



Mississippi Academic Assessment Program (MAAP)

**Science
Grade
5**

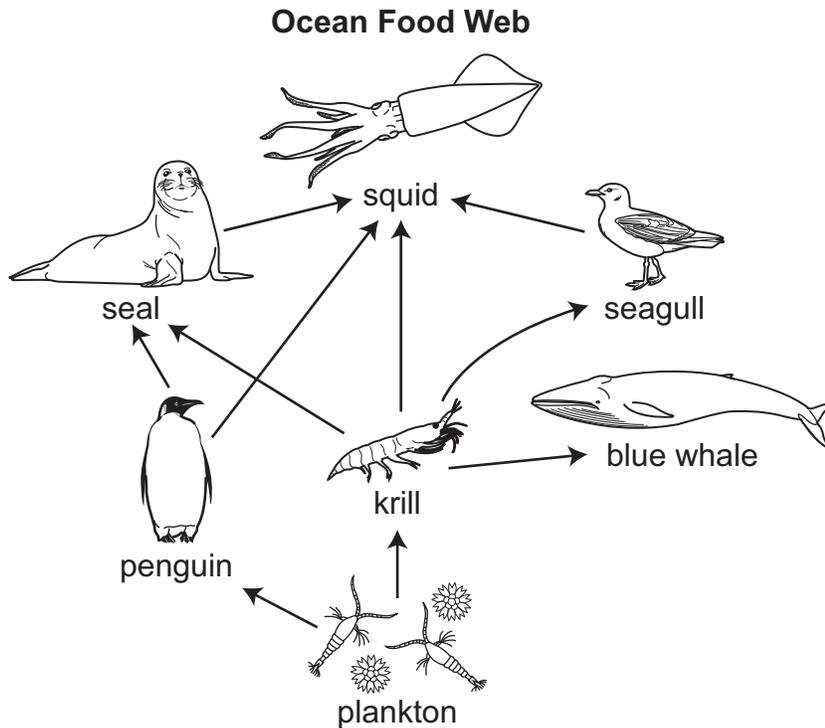
PRACTICE TEST

The Science Grade 5 Practice Test is a useful tool for Mississippi educators to use in preparing students for the format of the Mississippi Academic Assessment Program for Science. The items were written and aligned to the 2018 Mississippi College- and Career-Readiness Standards for Science.

This document contains 25 Science grade 5 items.

1. Individuals and communities must work together to conserve Earth's natural resources. Which **two** statements describe how Earth's natural resources can be conserved?
- A. Build more landfills for trash.
 - B. Bury used motor oil in the ground.
 - C. Carpool with friends to school activities.
 - D. Drink bottled water instead of using tap water.
 - E. Convert food waste into garden soil with a compost bin.

2. The diagram shows part of an ocean food web.



Data show that the sizes of krill populations in oceans around the world are decreasing. The populations are decreasing due to effects of climate change and overfishing.

A student wants to explain how penguin populations are affected by decreasing krill populations.

Which **two** pathways show the **most likely** effects on penguin populations as krill populations decrease?

- A. fewer krill → more seals → more penguins
- B. fewer krill → fewer seals → fewer penguins
- C. fewer krill → fewer squid → fewer penguins
- D. fewer krill → fewer squid → more penguins
- E. fewer krill → more plankton → more penguins
- F. fewer krill → more plankton → fewer penguins

3. A train is moving west. The force of the engines is reduced by half. Which statement **best** describes how the motion of the train will change?
- A. The train will stop moving, and its potential energy will increase.
 - B. The train will begin moving east, and its potential energy will decrease.
 - C. The train will continue to move west, and its kinetic energy will increase.
 - D. The train will continue to move west, and its kinetic energy will decrease.

4. In some parts of the United States, snow and ice often make roads slippery and unsafe to travel on during the winter months. Which statement **best** describes a way to reduce the impact of slippery road conditions for vehicles traveling during the winter months?
- A. Make sure drivers on the roads wear their safety belts.
 - B. Ask people to stay off the roads until all the snow and ice melts.
 - C. Use trucks that push snow away and drop sand on the roads to increase friction.
 - D. Wait until the ice is thickest and have city trucks spray water on the roads to reduce friction.

5. Students observed three unknown solid materials. The students conducted three of their four planned investigations to identify the unknown materials.

Investigation Observations

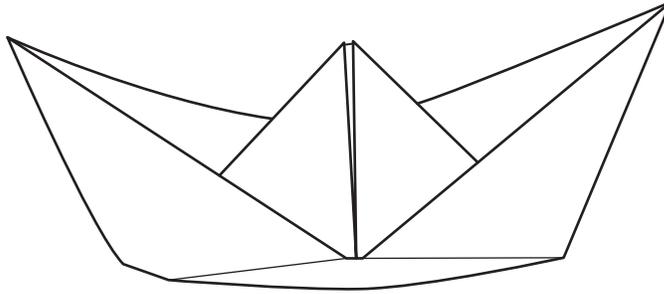
Observation	Unknown Material 1	Unknown Material 2	Unknown Material 3
color	gray and black	yellow	white
is magnetic?	yes	no	no
reacts with vinegar?	no	no	yes
mass	?	?	?

Based on the data collected, which statement **best** describes one of the unknown materials?

- A. Unknown material 2 must be a compound because it is yellow.
- B. Unknown material 1 must be a metal because it was attracted to the magnet.
- C. Unknown material 1 must have the greatest mass because it is gray and black.
- D. Unknown material 3 must be baking soda because it did not react with the vinegar.

6. The drawing shows a boat design that a student made by folding a piece of paper.

Paper Boat



The student is asked to use the paper boat to transport a metal weight across a pool. The paper boat sinks when the weight is added. Which statement describes the **best** solution to this problem?

- A. Make the boat out of a denser material.
- B. Fold a new paper boat so that the middle is taller.
- C. Use a different color paper to make the paper boat.
- D. Make a new boat with a wider bottom and taller sides.

7. A student is making a solar system model. Circle the **two** objects in the solar system model that should be the largest.

Earth

Jupiter

Mars

Mercury

Neptune

Saturn

Sun

Uranus

Venus

8. Star magnitude is a measure of how bright stars appear from Earth. The brighter a star appears from Earth, the lower its magnitude number.

Star Magnitude

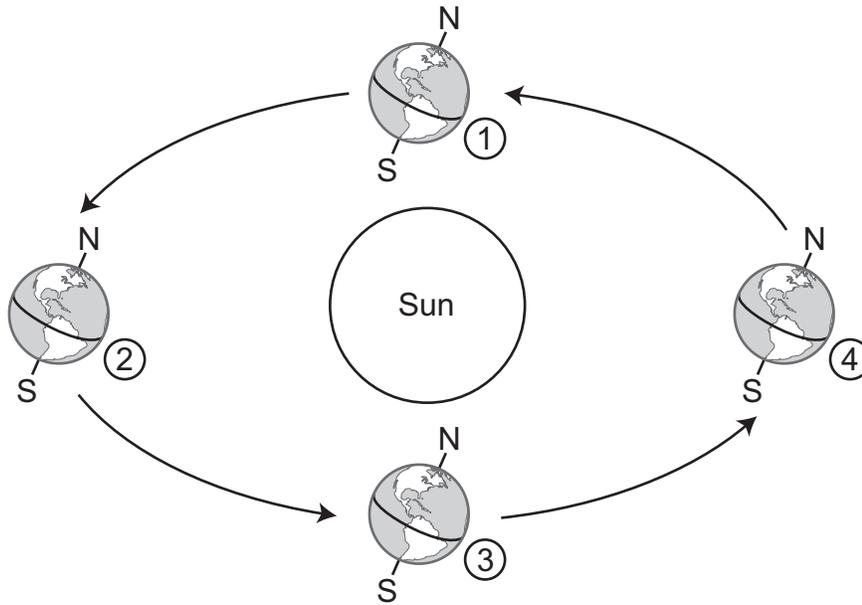
Magnitude	Star Type
-26	Sun
1	bright
3	average
5	dim

Which statement **best** explains why the Sun's magnitude is so much different than that of an average star?

- A. The Sun is hotter than an average star.
- B. The Sun is larger than an average star.
- C. The Sun is closer to Earth than an average star.
- D. The Sun has stronger gravity than an average star.

9. The model represents Earth as it orbits the Sun.

Locations of Earth around the Sun

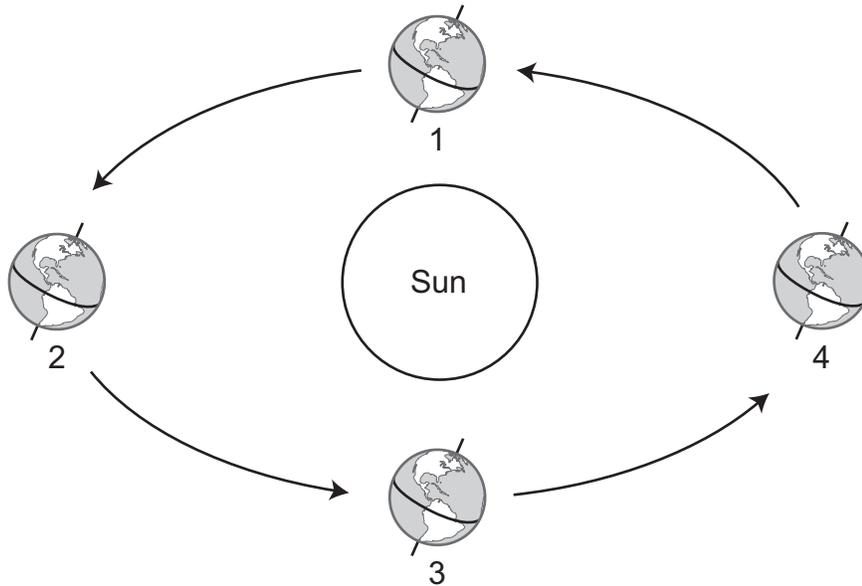


Record the number of the location that represents winter in the Northern Hemisphere.

Location: _____

10. The model shows Earth at four different times of year.

Locations of Earth around the Sun



Part A: Record the number of the position that represents when the Southern Hemisphere experiences the shortest days and longest nights.

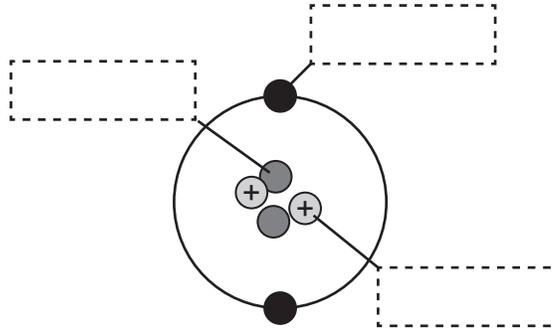
Part B: Circle a word or phrase in each set of parentheses to **best** explain why the Southern Hemisphere experiences the season identified in Part A.

The Southern Hemisphere is tilted (toward / away from) the Sun, and the Sun is (higher / lower) in the sky. This causes temperatures to be (cooler / warmer) than in the Northern Hemisphere.

11. The diagram shows a unit of matter.

Record the number of each label in the correct location to **best** complete the diagram.

Unit of Matter



proton

①

electron

②

neutron

③

12. A student made observations of two different mixtures. The data table compares the observations of each mixture before and after the materials were combined.

Mixture Observations

Characteristic	Mixture 1: Water and Sugar	Mixture 2: Iron and Sand
mass (g), separately	water: 100 g; sugar: 15 g	sand: 105 g; iron filings: 10 g
mass (g), combined	water and sugar: 115 g	sand and iron filings: 115 g
color, separately	water: transparent; sugar: white	sand: light brown; iron filings: dark gray
color, combined	water and sugar: transparent	sand and iron filings: light brown and dark gray
physical state, separately	water: liquid; sugar: solid	sand: solid; iron filings: solid
physical state, combined	water and sugar: liquid	sand and iron filings: solid

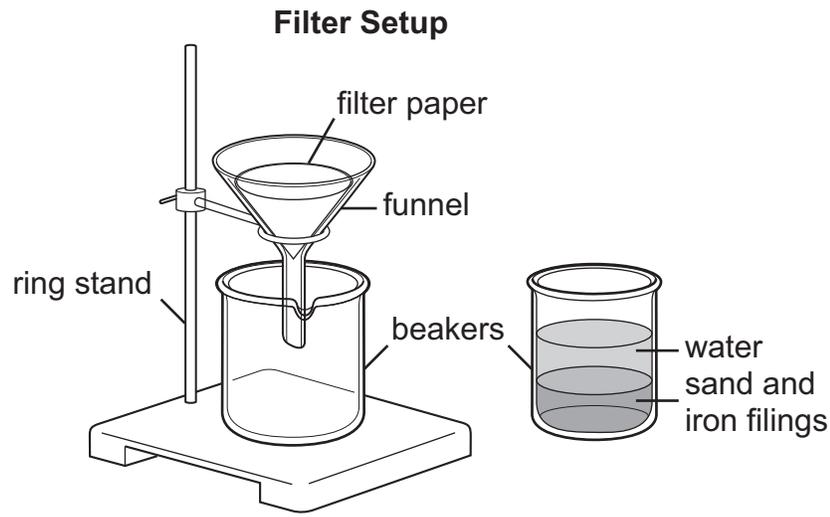
Part A: Circle a word or phrase in each set of parentheses to **best** describe the observations of the two mixtures.

The color of the materials in (Mixture 1 / Mixture 2 / neither mixture / both mixtures) changed after mixing. The physical states of the materials in (Mixture 1 / Mixture 2 / neither mixture / both mixtures) changed after mixing.

Part B: The student would like to mix 90 g of sugar with 25 g of salt. Record the mixture number from the investigation that will **most likely** match the physical state of this new mixture.

Mixture _____

13. A student uses the engineering design process to separate a mixture containing sand, iron filings, and water. A filter setup was constructed as shown below.



The student's notes show that the filter setup separated the mixture into two parts, solid and liquid. Which action is **most likely** the next step to follow in the engineering design process?

- A. research the problem with a new mixture
- B. communicate the results to other students
- C. retest the procedure using a new paper filter
- D. design another process to separate the remaining mixture

14. Students used a hot plate to heat a hard substance in a bowl. The students made observations before and after the substance was heated.

Observations

	Mass (g)	Volume (cm³)	Shape
before heating	43	38	rigid, rectangle
after heating	43	38	soft, round (filled the shape of bowl base)

Circle a word or phrase in each set of parentheses to **best** describe the changes to the substance.

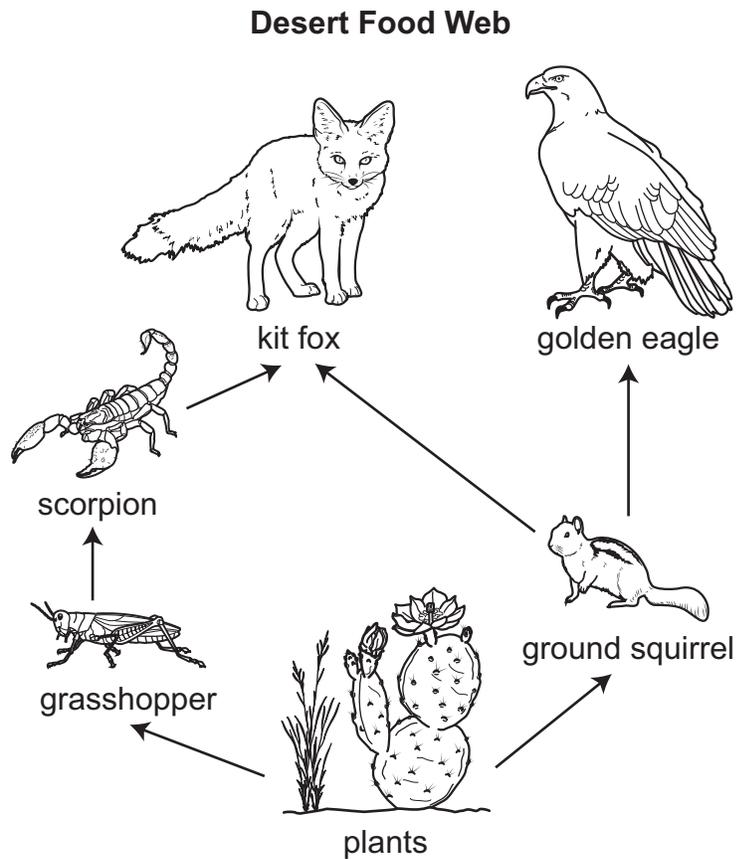
The substance changed from a (solid / liquid / gas) to a (solid / liquid / gas) because the substance (absorbed energy / released energy / mixed with the air).

15. Circle a word in each set of parentheses to correctly describe photosynthesis.

A plant uses (chemical / physical / light) energy from the Sun and converts it into

(chemical / physical / thermal) energy for the plant.

16. A desert food web is shown.



Which type of organism is missing and should be added to the food web?

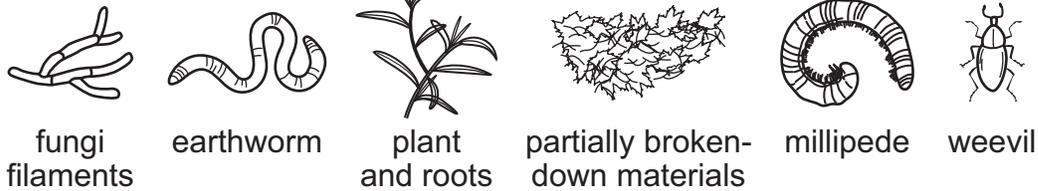
- A. consumers
- B. decomposers
- C. predators
- D. producers

Use the scenario to answer the next two questions.

A Soil Ecosystem

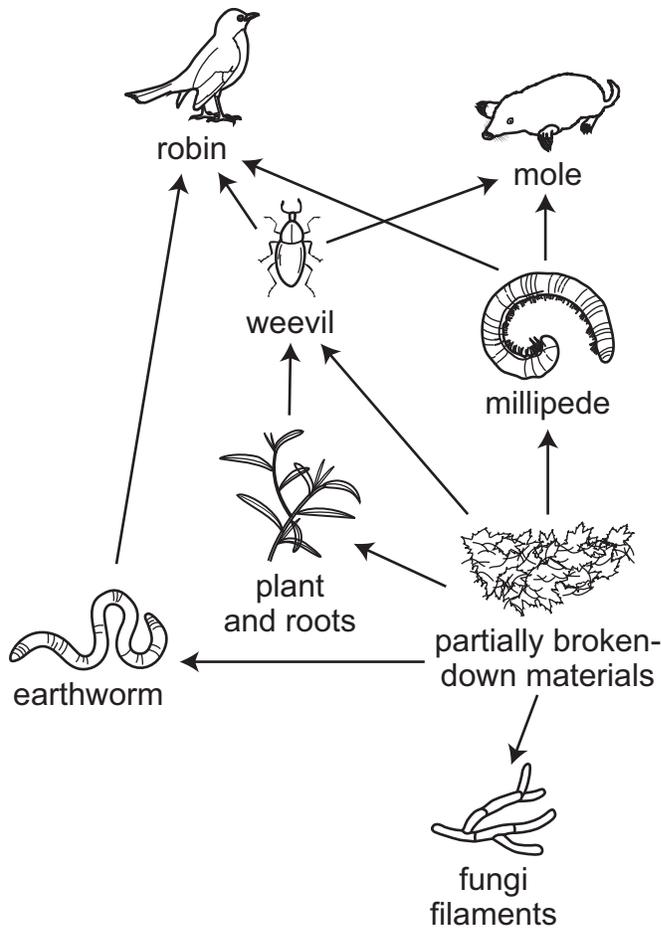
A student collected a sample of soil from a garden. The student made drawings of several organisms observed in the soil.

Student Soil Observations



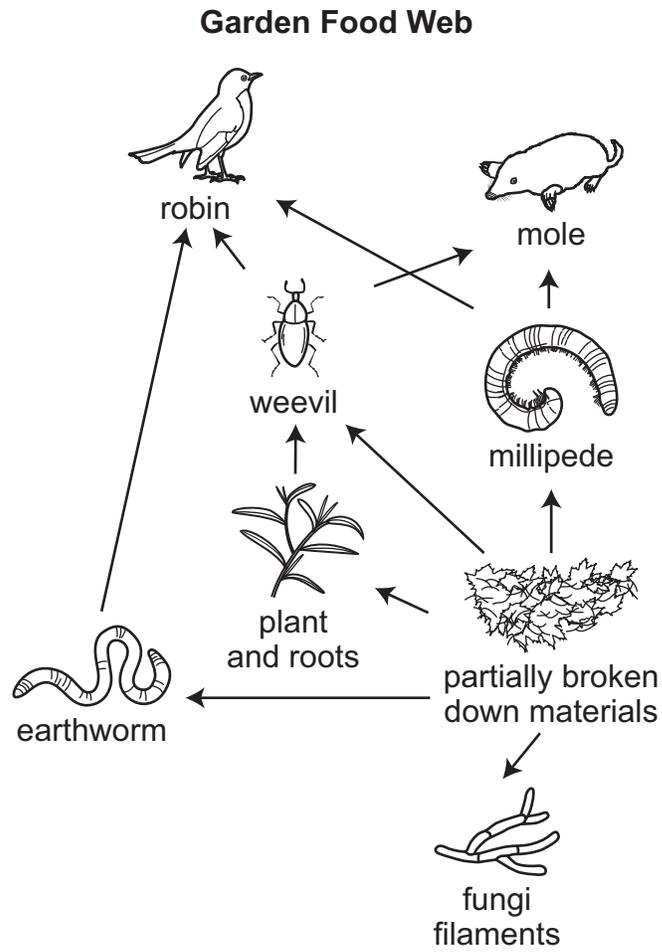
The student created a food web to show the connections between the organisms and other garden organisms.

Garden Food Web



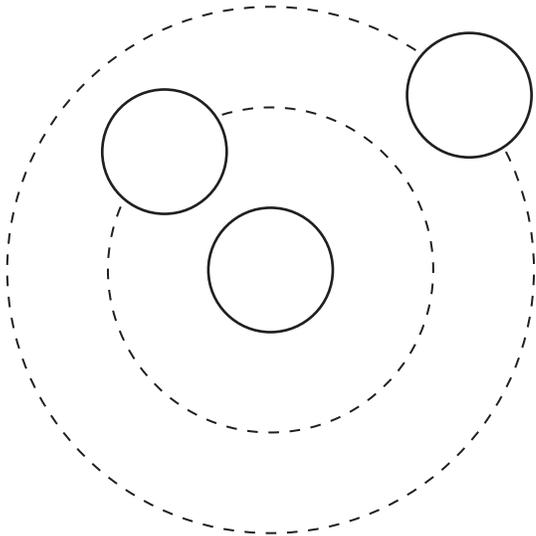
17. Plants need several inputs to make food for energy. Which input does a plant **most likely** get from the soil?
- A. carbon
 - B. carbon dioxide
 - C. oxygen
 - D. water

18. Circle the **two** organisms in the food web that would be **most** negatively affected by a decrease in the amount of insect species.

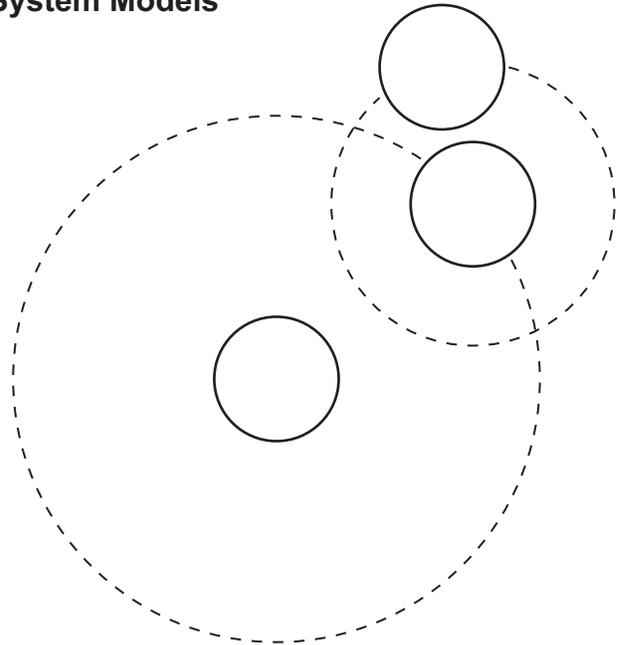


19. A student is comparing the solar system models described by Ptolemy and Copernicus.
Record the number of each label in the circles to correctly complete each model.

Comparison of Solar System Models



Ptolemy's model



Copernicus's model

Earth

①

Sun

②

Moon

③

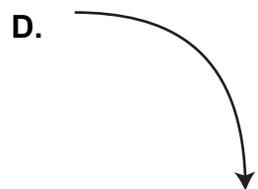
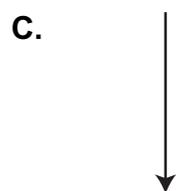
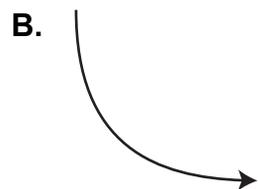
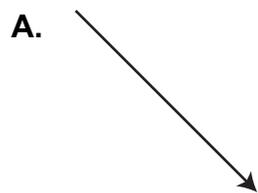
20. Students are designing a solution to stop soil from washing away from a stream bank. Which step should the students **most likely** complete first?
- A. brainstorm ideas
 - B. tell others the plan
 - C. research the issue
 - D. test different solutions

21. Some plants can live in deeper parts of the ocean where less sunlight is able to reach. Sunlight contains a mixture of all light colors—red, orange, yellow, green, blue, indigo, and violet. These colors of light are important for plants to perform photosynthesis. Red, orange, and yellow light are unable to reach deep in the water.

Which statement **best** explains how deep ocean plants perform photosynthesis?

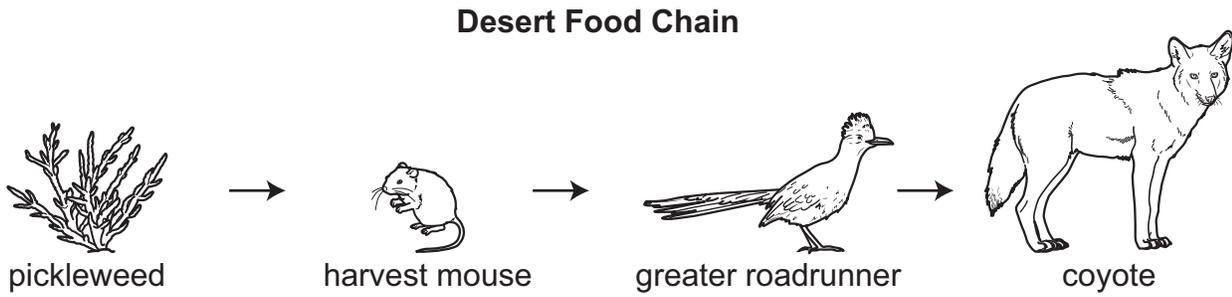
- A. Deep ocean plants absorb blue and green light colors to perform photosynthesis.
- B. Ocean animals breathe out carbon dioxide that deep ocean plants use to perform photosynthesis.
- C. Deep ocean plants move to the surface during the day to capture light and perform photosynthesis.
- D. Ocean animals move around and carry nutrients to the ocean bottom for plants to perform photosynthesis.

22. Which arrow **best** represents gravity's effect on a falling object?



23. Ocean explorers of the past used different methods than modern ocean explorers to navigate long distances. The explorers took careful measurements of their surroundings and recorded them in logbooks. Which measurement **best** helped these ocean explorers navigate long distances?
- A. wind direction changes
 - B. air temperature changes
 - C. changes in the locations of stars
 - D. changes in the apparent size of the Sun

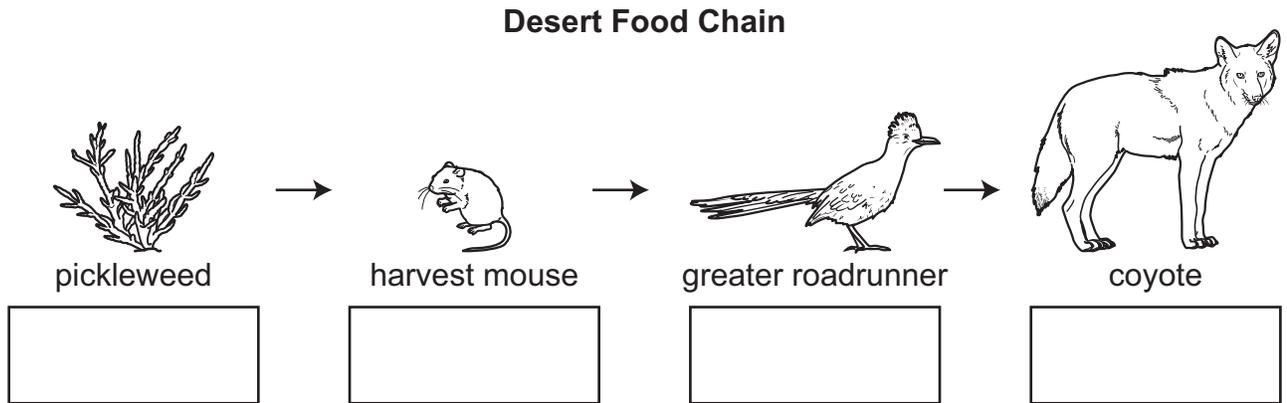
24. Greater roadrunners are birds that live in desert ecosystems. A food chain with the greater roadrunner is shown.



Part A: Based on the food chain, which statement **best** describes the relationship between the pickleweed and the greater roadrunner?

- A. Roadrunners are decomposers that consume dead pickleweed plants.
- B. Roadrunners are primary consumers that consume the pickleweed plant.
- C. Roadrunners are producers that use sunlight to make energy near pickleweed plants.
- D. Roadrunners are secondary consumers that consume animals that consume the pickleweed plant.

Part B: Drag the labels into the boxes in the food chain to correctly identify the roles of the organisms.



tertiary consumer

(A)

primary consumer

(B)

decomposer

(C)

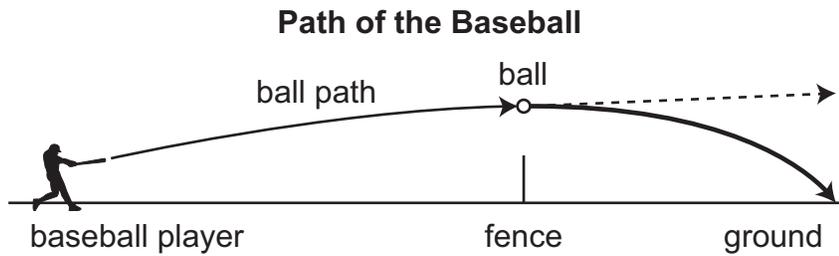
secondary consumer

(D)

producer

(E)

25. Two students watch a baseball player hit a ball over a fence. The diagram shows the path of the baseball after it is hit by the baseball player. Each student makes a prediction about the motion of the ball after it passes the fence.



Key	
—	student 1 predicted path
- - - -	student 2 predicted path

Student 1 predicts that the ball will slow down and fall to the ground before it stops moving. Student 2 predicts that the ball will continue at the same speed until it hits another object and stops moving.

Which statement **best** explains which student's prediction about the motion of the ball is correct?

- A. Student 1's prediction is correct because the ball loses speed before Earth's gravity pulls it downward.
- B. Student 2's prediction is correct because the ball travels fast enough to overcome Earth's gravity.
- C. Student 1's prediction is correct because the ball loses speed before gaining mass and falling to the ground.
- D. Student 2's prediction is correct because the ball stays in motion until it hits another object and falls to the ground.

**Mississippi Academic Assessment Program
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Practice Test**

The information for each item, including the performance objective, DOK level, item type, and correct answer, is located in this document. The items appear in the order as shown in the table.

Note: The item types are representative of items that will appear in administrations starting in Spring 2021.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	(E.5.10.1) Collect and organize scientific ideas that individuals and communities can use to conserve Earth's natural resources and systems (e.g., implementing watershed management practices to conserve water resources, utilizing no-till farming to improve soil fertility, reducing emissions to abate air pollution, or recycling to reduce landfill waste).	2	Multiple Choice	C,E
2	(L.5.3B.3) Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	3	Multiple Choice	D,E
3	(P.5.6.5) Predict how a change of force, mass, and/or friction affects the motion of an object to convert potential energy into kinetic energy.	2	Multiple Choice	D
4	(P.5.6.6) Design a system to increase the effects of friction on the motion of an object (e.g., non-slip surfaces or vehicle braking systems or flaps on aircraft wings). Use an engineering design process to define the problem, design, construct, evaluate, and improve the system.*	2	Multiple Choice	C
5	(P.5.5A.3) Analyze matter through observations and measurements to classify materials (e.g., powders, metals, minerals, or liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, or density).	2	Multiple Choice	B
6	(P.5.5A.5) Design a vessel that can safely transport a dense substance (e.g., syrup, coins, marbles) through water at various distances and under variable conditions. Use an engineering design process to define the problem, design, construct, evaluate, and improve the vessel.*	2	Multiple Choice	D
7	(E.5.8A.1) Develop and use scaled models of Earth's solar system to demonstrate the size, composition (i.e., rock or gas), location, and order of the planets as they orbit the Sun.	2	Technology Enhanced	See Answer Key
8	(E.5.8A.2) Use evidence to argue why the sun appears brighter than other stars.	2	Multiple Choice	C
9	(E.5.8B.2) Develop and use a model of the Earth-Sun-Moon system to analyze the cyclic patterns of lunar phases, solar and lunar eclipses, and seasons.	2	Constructed Response	See Answer Key
10	(E.5.8B.3) Develop and use models to explain the factors (e.g., tilt, revolution, and angle of sunlight) that result in Earth's seasonal changes.	3	Technology Enhanced	See Answer Key
11	(P.5.5A.1) Obtain and evaluate scientific information to describe basic physical properties of atoms and molecules.	2	Technology Enhanced	See Answer Key
12	(P.5.5B.1) Obtain and evaluate scientific information to describe what happens to the properties of substances in mixtures and solutions.	3	Technology Enhanced	See Answer Key
13	(P.5.5B.4) Design an effective system (e.g., sifting, filtration, evaporation, magnetic attraction, or floatation) for separating various mixtures. Use an engineering design process to define the problem, design, construct, evaluate, and improve the system.*	2	Multiple Choice	D
14	(P.5.5C.2) Analyze and communicate the results of physical changes to a substance that results in a reversible change (e.g., changes in states of matter with the addition or removal of energy, changes in size or shape, or combining/separating mixtures or solutions).	2	Technology Enhanced	See Answer Key
15	(L.5.3A.1) Research and communicate the basic process of photosynthesis that is used by plants to convert light energy into chemical energy that can be stored and released to fuel an organism's activities.	1	Technology Enhanced	See Answer Key

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Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
16	(L.5.3B.1) Obtain and evaluate scientific information regarding the characteristics of different ecosystems and the organisms they support (e.g., salt and fresh water, deserts, grasslands, forests, rain forests, or polar tundra lands).	2	Multiple Choice	B
17	(L.5.3A.1) Research and communicate the basic process of photosynthesis that is used by plants to convert light energy into chemical energy that can be stored and released to fuel an organism's activities.	2	Multiple Choice	D
18	(L.5.3B.3) Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	2	Technology Enhanced	See Answer Key
19	(E.5.8B.4) Obtain information and analyze how our understanding of the solar system has evolved over time (e.g., Earth-centered model of Aristotle and Ptolemy compared to the Sun-centered model of Copernicus and Galileo).	2	Technology Enhanced	See Answer Key
20	(E.5.10.2) Design a process for better preparing communities to withstand manmade or natural disasters (e.g., removing oil from water or soil, systems that reduce the impact of floods, structures that resist hurricane forces). Use an engineering design process to define the problem, design, construct, evaluate, and improve the disaster plan.*	3	Multiple Choice	C
21	(L.5.3A.2) Analyze environments that do not receive direct sunlight and devise explanations as to how photosynthesis occurs, either naturally or artificially.	2	Multiple Choice	A
22	(P.5.6.1) Obtain and communicate information describing gravity's effect on an object.	1	Multiple Choice	C
23	(E.5.8A.4) Construct scientific arguments to support claims about the importance of astronomy in navigation and exploration, including the use of telescopes, compasses, and star charts.	2	Multiple Choice	C
24	(L.5.3B.2) Develop and use a food chain model to classify organisms as producers, consumers, or decomposers. Trace the energy flow to explain how each group of organisms obtains energy.	2	Technology Enhanced	See Answer Key
25	(P.5.6.3) Develop and use models to explain how the amount or type of force, both contact and noncontact, affects the motion of an object.	2	Multiple Choice	A

Mississippi Academic Assessment Program
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Technology Enhanced Items
Answer Key

Item #7

Earth

Jupiter

Mars

Mercury

Neptune

Saturn

Sun

Uranus

Venus

Item #9

Location: 4

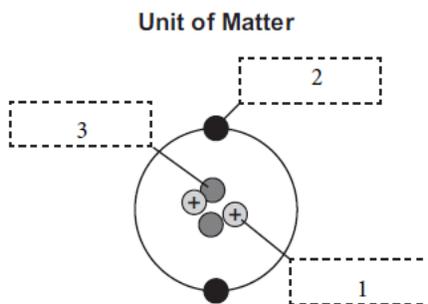
Item #10

Part A: 2

Part B:

The Southern Hemisphere is tilted (toward / away from) the Sun, and the Sun is (higher / lower) in the sky. This causes temperatures to be (cooler / warmer) than in the Northern Hemisphere.

Item #11



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Item #12

Part A: Circle a word or phrase in each set of parentheses to **best** describe the observations of the two mixtures.

The color of the materials in (Mixture 1 / Mixture 2 / neither mixture / both mixtures) changed after mixing. The physical states of the materials in (Mixture 1 / Mixture 2 / neither mixture / both mixtures) changed after mixing.

Part B: The student would like to mix 90 g of sugar with 25 g of salt. Record the mixture number from the investigation that will **most likely** match the physical state of this new mixture.

Mixture 2

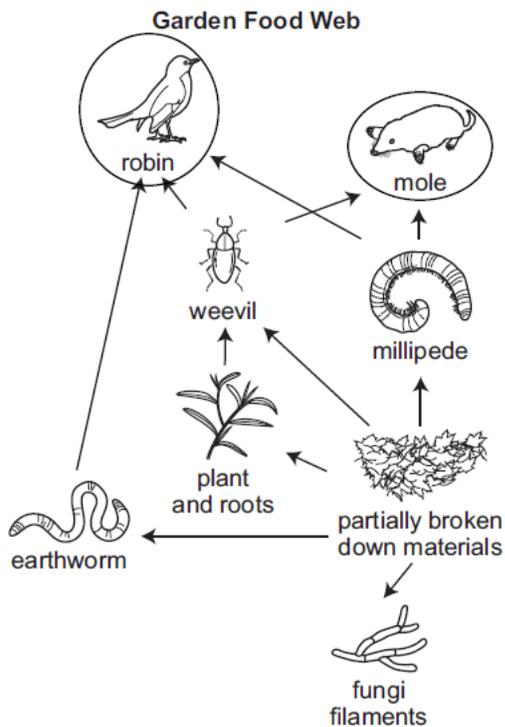
Item #14

The substance changed from a (solid / liquid / gas) to a (solid / liquid / gas) because the substance (absorbed energy / released energy / mixed with the air).

Item #15

A plant uses (chemical / physical / light) energy from the Sun and converts it into (chemical / physical / thermal) energy for the plant.

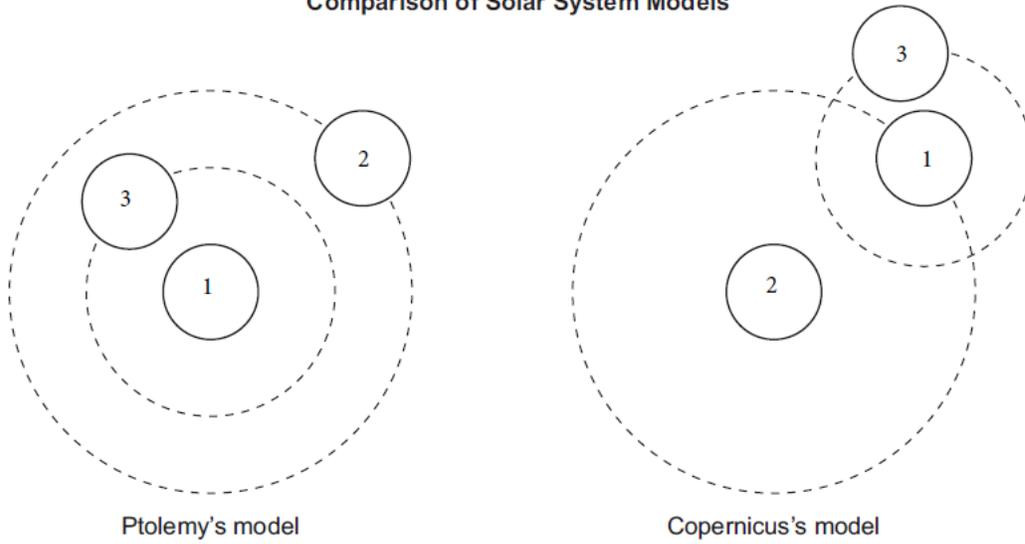
Item #18



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Item #19

Comparison of Solar System Models

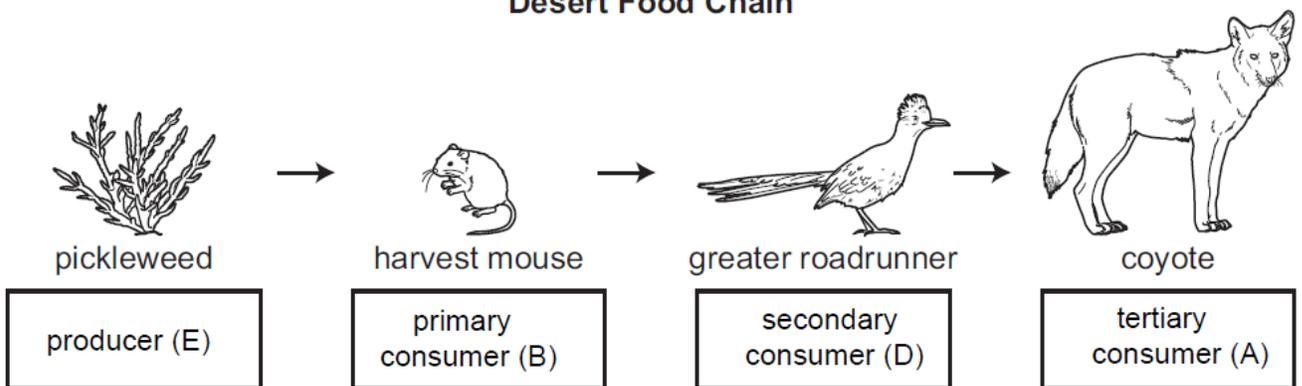


Item #24

Part A: D

Part B:

Desert Food Chain



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