examples
Part C	
Explanation of the cause of the respiration switch (1 point)	• A decrease in oxygen level causes a change from aerobic respiration to anaerobic respiration.
Description of how the type of respiration affects the amount of energy produced for the muscle cells (1 point)	• The change to anaerobic respiration results in a decrease in the amount of energy produced in the muscles.
Description of how the amount of energy produced for the muscle cells affects the performance level of a runner (1 point)	• Less available energy decreases the performance level of the runner.

Accept other reasonable answers.

Student Responses (ER)

Part A
Marathon runners regularly eat foods that are rich in complex carbohydrates. Explain why runners include these foods in their diets.

In your answer:
- Identify the product that is formed from the complex carbohydrates that provides energy for the body.
- Describe how this product provides energy for the body.
- Describe how athletes use this energy during a race.

Response 1

Runners regularly eat foods that are rich in complex carbohydrates because they need large amounts of energy. As it says in the source, “Carbohydrate-rich foods contain many molecules that the body can store as energy sources for muscle cells to reduce this fatigue.” When complex carbohydrates are broken down, glucose is produced. Glucose is then used in aerobic respiration alongside oxygen to create ATP energy. ATP energy is what powers the body and gives it energy. Athletes use this energy to power their muscles and combat their muscle fatigue. This is why runners eat a lot of carbohydrate rich foods

Score: 3
This response earns a 3. It accurately identifies the product that is formed from the complex carbohydrates that provides energy for the body — “When complex carbohydrates are broken down, glucose is produced” — and it accurately describes how this product provides energy for the body: “Glucose is then used in aerobic respiration alongside oxygen to create ATP energy.” The response accurately describes how athletes use this energy during a race: “Athletes use this energy to power their muscles and combat their muscle fatigue."

Response 2

Athletes usually high carbohydrate meals before races because they contain starch which gets broken down into glucose, and is used in a process called cellular respiration which is a chemical reaction that releases energy allowing for athletes to run faster. My evidence is my knowledge that starch breaks down into glucose and combines with oxygen in a chemical reaction called cellular respiration to make energy. This proves that if a athlete eats more starch before a race they will run better. In conclusion athletes eat high carbohydrate meals before a race so that they can be able to run better.

Score: 2

This response earns a 2. It accurately identifies the product that is formed from the complex carbohydrates that provides energy for the body — "Athletes usually high carbohydrate meals before races because they contain starch which gets broken down into glucose" — and it accurately describes how this product provides energy for the body: "and is used in a process called cellular respiration which is a chemical reaction that releases energy allowing for the athletes to run faster." The response does not accurately describe how athletes use this energy during a race.

Response 3

Runners include these foods in their diets because to reduce muscle fatigue and cramping. They don't want to have cramps or have bad muscles while they are running because that can affect them. The product that is formed from the complex carbohydrates that provides energy for the body energy sources for mucles. This product provides energy for the body because it gives the muscles energy so they will be able to move when they are running and to prevent anything bad from happening to the mucles while they are running. The athletes use this energy by always running not stopping. They also night use this energy to breathe. They breathe while they are running to get rid of the bad air and to get oxygen for their body. Thus proving, runners include rich complex carbohydrates in their diet before a race because they want to provide energy for their muscles and they don't want to cramp or have their muscles hurt while they are running.

Score: 1

This response earns a 1. It does not accurately identify the product that is formed from the complex carbohydrates that provides energy for the body, and does not accurately describe how the product provides energy for the body. The response accurately describes how athletes use this energy during a race: "Thus proving, runners include rich complex carbohydrates in their diets before a race because they want to provide energy for their muscles and they don't want to cramp or have their muscles hurt while they are running."

Response 4

They include these foods int their diets because of the nutrients. This product give senergy because it is healthy and it is also sweet. Athletes use this energy during a race by running.

Score: 0

This response earns a 0. It does not accurately identify the product that is formed from the complex carbohydrates that provides energy for the body. It does not accurately describe how the product provides energy for the body. It does not accurately describe how athletes use this energy during a race.

Part B
Use the information in Graph 1 to answer the question.

Describe how an athlete's body uses the energy stored by the body 30 minutes into a race.

In your answer:

- Identify the main type of respiration used by the athlete's muscles 30 minutes into the race.
- Identify one piece of evidence that helps identify the main type of respiration used by the athlete's muscles.
- Describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Response 1

The athlete uses the energy 30 minutes into the race using areaboic respiration and one difference between that and anaerobic respiration the type used at the beginning of the race is that aerobic means oxygen and anaerobic means little to no oxygen. My evidence is that the graph shows where it starts off as anaerobic respiration but that decreases while aerobic respiration increases. This proves they used anaerobic respiration first then slowly stopped and started using arerobic respiration as the race went on. In conclusion the types of respiration an athlete uses throughout a race is always changing.

Score: 3
This response earns a 3. It accurately identifies that the main type of respiration used by the athlete's muscles 30 minutes into the race is aerobic respiration: "The athlete uses the energy 30 minutes into the race using areaboic respiration" and accurately identifies one piece of evidence that helps identify the main type of respiration used by the athlete's muscles: "My evidence is that the graph shows where it starts off as anaerobic respiration but that decreases while aerobic respiration increases." The response accurately describes one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race: "one difference between that and anaerobic respiration the type used at the beginning of the race is that aerobic means oxygen and anaerobic means little to no oxygen."

Response 2

An athlete mainly uses aerobic respiration 30 minutes in a race. In the graph the aerobic has a higher percentage of total energy at the 30 minute mark. One difference between the reactions that occurs in the beginning and the end is, in the beginning the athlete is using anaerobic and at the end its using aerobic.

Score: 2
This response earns a 2. It accurately identifies that the main type of respiration used by the athlete's muscles 30 minutes into the race is aerobic respiration: "An athlete mainly uses aerobic respiration 30 minutes in a race" and accurately identifies one piece of evidence that helps identify the main type of respiration used by the athlete's muscles: "In the graph the aerobic has a higher percentage of total energy at the 30 minute mark." The response does not accurately describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Response 3

If a athlete's body uses energy stored by the body, then that would be aerobic respiration because even at 30+ the energy keeps rising. The difference between anaerobic and aerobic is that anaerobic gives up half way through the race, but aerobic stays with you.

Score: 1

This response earns a 1. It accurately identifies that the main type of respiration used by the athlete's muscles 30 minutes into the race is aerobic respiration:"If a athlete's body uses energy stored by the body, then that would be aerobic respiration because even at 30+ the energy keeps rising" but does not accurately identify one piece of evidence that helps identify the main type of respiration used by the athlete's muscles. The response does not accurately describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Response 4

An athleta's body uses energy stored by the body is when the body need more energy it take some of rhe stored energy form the plants it eat from before it started racing.it uses aerobic and anerbic.

Score: 0

This response earns a 0. It does not accurately identify that the main type of respiration used by the athlete's muscles 30 minutes into the race is aerobic respiration. The response does not accurately identify one piece of evidence that helps identify the main type of respiration used by the athlete's muscles. The response does not accurately describe one difference between the reaction that occurs during the type of respiration identified and the reaction that occurs during the type of respiration the body uses at the beginning of the race.

Part C

To have an opportunity to win a race, runners regularly need to sprint at the end of a race. When sprinting, the runners' bodies switch from aerobic respiration to anaerobic respiration. Explain the cause of the switch from aerobic to anaerobic respiration as the runners sprint. Be sure to explain how this switch in type of respiration affects the energy level of the runner.

In your answer:

- Explain what causes the switch from aerobic to anaerobic respiration when the runner is sprinting.
- Describe how the type of respiration affects the amount of energy produced for the muscle cells.
- Describe how the amount of energy produced for the muscle cells affects the performance level of the runner.

Response 1

The switch from aerobic to anaerobic repiration happends when a runner is sprinting. When the runner first starts they have enough oxygen but as they excelerate they begin to get less oxygen causing their breathing to switch from aerobic to anaerobic.

This type of respiratiom affects the amount of energy produced for muscle cells by decreasing the amount of energy produced.

The amount of energy produced affects the preformed level because the less energy the worse the performance level of the runner.

Score: 3

This response earns a 3. It accurately explains what causes the switch from aerobic to anaerobic respiration when the runner is sprinting — "The switch from aerobic to anaerobic repiration happends when a runner is sprinting. When the runner first starts they have enough oxygen but as they excelerate they begin to get less oxygen causing their breathing to switch from aerobic to anaerobic" and accurately describes how the type of respiration affects the amount of energy produced for the muscle cells: "This type of respiratiom affects the amount of energy produced for muscle cells by decreasing the amount of energy produced." The response accurately describes how the amount of energy produced for the muscle cells affects the performance level of the runner: "The amount of energy produced affects the preformed level because the less energy the worse the performance level of the runner."

Response 2

The cause of the switch from aerobic to anaerobic repiration when the runner is sprinting is after long periods of exertion. Most often occurs near the end of a race when atlete sprint towards the finish. The type of respiration affects the amount of energy being produced for the muscle cells because when ever its at anaerobic it produces less energy and when it at aerobic is produces more energy. The amount of energy produced for the muscle cells affects the performance level of the runner, because if less energy is produced the runner is going to get tired easily.

Score: 2

This response earns a 2. It does not accurately explain what causes the switch from aerobic to anaerobic respiration when the runner is sprinting. The response accurately describes how the type of respiration affects the amount of energy produced for the muscle cells: "The type of respiration affects the amount of energy being produced for the muscle cells because when ever its at anaerobic it produces less energy and when it at aerobic is produces more energy." The response also accurately describes how the amount of energy produced for the muscle cells affects the performance level of the runner: "The amount of energy produced for the muscle cells affects the performance level of the runner, because if less energy is produced the runner is going to get tired easily."

Response 3

The cause of the switch from aerobic and anaerobic respiration when the runner is sprinting is because of long periods of exertion and low oxygen. The type of respiration affects the amount of energy produced for the muscle cells because aerobic respiration is to gain energy and anaerobic respiration is to restore the energy that was used. The amount of energy produced for the muscle cells affects the performance level of the runner because it depends on how much energy the runner has had.

Score: 1

This response earns a 1. It accurately explains what causes the switch from anerobic respiration when the runner is sprinting: "The cause of the switch from aerobic and anaerobic respiration when the runner is sprinting is because of long periods of exertion and low oxygen." It does not accurately describe how the type of respiration affects the amount of energy produced for the muscle cells. The response does not accurately describe how the amount of energy produced for the muscle cells affects the performance level of the runner.

Response 4

It can switch on them because they are using every last bit of energy to finish the race. It is most prone to switch over when close to the end because the runner is getting sports drinks that are giving them energy during the race and tge body uses that energy that the drink gave the body so the body has to find more energy so that the runner can finish the race and that's when they can get cramps and stuff because the they are pushing the bady to finish.

Score: 0

This response earns a 0. It does not accurately explain what causes the switch from anerobic respiration when the runner is sprinting. It does not accurately describe how the type of respiration affects the amount of energy produced for the muscle cells. The response also does not accurately describe how the amount of energy produced for the muscle cells affects the performance level of the runner.

Resources

Contact the LDOE

- assessment@la.gov for assessment questions
- STEM@la.gov for instructional or curriculum implementation support
- AskLDOE for general questions
- ldoecommunications@la.gov to subscribe to newsletters; include the newsletter(s) you want to subscribe to in your email

Updates Log

The table below lists any updates made to this document after the original posting date.

Available	Description of Updates
July 2025	Document original posting.
November 2025	Added on page 24 that ERs will be reduced to 6 points beginning in 2025-2026

Email assessment@la.gov with any questions or comments about this released item guide.