

Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grades 3–8 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 3 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 3..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS30421

Passage Title:

Standard Code: 0307.1.1

Passage Code:

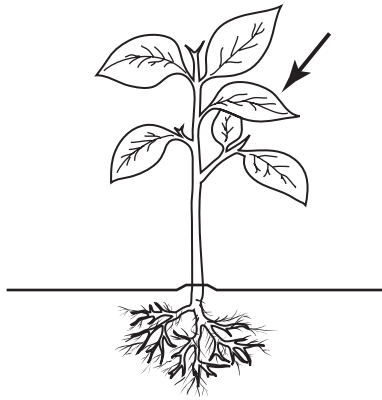
Standard Text: Identify specific parts of a plant and describe their function.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

A plant is shown in the diagram below.



What is the main function of the part of the plant shown by the arrow?

- A** taking in water
- B** giving support
- C** making food
- D** producing offspring

Item Information

Item Code: TNS21061

Passage Title:

Standard Code: 0307.2.2

Passage Code:

Standard Text: Determine how plants and animals compete for resources such as food, space, water, air, and shelter.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: A

DOK Level: 2

The cards below list information about some animals.



Frog

Shelter: Lives on land near water and will seek shelter under plants

Diet: Mostly insects



Beaver

Shelter: Builds dome-shaped lodge in the water

Diet: Tree bark, leaves, roots, twigs, and water plants



Egret

Shelter: Nests in trees near water

Diet: Fish, frogs, insects, lizards, and crayfish



Turtle

Shelter: Spends most of its life in water

Diet: Insects, small fish, crayfish, and plants

(This item continues on the next page.)

(Item 2, continued from the previous page)

Which animals compete for the most food?

- A** Egret and Turtle
- B** Beaver and Egret
- C** Frog and Beaver
- D** Turtle and Frog

Item Information

Item Code: TNS10102	Passage Title:
Standard Code: 0307.3.1	Passage Code:
Standard Text: Identify the basic needs of plants and animals.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

The chart below lists the steps for planting flower seeds.

Planting a Flower	
1.	Put the soil into a flowerpot.
2.	Put the flower seeds in the soil.
3.	Put the flowerpot in a sunny place.
4.	?

Which step best completes the chart?

- A** Add insects in with the seeds.
- B** Water the flower seeds.
- C** Place rocks on top of the seeds.
- D** Let the wind blow on the seeds.

Item Information

Item Code: TNS30050

Passage Title:

Standard Code: 0307.3.2

Passage Code:

Standard Text: Recognize that animals obtain their food by eating plants and other animals.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: D

DOK Level: 2

The table below lists some facts about four different organisms.

Organism Facts

Organism	Able to Move	Food Source
1	No	Breaks down dead trees
2	No	Makes its own food
3	Yes	Makes its own food
4	Yes	Eats plants and animals

Which organism is most likely an animal?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS30098

Passage Title:

Standard Code: 0307.4.1

Passage Code:

Standard Text: Select an illustration that shows how an organism changes as it develops.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

An adult animal is shown in the picture below.



Which picture best shows the offspring of this animal?

A



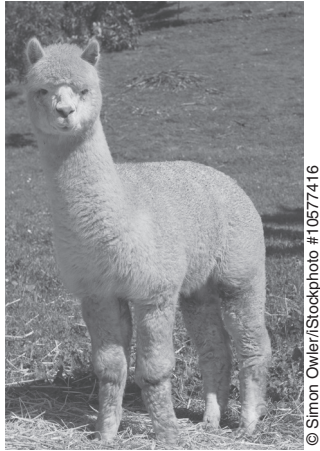
C



(This item continues on the next page.)

(Item 5, continued from the previous page)

B



© Simon Owler/Stockphoto #10577416

D



© Bigsky06/Dreamstime #8606226

Item Information

Item Code: TNS10010

Passage Title:

Standard Code: 0307.4.2

Passage Code:

Standard Text: Distinguish between characteristics that are transmitted from parents to offspring and those that are not.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: A

DOK Level: 2

Parrots are birds that some people keep as pets.



Parrots get some things from their parents and some things from their owners. Which can a parrot get from its owner?

- A** learning to make word-like sounds
- B** having a strong beak
- C** being able to fly long distances
- D** having colorful feathers

Item Information

Item Code: TNS20637

Passage Title:

Standard Code: 0307.5.1

Passage Code:

Standard Text: Investigate an organism's characteristics and evaluate how these features enable it to survive in a particular environment.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: A

DOK Level: 2

The fur of sea otters is very thick.



How does this characteristic help sea otters survive?

- A** The fur keeps them warm.
- B** The fur helps them breathe.
- C** The fur protects them from hunters.
- D** The fur allows them to see underwater.

Item Information

Item Code: TNS20398

Passage Title:

Standard Code: 0307.5.3

Passage Code:

Standard Text: Match the organism with evidence of its prior existence

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: A

DOK Level: 2

The picture shows a fossil from an animal that lived a long time ago.



Which animal living today is most like the fossil?

A



C



(This item continues on the next page.)

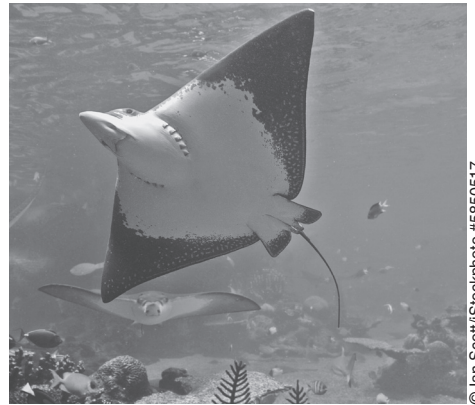
(Item 8, continued from the previous page)

B



© Tammy Peluso/Stockphoto #5658863

D



© Ian Scott/Stockphoto #5850517

Item Information

Item Code: TNS21186

Passage Title:

Standard Code: 0307.6.1

Passage Code:

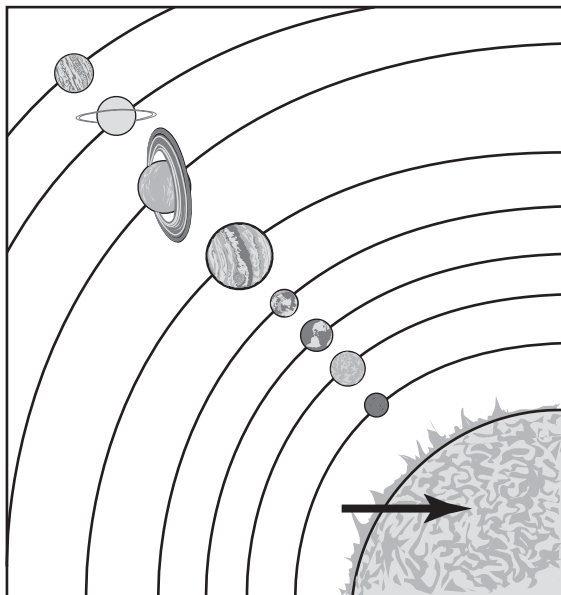
Standard Text: Identify the major components of the solar system (i.e., sun, planets and moons).

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 1

Look at the following picture of the solar system.



Which object in the solar system is the arrow pointing to?

- A** Mars
- B** the sun
- C** a moon
- D** Earth

Item Information

Item Code: TNS20639

Passage Title:

Standard Code: 0307.6.1

Passage Code:

Standard Text: Identify the major components of the solar system (i.e., sun, planets and moons).

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 1

Which object do the planets in our solar system orbit?

- A** the moon
- B** the sun
- C** a comet
- D** an asteroid

Item Information

Item Code:	TNS30455	Passage Title:	
Standard Code:	0307.7.1	Passage Code:	
Standard Text:	Classify landforms and bodies of water according to their geological features and identify them on a map.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	C	DOK Level:	1

A landform is shown below.



The flat area at the top of the landform is called a

- A** canyon.
- B** cliff.
- C** plateau.
- D** valley.

Item Information

Item Code: TNS30219

Passage Title:

Standard Code: 0307.7.2

Passage Code:

Standard Text: Describe how rocks can be classified according to their physical characteristics.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 2

Students were observing the rock shown below.



The students compared the rock to the table below.

Rock Table

Rock Name	Characteristic
Gneiss	Has crystals lined up in rows
Obsidian	Looks like black glass
Sandstone	Looks like sand glued together
Pumice	Has holes

(This item continues on the next page.)

(Item 12, continued from the previous page)

Based on the table, which rock is shown in the picture?

- A** Gneiss
- B** Obsidian
- C** Sandstone
- D** Pumice

Item Information

Item Code: TNS21096

Passage Title:

Standard Code: 0307.7.3

Passage Code:

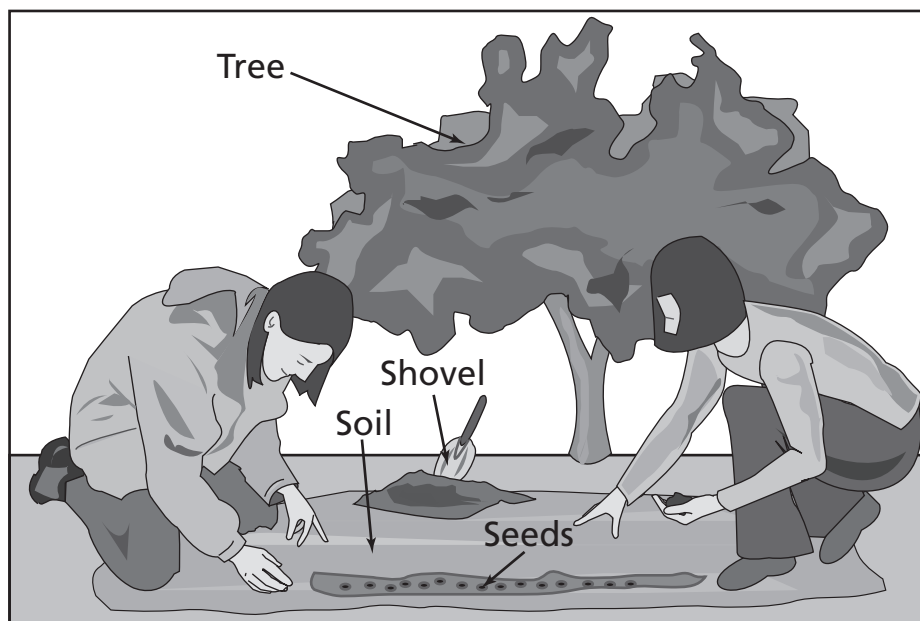
Standard Text: Identify an object as natural or man-made.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 1

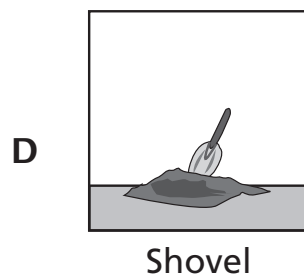
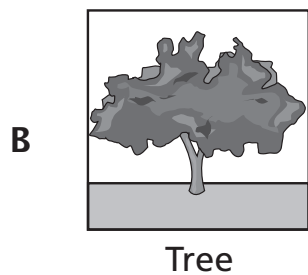
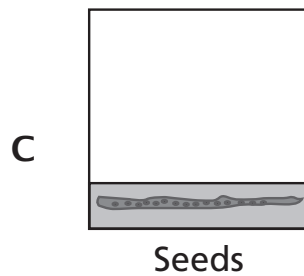
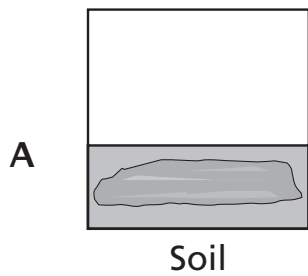
Students are planting a garden at school.



Which object is man-made?

(This item continues on the next page.)

(Item 13, continued from the previous page)



Item Information

Item Code: TNS20727	Passage Title:
Standard Code: 0307.7.4	Passage Code:
Standard Text: Determine methods for conserving natural resources.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: D	DOK Level: 2

Which of these will save the most water?

- A** watering an outdoor plant rather than waiting for rain
- B** watering the garden every day rather than twice a week
- C** washing several small loads of clothes rather than one large load
- D** turning off the water while brushing teeth

Item Information

Item Code: TNS10193	Passage Title:
Standard Code: 0307.8.1	Passage Code:
Standard Text: Choose the correct tool for measuring a particular atmospheric condition.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: B	DOK Level: 2

An anemometer is used to measure

- A** rainfall.
- B** wind speed.
- C** temperature.
- D** air pressure.

Item Information

Item Code: TNS01075

Passage Title:

Standard Code: 0307.8.2

Passage Code:

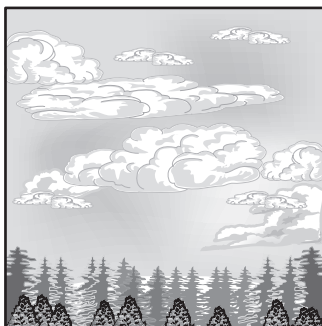
Standard Text: Match major cloud types with specific atmospheric conditions.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 1

Look at the clouds in the picture.



Which weather condition usually comes from this type of cloud?

- A** rain
- B** snow
- C** high winds
- D** fair weather

Item Information

Item Code: TNS20730

Passage Title:

Standard Code: 0307.9.2

Passage Code:

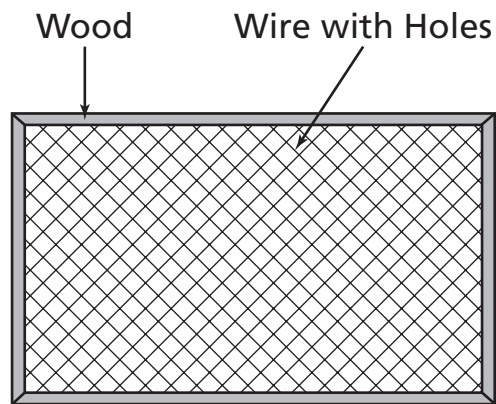
Standard Text: Identify methods for separating different types of mixtures.

Reporting Category: Matter and Energy

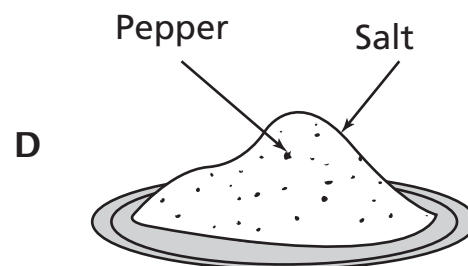
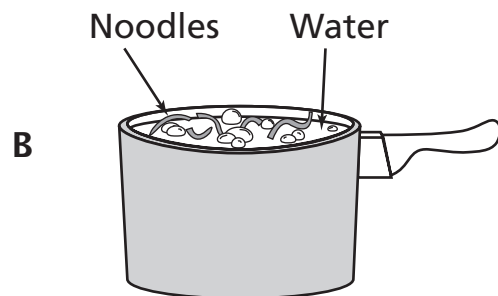
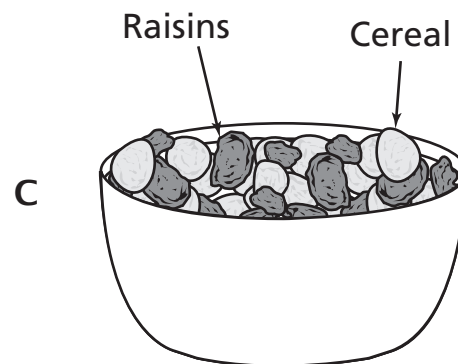
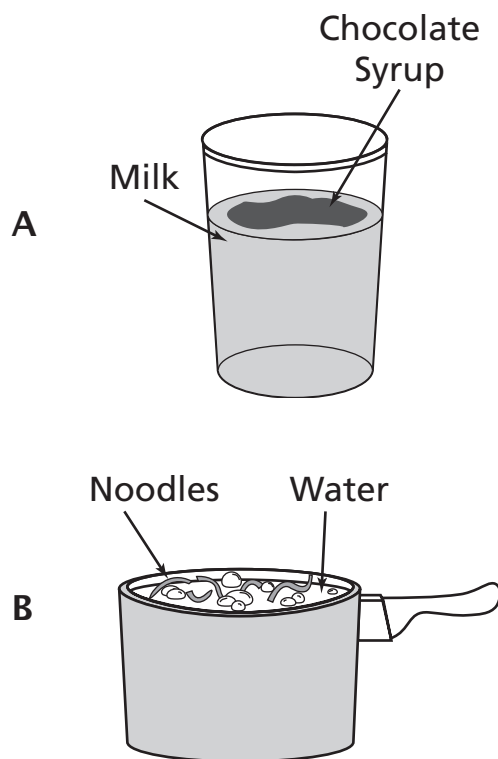
Correct Answer: B

DOK Level: 2

A teacher built a tool for students to use.



Which mixture could be most easily separated using the tool?



Item Information

Item Code: TNS30302

Passage Title:

Standard Code: 0307.10.1

Passage Code:

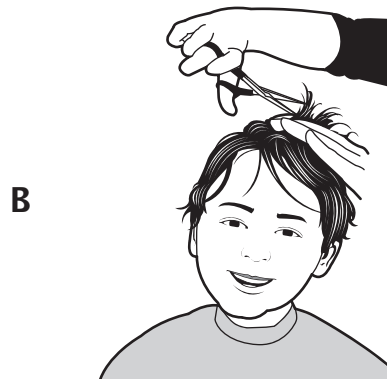
Standard Text: Use an illustration to identify various sources of heat energy.

Reporting Category: Matter and Energy

Correct Answer: C

DOK Level: 2

Which picture shows the greatest amount of heat energy being produced?



Item Information

Item Code: TNS00059	Passage Title:
Standard Code: 0307.10.2	Passage Code:
Standard Text: Classify materials according to their ability to conduct heat.	
Reporting Category: Matter and Energy	
Correct Answer: D	DOK Level: 2

Sam has four spoons that are the same size and shape. Each spoon is made from a different material. He places the spoons in a pot of boiling water for five minutes.

Which type of spoon will heat the fastest?

- A** a rubber spoon
- B** a wooden spoon
- C** a plastic spoon
- D** a metal spoon

Item Information

Item Code: TNS30495

Passage Title:

Standard Code: 0307.11.2

Passage Code:

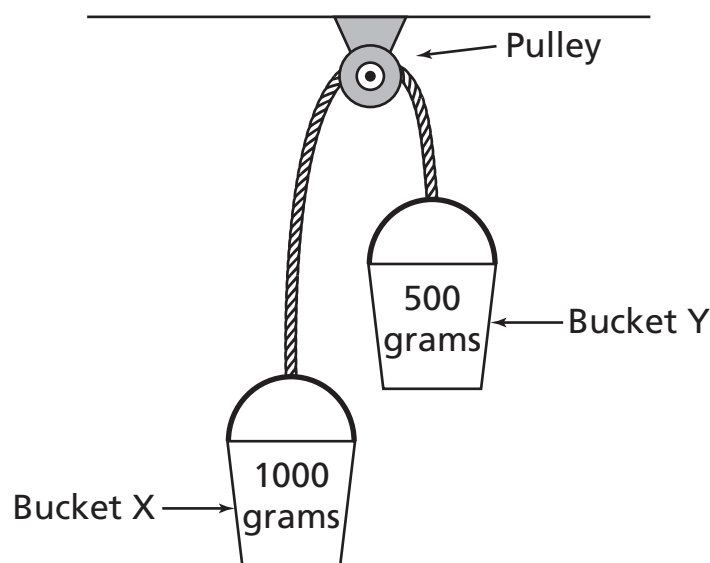
Standard Text: Demonstrate how changing the mass affects a balanced system.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

The diagram shows two buckets connected by a rope. The rope goes through a pulley. Each bucket is filled with rocks.



If 600 grams of rocks are added to Bucket Y, what will most likely happen to the buckets?

- A Both buckets will move up.
- B Both buckets will move down.
- C Bucket Y will move down and Bucket X will move up.
- D Bucket Y will move up and Bucket X will move down.

Item Information

Item Code: TNS30423

Passage Title:

Standard Code: 0307.11.2

Passage Code:

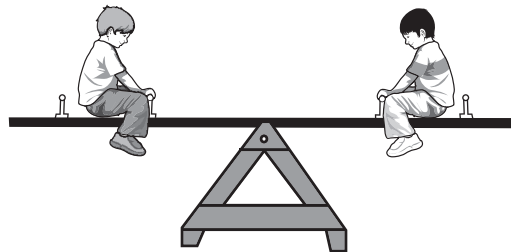
Standard Text: Demonstrate how changing the mass affects a balanced system.

Reporting Category: Motion, Forces in Nature

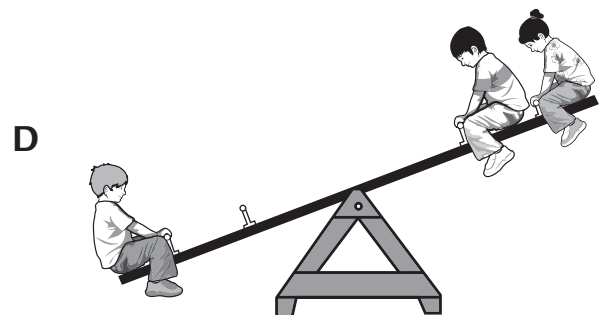
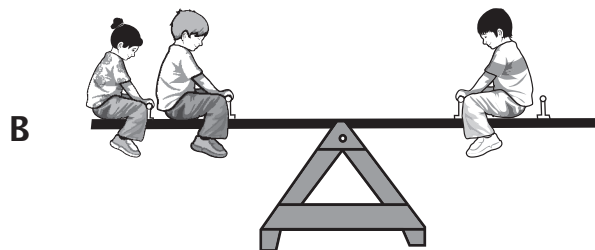
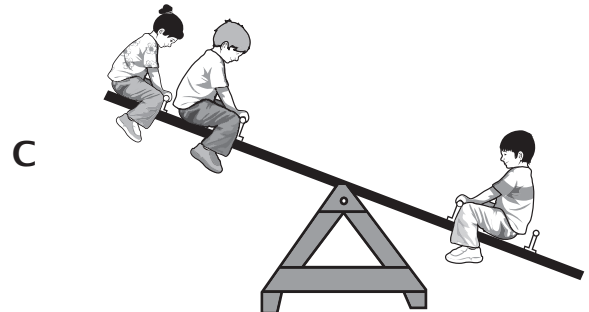
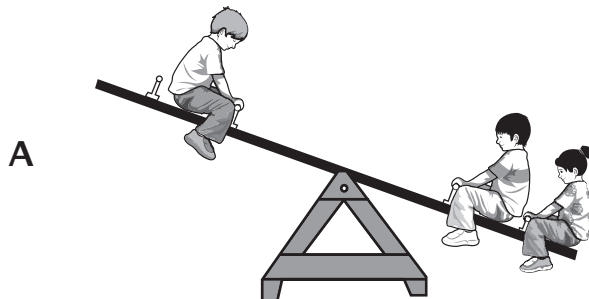
Correct Answer: A

DOK Level: 2

The picture shows two children balancing on a seesaw.



What would most likely happen to the seesaw if another child sat on one end?



Item Information

Item Code: TNS30462	Passage Title:
Standard Code: 0307.11.3	Passage Code:
Standard Text: Distinguish between pitch and volume.	
Reporting Category: Motion, Forces in Nature	
Correct Answer: D	DOK Level: 2

A student turned down the sound on a television. What happened to the sound?

- A** The pitch increased.
- B** The volume increased.
- C** The pitch decreased.
- D** The volume decreased.

Item Information

Item Code: TNS30499

Passage Title:

Standard Code: 0307.11.4

Passage Code:

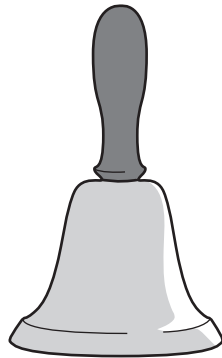
Standard Text: Identify how sounds with different pitch and volume are produced.

Reporting Category: Motion, Forces in Nature

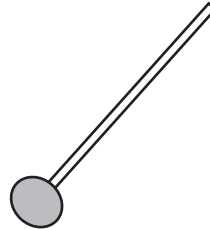
Correct Answer: B

DOK Level: 2

The picture shows a bell and a mallet. The bell makes a sound when it is hit by the mallet.



Bell



Mallet

A student wants to increase the volume of the sound produced by the bell. The student should

- A** use a softer mallet.
- B** hit the bell with more force.
- C** use a mallet with a shorter handle.
- D** hit closer to the top of the bell.

Item Information

Item Code: TNS02236

Passage Title:

Standard Code: 0307.12.2

Passage Code:

Standard Text: Identify objects that are attracted to magnets.

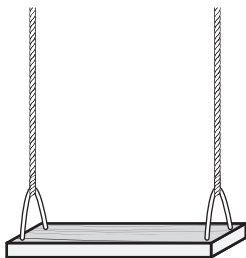
Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

Lee is studying magnets. He places a magnet near four different objects at the park.

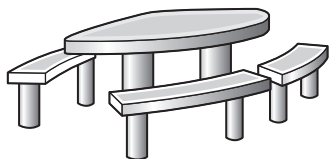
Which object will attract Lee's magnet?

A

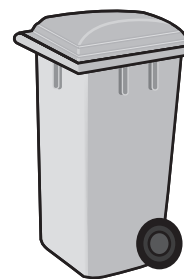
Wood swing

C

Steel slide

B

Cement picnic table

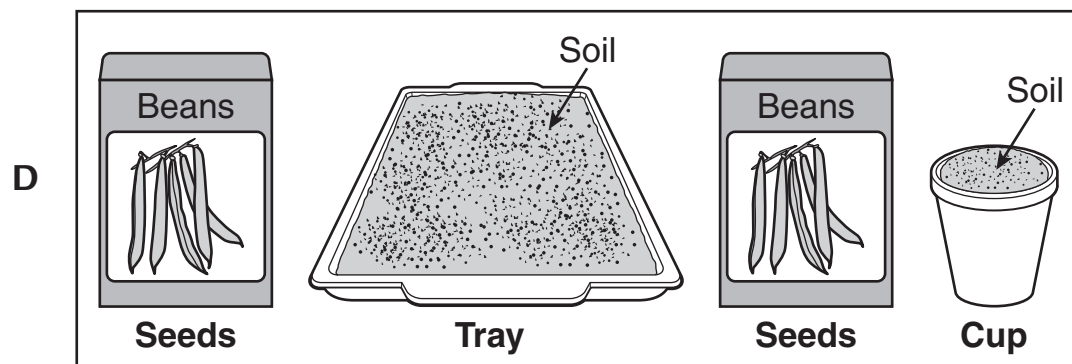
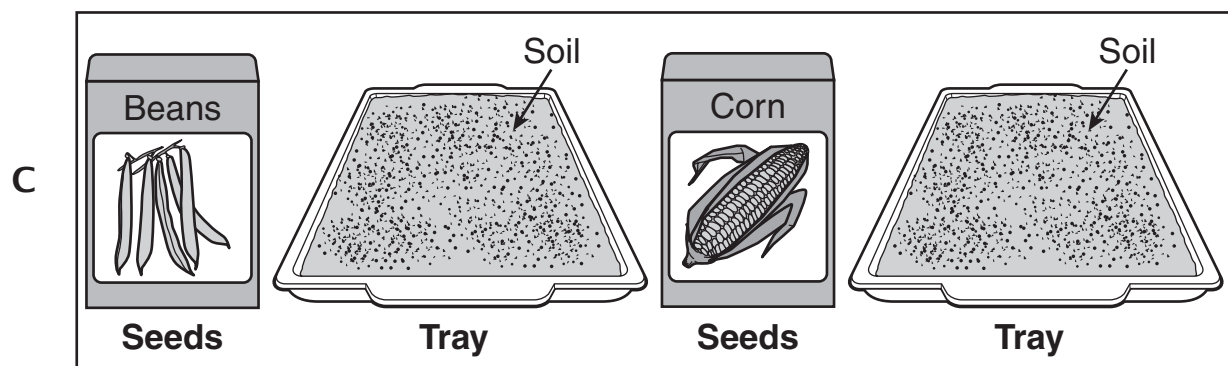
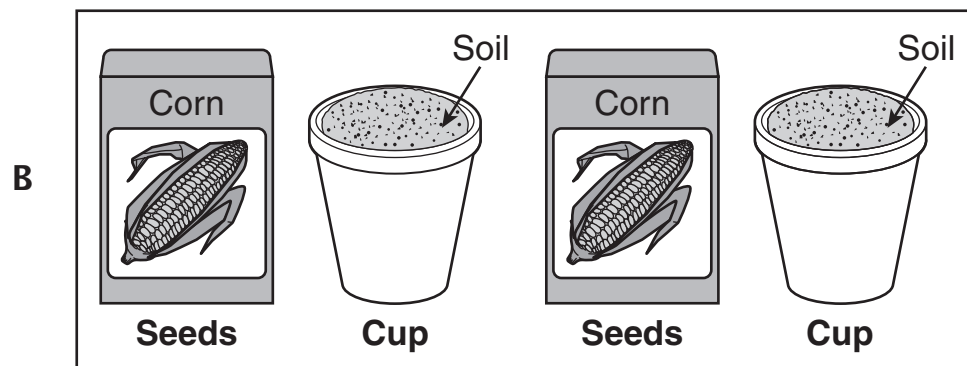
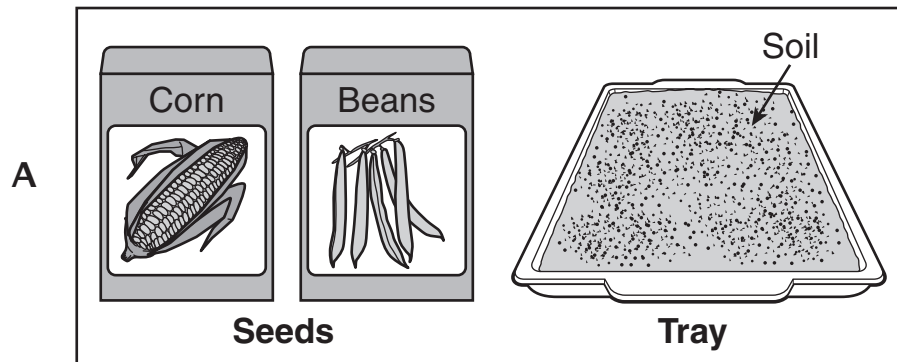
D

Plastic trash bin

Item Information

Item Code:	TNS30265	Passage Title:	
Standard Code:	2.0307.Inq.1	Passage Code:	
Standard Text:	Select an investigation that could be used to answer a specific question.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	D	DOK Level:	2

A student was planting seeds in different containers. The student wanted to know if a plant growing on a tray would grow as tall as a plant growing in a foam cup. Which materials would best help to answer this question?



Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 3 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 4 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 4..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Science Grade 4

Item Information

Item Code: TNS20417	Passage Title:
Standard Code: 0407.1.1	Passage Code:
Standard Text: Compare basic structures of plant and animal cells.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: C	DOK Level: 2

What cell structure is found in plant cells but not in animal cells?

- A** cell membrane
- B** vacuole
- C** cell wall
- D** nucleus

Item Information

Item Code: TNS30216

Passage Title:

Standard Code: 0407.2.1

Passage Code:

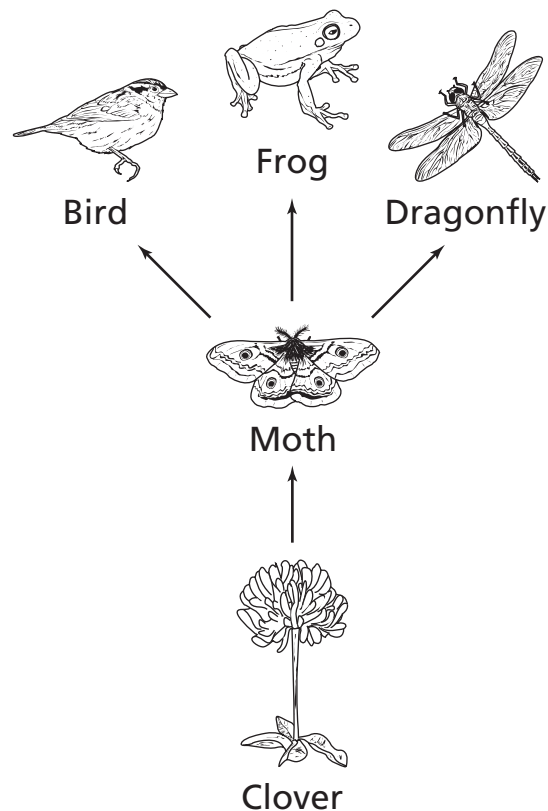
Standard Text: Recognize the impact of predation and competition on an ecosystem.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

A food web is shown below.



If another animal that eats the clover enters this food web, what will most likely happen?

- A The bird will stop eating the moth.
- B The frog will move to a new habitat.
- C The dragonfly will begin eating the clover.
- D The moth will have to compete for food.

Item Information

Item Code: TNS10070

Passage Title:

Standard Code: 0407.3.1

Passage Code:

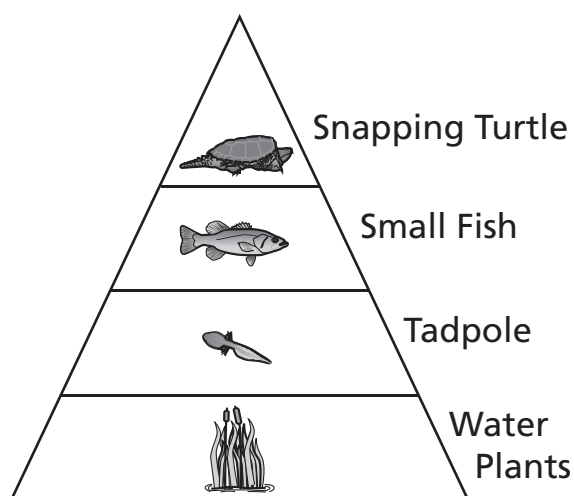
Standard Text: Determine how different organisms function within an environment in terms of their location on an energy pyramid.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 2

An energy pyramid is shown in the diagram below.



According to the energy pyramid, the snapping turtle is classified as a

- A producer
- B carnivore
- C herbivore
- D decomposer

Item Information

Item Code: TNS30109

Passage Title:

Standard Code: 0407.3.1

Passage Code:

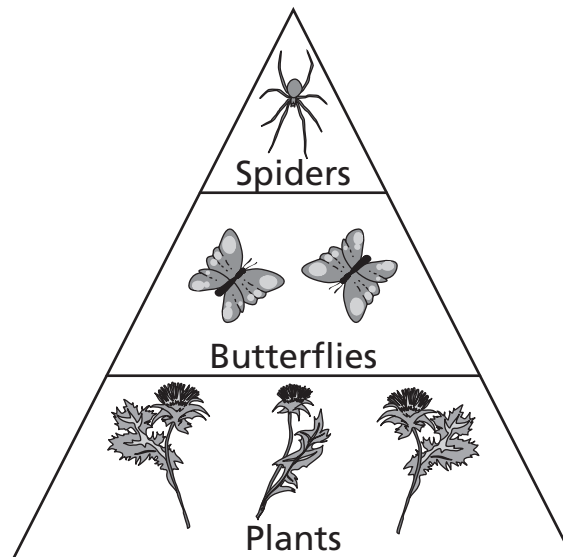
Standard Text: Determine how different organisms function within an environment in terms of their location on an energy pyramid.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: D

DOK Level: 2

The diagram represents energy flow between organisms.



Based on this information, what is the role of the butterflies?

- A** producer
- B** decomposer
- C** carnivore
- D** herbivore

Item Information

Item Code: TNS10219

Passage Title:

Standard Code: 0407.4.1

Passage Code:

Standard Text: Draw conclusions about the relationship between reproduction and the survival of a species.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 3-4

Some species of sea turtles lay a large number of eggs during reproduction. How does this benefit the sea turtles?

- A** The sea turtles are able to compete for more space.
- B** The sea turtles are able to swim longer distances.
- C** It increases the chances of more turtles surviving.
- D** It decreases the number of predators in the area.

Item Information

Item Code: TNS20344

Passage Title:

Standard Code: 0407.4.2

Passage Code:

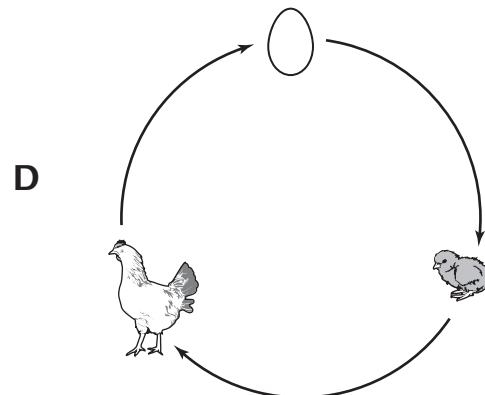
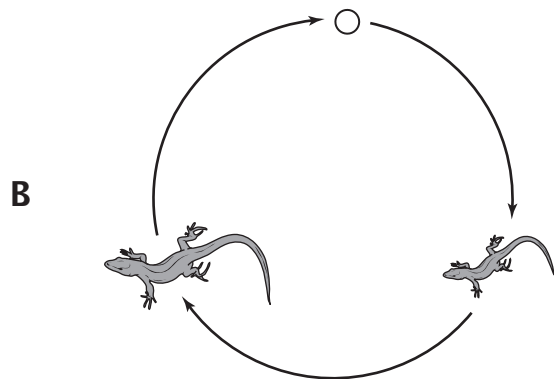
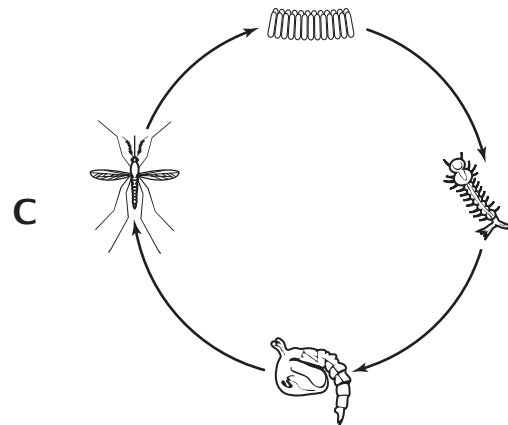
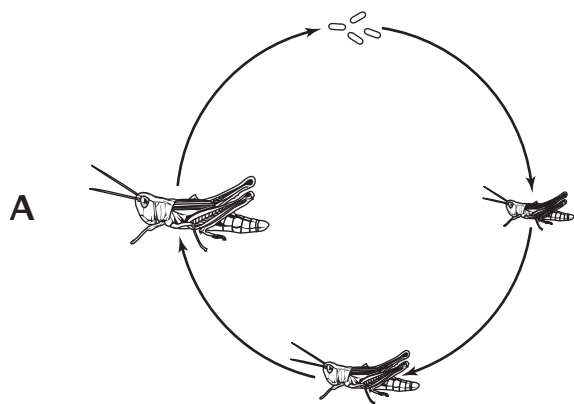
Standard Text: Distinguish between complete and incomplete metamorphosis.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

Which diagram shows complete metamorphosis?



Item Information

Item Code: TNS30391

Passage Title:

Standard Code: 0407.5.2

Passage Code:

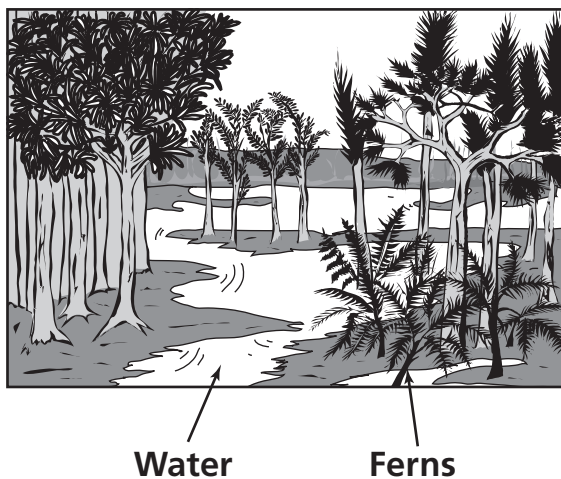
Standard Text: Infer the possible reasons why a species became endangered or extinct.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: A

DOK Level: 3-4

Millions of years ago, some ferns grew in warm, swampy areas. These ferns are now extinct.

Ancient Swamp

Which is the most likely reason these ferns became extinct?

- A The environment changed.
- B Birds made nests with the ferns.
- C Carnivores ate all the plants.
- D The ferns changed into other plants.

Item Information

Item Code: TNS30420	Passage Title:
Standard Code: 0407.7.1	Passage Code:
Standard Text: Design a simple model to illustrate how the wind and movement of water alter the earth's surface.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: B	DOK Level: 2

Students want to make a model that shows how a beach can change during a hurricane. Which materials would be best for the students to include in their model?

- A** ice and rocks
- B** water and sand
- C** magnets and iron filings
- D** baking soda and vinegar

Item Information

Item Code: TNS30136

Passage Title:

Standard Code: 0407.7.2

Passage Code:

Standard Text: Analyze how different earth materials are utilized to solve human problems or improve the quality of life.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

An earth material is described below.

Earth Material

- Lightweight
 - Does not form rust
 - Can be made into a cooking pot

Which earth material is being described?

- A** iron
- B** coal
- C** wood
- D** aluminum

Item Information

Item Code: TNS30448	Passage Title:
Standard Code: 0407.7.2	Passage Code:
Standard Text: Analyze how different earth materials are utilized to solve human problems or improve the quality of life.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: B	DOK Level: 2

When a small amount of silver is used as a medicine, it can kill bacteria. Silver most likely helps protect people from bacteria when it is

- A** put behind glass to reflect light.
- B** put on bandages that cover cuts or scrapes.
- C** used to make coins and jewelry.
- D** used to make cups and plates.

Item Information

Item Code: TNS02663

Passage Title:

Standard Code: 0407.8.1

Passage Code:

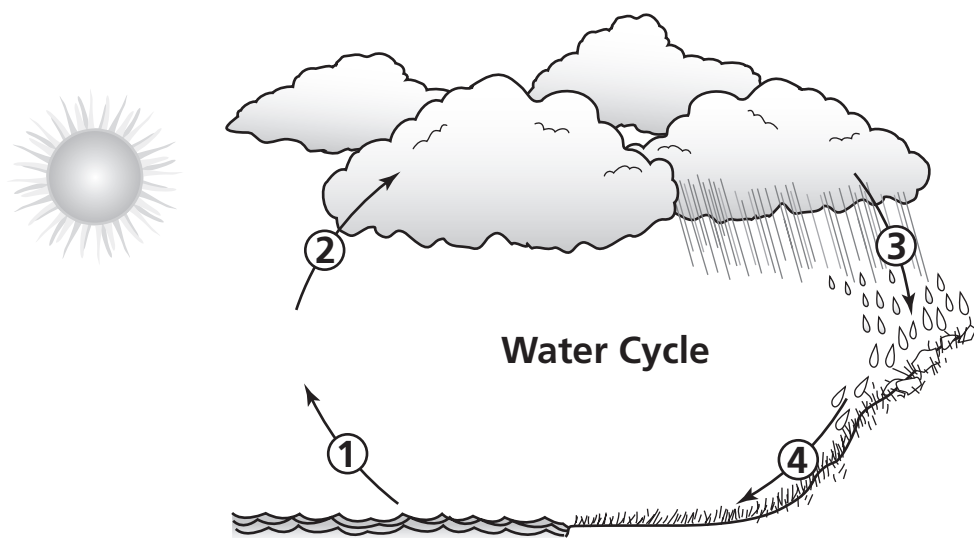
Standard Text: Identify the basic features of the water cycle and describe their importance to life on earth.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

Look at the diagram of the water cycle below.



Which of these best describes what is happening at arrow 1 in the water cycle?

- A Water is flowing into the ocean.
- B Water vapor is collecting to form clouds.
- C Water falling as rain is changing into clouds.
- D Water heated by the sun is changing to water vapor.

Item Information

Item Code:	TNS10326	Passage Title:	
Standard Code:	0407.8.1	Passage Code:	
Standard Text:	Identify the basic features of the water cycle and describe their importance to life on earth.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	C	DOK Level:	2

Fresh water is important to life on Earth. People can only survive by using fresh water for

- A** bathing
- B** washing
- C** drinking
- D** swimming

Item Information

Item Code:	TNS30407	Passage Title:	
Standard Code:	0407.9.2	Passage Code:	
Standard Text:	Determine the mass, volume, and temperature of a substance or object using proper units of measurement.		
Reporting Category:	Matter and Energy		
Correct Answer:	A	DOK Level:	1

In what unit should a student record the length of a leaf?

- A** centimeters
- B** milliliters
- C** degrees Celsius
- D** kilograms

Item Information

Item Code: TNS30076

Passage Title:

Standard Code: 0407.10.2

Passage Code:

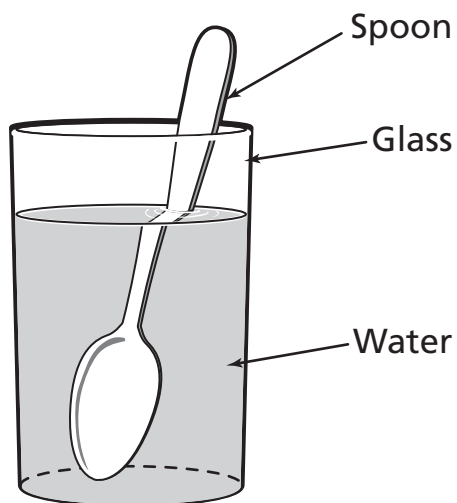
Standard Text: Determine which surfaces reflect, refract, or absorb light.

Reporting Category: Matter and Energy

Correct Answer: B

DOK Level: 2

The picture shows a spoon in a glass of water.



Why does the spoon in the glass look broken?

- A** The glass absorbs light.
- B** The water refracts light.
- C** The spoon reflects light.
- D** The air moves the light.

Item Information

Item Code: TNS30322

Passage Title:

Standard Code: 0407.10.3

Passage Code:

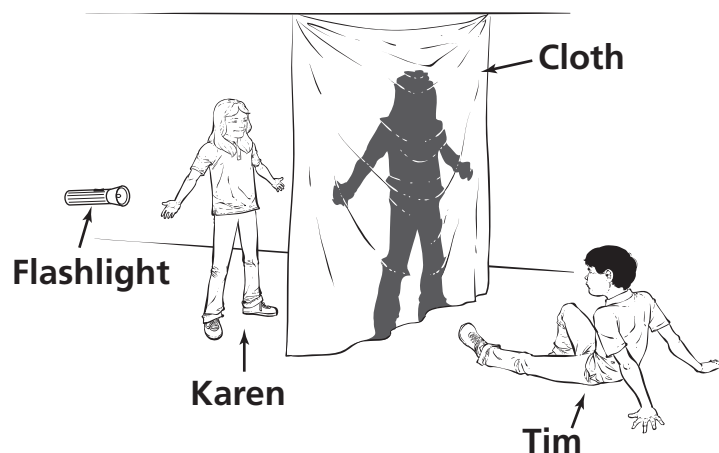
Standard Text: Determine whether a material is transparent, translucent, or opaque.

Reporting Category: Matter and Energy

Correct Answer: D

DOK Level: 2

Karen stood between a flashlight and a thin cloth, as shown below.



Tim sat on the other side of the cloth. Tim could see Karen's outline through the cloth but could not see any details. Which best describes the material of the cloth?

- A** opaque
- B** reflective
- C** transparent
- D** translucent

Item Information

Item Code: TNS20605

Passage Title:

Standard Code: 0407.10.3

Passage Code:

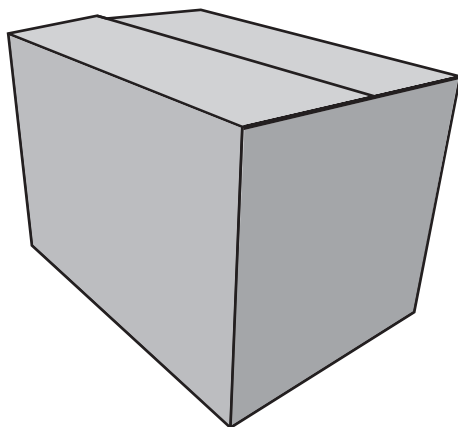
Standard Text: Determine whether a material is transparent, translucent, or opaque.

Reporting Category: Matter and Energy

Correct Answer: D

DOK Level: 1

A cardboard box is shown below.



Which term best describes the cardboard box?

- A** transparent
- B** translucent
- C** shiny
- D** opaque

Item Information

Item Code: TNS30323

Passage Title:

Standard Code: 0407.11.1

Passage Code:

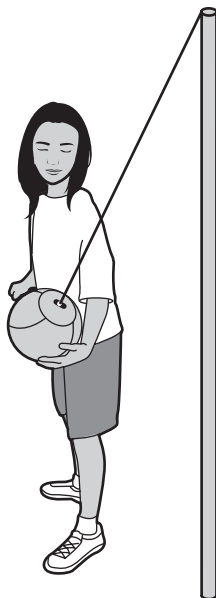
Standard Text: Describe the position of an object relative to fixed reference points.

Reporting Category: Motion, Forces in Nature

Correct Answer: A

DOK Level: 2

A girl plays a game with a ball. The ball is attached to a rope that is tied to a pole.



Which of these best describes the position of the ball?

- A** in front of the girl
- B** behind the girl
- C** above the girl
- D** under the girl

Item Information

Item Code: TNS30035

Passage Title:

Standard Code: 0407.11.1

Passage Code:

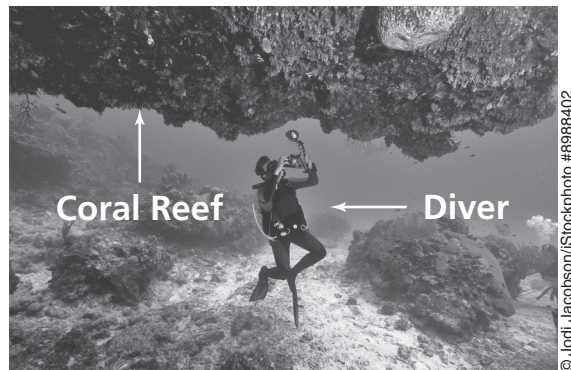
Standard Text: Describe the position of an object relative to fixed reference points.

Reporting Category: Motion, Forces in Nature

Correct Answer: B

DOK Level: 2

The picture below shows a diver and a coral reef.



Which of these best describes the position of the diver relative to the coral reef?

- A The diver is above the coral reef.
- B The diver is below the coral reef.
- C The diver is beside the coral reef.
- D The diver is behind the coral reef.

Item Information

Item Code: TNS30030	Passage Title:
Standard Code: 0407.11.2	Passage Code:
Standard Text: Identify factors that influence the motion of an object.	
Reporting Category: Motion, Forces in Nature	
Correct Answer: A	DOK Level: 2

A girl rode her bicycle at a steady speed across pavement. When the girl rode across a grassy field, her speed slowed. What caused the girl to travel more slowly on the grass than the pavement?

- A** an increase in friction
- B** a decrease in friction
- C** an increase in gravity
- D** a decrease in gravity

Item Information

Item Code: TNS10092	Passage Title:
Standard Code: 0407.11.2	Passage Code:
Standard Text: Identify factors that influence the motion of an object.	
Reporting Category: Motion, Forces in Nature	
Correct Answer: B	DOK Level: 2

A pencil, a softball, a piece of paper, and a book are dropped from the same height at the same time. Air resistance will cause which object to fall most slowly?

- A** book
- B** piece of paper
- C** pencil
- D** softball

Item Information

Item Code: TNS30086

Passage Title:

Standard Code: 0407.12.1

Passage Code:

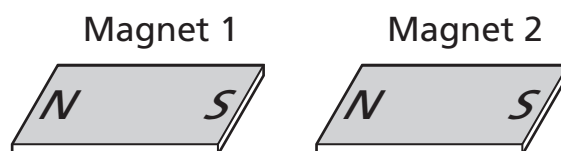
Standard Text: Identify how magnets attract or repel one another.

Reporting Category: Motion, Forces in Nature

Correct Answer: A

DOK Level: 1

Two magnets are shown in the diagram below. The magnets are too far apart to affect each other.



What will most likely happen if Magnet 1 is moved slowly toward Magnet 2?

- A The magnets will attract each other.
- B The magnets will repel each other.
- C Both magnets will spin around in circles.
- D Both magnets will turn on their sides.

Item Information

Item Code: TNS30021

Passage Title:

Standard Code: 0407.12.2

Passage Code:

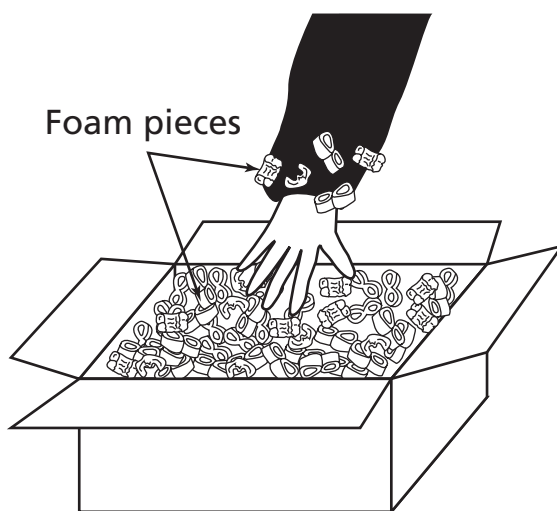
Standard Text: Determine how an electrically charged material interacts with other objects.

Reporting Category: Motion, Forces in Nature

Correct Answer: A

DOK Level: 2

A student opens a box that contains foam pieces. When the student reaches into the box, the foam pieces stick to the student's shirt.



Which is the most likely reason why the foam pieces stick to the student's shirt?

- A** The foam pieces and the student's shirt have opposite static charges.
- B** The foam pieces stay on the student's shirt due to the force of gravity.
- C** The foam pieces have a magnetic attraction to the student's shirt.
- D** The foam pieces are held in place by the texture of the student's shirt.

Item Information

Item Code: TNS10095

Passage Title:

Standard Code: 0407.12.2

Passage Code:

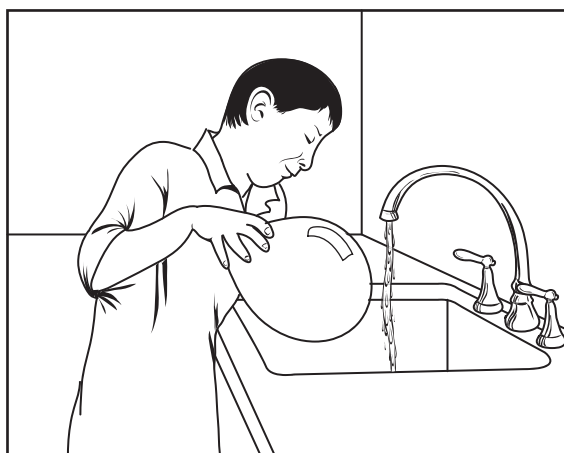
Standard Text: Determine how an electrically charged material interacts with other objects.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 3-4

Tommy rubs a balloon in his hair and then places the balloon near a thin stream of running water.



The stream of water moves toward the balloon. Which best describes why this happened?

- A** The balloon has no charge, and the water contains positive charges.
- B** The balloon is positively charged, and the water has no charge.
- C** The balloon is negatively charged, and the water contains positive charges.
- D** The balloon is negatively charged, and the water contains negative charges.

Item Information

Item Code: TNS10096

Passage Title:

Standard Code: 0407.12.3

Passage Code:

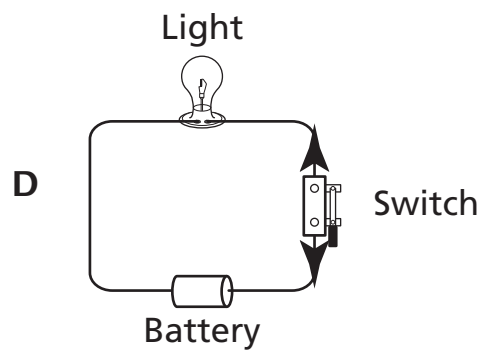
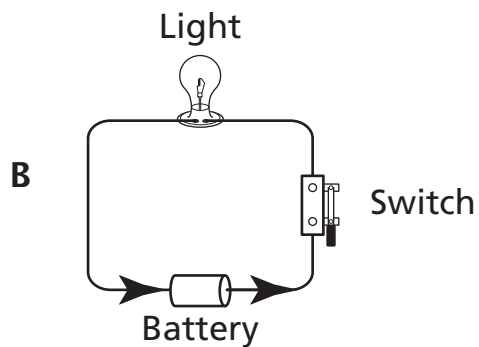
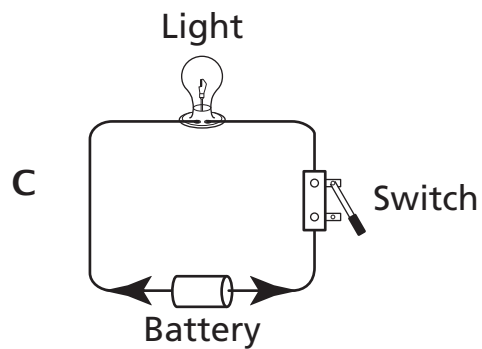
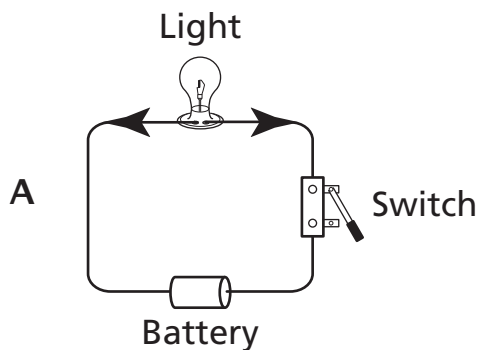
Standard Text: Determine the path of an electrical current in a simple circuit.

Reporting Category: Motion, Forces in Nature

Correct Answer: B

DOK Level: 2

Which shows the correct path of an electrical current?



Item Information

Item Code: TNS30091

Passage Title:

Standard Code: 5.0407.INQ.1

Passage Code:

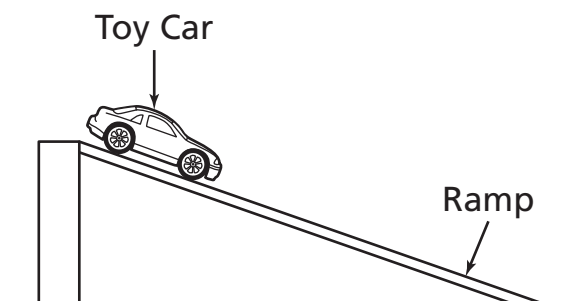
Standard Text: Select an investigation that could be used to answer a specific question.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 3-4

A group of students wants to find out how friction affects the motion of a toy car traveling down a ramp.



Which set of ramps will best help the students in their investigation?

- A wooden ramps that are different heights
- B plastic ramps that are different lengths
- C ramps that are identical except for their surfaces
- D ramps that have identical surfaces but have different lengths and heights

This page intentionally left blank.

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 4 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 5 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 5..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS30016

Passage Title:

Standard Code: 0507.1.1

Passage Code:

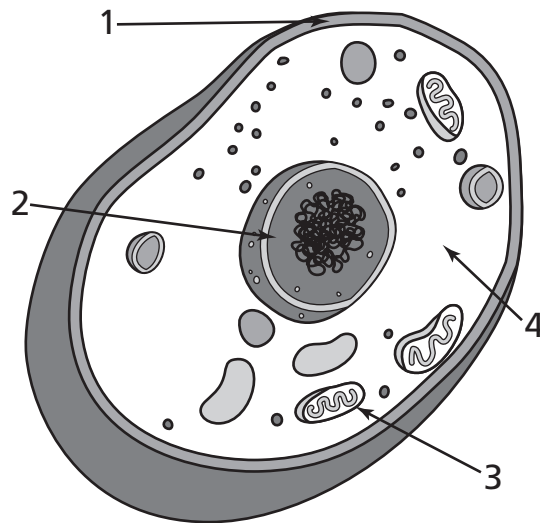
Standard Text: Identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 2

Some parts in a cell are numbered in the diagram below.



What number represents the part that controls the activities of the cell?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code:	TNS20025	Passage Title:	
Standard Code:	0507.1.1	Passage Code:	
Standard Text:	Identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	D	DOK Level:	1

In which structure of a plant cell are water and nutrients stored?

- A** nucleus
- B** chloroplast
- C** cell membrane
- D** vacuole

Item Information

Item Code:	TNS00319	Passage Title:	
Standard Code:	0507.1.2	Passage Code:	
Standard Text:	Compare and contrast basic structures and functions of plant and animal cells.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	C	DOK Level:	2

Which cell structures are found in both plant and animal cells?

- A** cell membrane, cell wall, nucleus
- B** cell membrane, chloroplast, cytoplasm
- C** cell membrane, cytoplasm, nucleus
- D** cell wall, cytoplasm, vacuole

Item Information

Item Code:	TNS00318	Passage Title:	
Standard Code:	0507.1.2	Passage Code:	
Standard Text:	Compare and contrast basic structures and functions of plant and animal cells.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	A	DOK Level:	1

Which cell structure absorbs sunlight and gives plants their green color?

- A** chloroplast
- B** cytoplasm
- C** nucleus
- D** vacuole

Item Information

Item Code: TNS30336

Passage Title:

Standard Code: 0507.2.1

Passage Code:

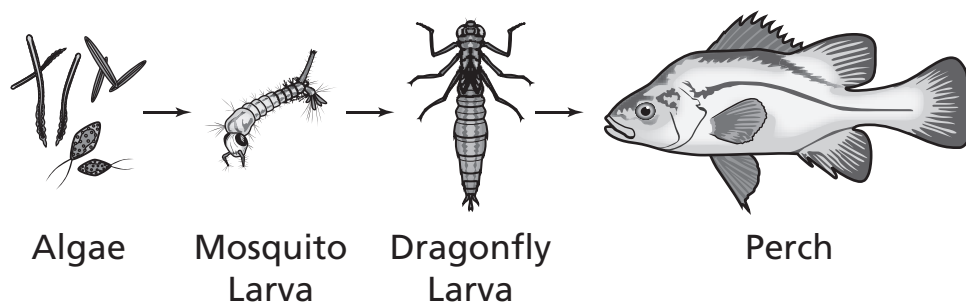
Standard Text: Describe the different types of nutritional relationships that exist among organisms.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

A food chain from a pond ecosystem is shown below.



The relationship between the algae and mosquito larva is best described as

- A predator and consumer.
- B producer and consumer.
- C parasite and host.
- D producer and decomposer.

Item Information

Item Code:	TNS30334	Passage Title:	
Standard Code:	0507.2.1	Passage Code:	
Standard Text:	Describe the different types of nutritional relationships that exist among organisms.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	B	DOK Level:	2

Vultures consume the remains of animals left behind by other predators. The role of a vulture is best described as

- A** producer.
- B** scavenger.
- C** prey.
- D** decomposer.

Item Information

Item Code:	TNS20032	Passage Title:	
Standard Code:	0507.2.1	Passage Code:	
Standard Text:	Describe the different types of nutritional relationships that exist among organisms.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

Barn owls eat mice and other small mammals. What is the relationship between barn owls and mice?

- A** consumer-producer
- B** producer-decomposer
- C** predator-prey
- D** parasite-host

Item Information

Item Code: TNS10789

Passage Title:

Standard Code: 0507.2.1

Passage Code:

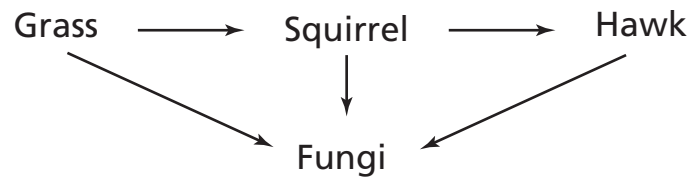
Standard Text: Describe the different types of nutritional relationships that exist among organisms.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 1

A food chain is shown.



Which organism is the decomposer in this food chain?

- A** Grass
- B** Squirrel
- C** Hawk
- D** Fungi

Item Information

Item Code: TNS10334

Passage Title:

Standard Code: 0507.2.1

Passage Code:

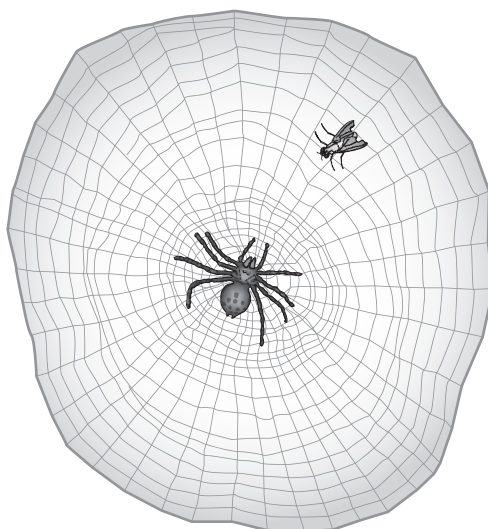
Standard Text: Describe the different types of nutritional relationships that exist among organisms.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 1

The picture shows a fly caught in a spider web.



The fly primarily will provide the spider with

- A** habitat.
- B** shelter.
- C** oxygen.
- D** nutrition.

Item Information

Item Code: TNS30338	Passage Title:
Standard Code: 0507.2.2	Passage Code:
Standard Text: Distinguish among symbiotic, commensal, and parasitic relationships.	
Reporting Category: Interdependence, Biodiversity & Change	
Correct Answer: A	DOK Level: 2

Spanish moss grows on the branches of some trees. The moss obtains sunlight, water, and nutrients because of the tree. The tree is unharmed by the moss. What is the relationship between the tree and the Spanish moss?

- A** commensal
- B** mutual
- C** parasite / host
- D** predator / prey

Item Information

Item Code: TNS10599

Passage Title:

Standard Code: 0507.2.2

Passage Code:

Standard Text: Distinguish among symbiotic, commensal, and parasitic relationships.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

The picture shows mistletoe growing on the branches of a tree.



© Markus Guhn/Stockphoto #6088999

The mistletoe takes some water and nutrients away from the tree, which could hurt the tree. Which of these best describes this relationship?

- A** competitive
- B** commensal
- C** mutualism
- D** parasitic

Item Information

Item Code:	TNS00328	Passage Title:	
Standard Code:	0507.2.3	Passage Code:	
Standard Text:	Use information about the impact of human actions or natural disasters on the environment to support a simple hypothesis, make a prediction, or draw a conclusion.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	B	DOK Level:	2

Scientists believe that over 70% of the world's fish species are now being killed faster than they can reproduce. What will most likely happen if people continue to fish at the same rate?

- A** Fish will adapt to reproduce faster.
- B** Many fish species will become extinct.
- C** Many fish species will learn to escape fishing nets.
- D** Fish will be caught more quickly with new fishing nets.

Item Information

Item Code: TNS30040

Passage Title:

Standard Code: 0507.3.1

Passage Code:

Standard Text: Identify photosynthesis as the food manufacturing process in plants.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 2

The chart below lists how four different organisms obtain energy.

Energy Data

Organism	Energy Source
1	breaks down dead material
2	makes its own food
3	feeds on nectar and pollen
4	feeds on seeds and nuts

Which organism is most likely a plant?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS20258

Passage Title:

Standard Code: 0507.3.2

Passage Code:

Standard Text: Compare how plants and animals obtain energy.

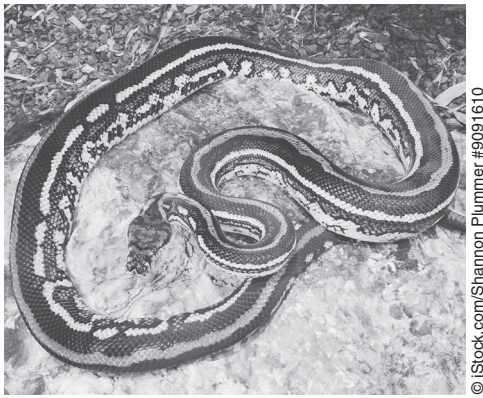
Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

Which picture shows a plant providing energy for another organism?

A



C



B



D



Item Information

Item Code: TNS00333	Passage Title:
Standard Code: 0507.3.2	Passage Code:
Standard Text: Compare how plants and animals obtain energy.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: D	DOK Level: 1

How does a dandelion obtain energy?

- A** It takes energy from grass.
- B** It receives energy from bees.
- C** It draws energy from the soil.
- D** It obtains energy from the sun.

Item Information

Item Code:	TNS30285	Passage Title:	
Standard Code:	0507.4.1	Passage Code:	
Standard Text:	Recognize that information is passed from parent to offspring during reproduction.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	A	DOK Level:	2

A boy has ears shaped like his father's ears and a nose shaped like his mother's nose. Which of these best explains why the child looks a little like each parent?

- A** Genes were passed from both parents to the boy.
- B** Genes were passed from the boy to both parents.
- C** Genes were passed only from the mother to the father.
- D** Genes were passed only from the father to the boy.

Item Information

Item Code:	TNS20261	Passage Title:	
Standard Code:	0507.4.1	Passage Code:	
Standard Text:	Recognize that information is passed from parent to offspring during reproduction.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	C	DOK Level:	2

Genetic information is best shown by the way a kitten

- A** plays with a ball of yarn.
- B** prefers to eat certain foods.
- C** looks like its parents.
- D** comes when it hears a can opener.

Item Information

Item Code:	TNS00334	Passage Title:	
Standard Code:	0507.4.1	Passage Code:	
Standard Text:	Recognize that information is passed from parent to offspring during reproduction.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	C	DOK Level:	2

A pair of hamsters produces 5 female offspring and 3 male offspring.

Which of these best describes the characteristics of the offspring?

- A** All the offspring will look exactly like the father.
- B** All the offspring will look exactly like the mother.
- C** The male and female offspring will look like both the mother and the father.
- D** The male offspring will look like the father and the female offspring will look like the mother.

Item Information

Item Code:	TNS20185	Passage Title:	
Standard Code:	0507.4.2	Passage Code:	
Standard Text:	Distinguish between inherited traits and those that can be attributed to the environment.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	A	DOK Level:	1

The environment can most directly influence a pony's

- A** favorite food.
- B** head shape.
- C** eye color.
- D** fur pattern.

Item Information

Item Code:	TNS00339	Passage Title:	
Standard Code:	0507.4.2	Passage Code:	
Standard Text:	Distinguish between inherited traits and those that can be attributed to the environment.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	C	DOK Level:	1

Sarah's dog has all the skills listed below.

Which skill is inherited?

- A** sitting when asked
- B** walking on a leash
- C** following scent trails
- D** recognizing its name

Item Information

Item Code: TNS30254

Passage Title:

Standard Code: 0507.5.1

Passage Code:

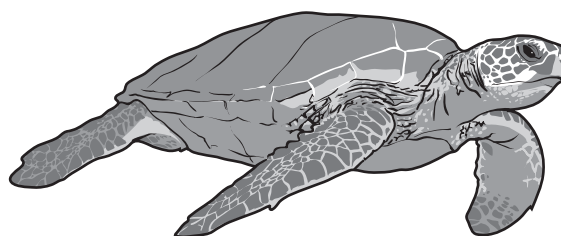
Standard Text: Identify physical and behavioral adaptations that enable animals such as, amphibians, reptiles, birds, fish, and mammals to survive in a particular environment.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: C

DOK Level: 3-4

A sea turtle is shown in the picture below.



Which adaptation best helps a sea turtle to survive in the ocean?

- A It stays most active during the day.
- B It can lay hundreds of eggs at one time.
- C It can hold its breath for long periods of time.
- D It returns to nest in the area where it hatched.

Item Information

Item Code: TNS10539

Passage Title:

Standard Code: 0507.5.1

Passage Code:

Standard Text: Identify physical and behavioral adaptations that enable animals such as, amphibians, reptiles, birds, fish, and mammals to survive in a particular environment.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

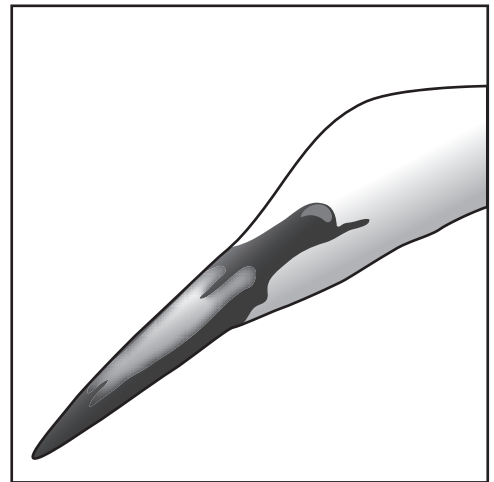
DOK Level: 2

Which bird beak is best adapted for opening hard-shelled nuts and seeds?

A



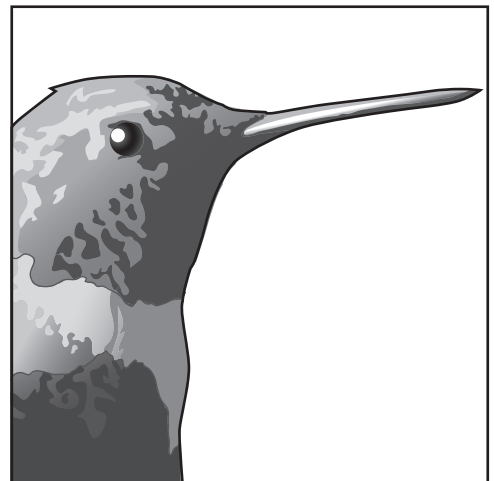
C



B



D



Item Information

Item Code: TNS30347

Passage Title:

Standard Code: 0507.5.2

Passage Code:

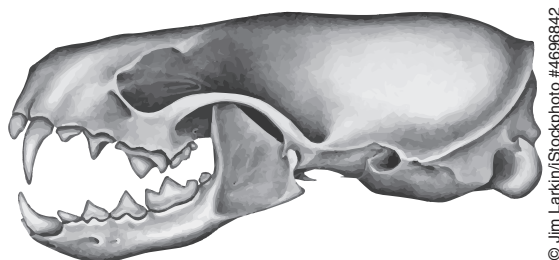
Standard Text: Explain how fossils provide information about the past.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

A fossil skull is shown in the diagram below.



Which information can be learned by examining this fossil?

- A the habitat where the animal lived
- B the temperatures the animal preferred
- C the size of the population where the animal lived
- D the type of food the animal ate

Item Information

Item Code:	TNS30043	Passage Title:	
Standard Code:	0507.5.2	Passage Code:	
Standard Text:	Explain how fossils provide information about the past.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	D	DOK Level:	2

Scientists found some fossils on land. Based on its characteristics, which fossil belonged to an animal that most likely lived under water?

A



B



C



(This item continues on the next page.)

(Item 25, continued from the previous page)

D



Item Information

Item Code:	TNS20585	Passage Title:	
Standard Code:	0507.6.1	Passage Code:	
Standard Text:	Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	C	DOK Level:	1

Which planet has the greatest mass of all the planets in the solar system?

- A** Mars
- B** Earth
- C** Jupiter
- D** Mercury

Item Information

Item Code: TNS01966	Passage Title:
Standard Code: 0507.6.1	Passage Code:
Standard Text: Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: A	DOK Level: 2

Which of these is true of the four planets that are closest to the sun?

- A** They are all rocky.
- B** They are all gaseous.
- C** They all have rings.
- D** They all have water.

Item Information

Item Code: TNS30046

Passage Title:

Standard Code: 0507.6.2

Passage Code:

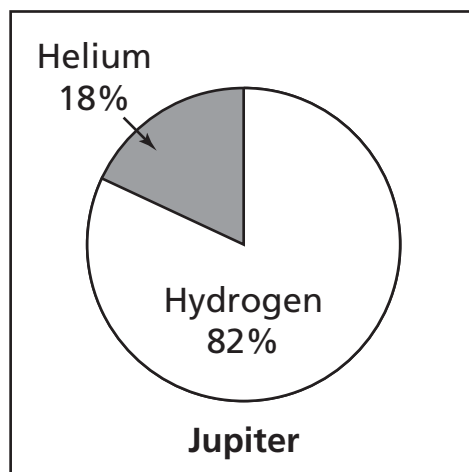
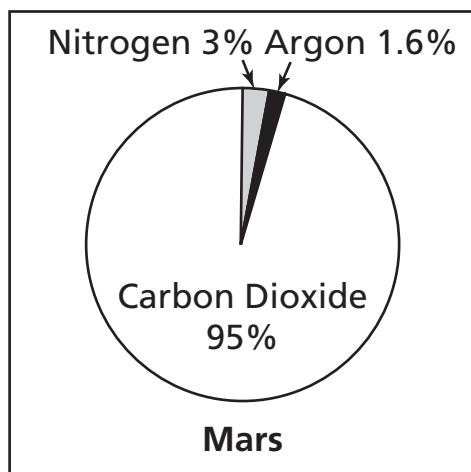
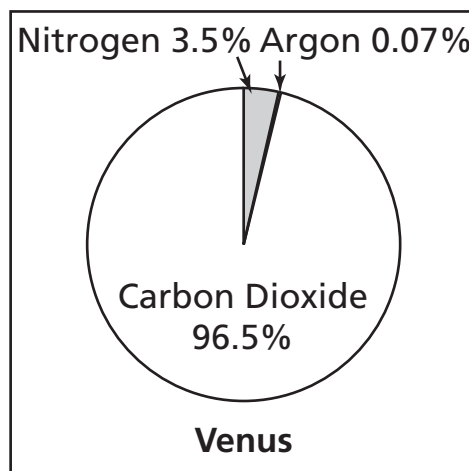
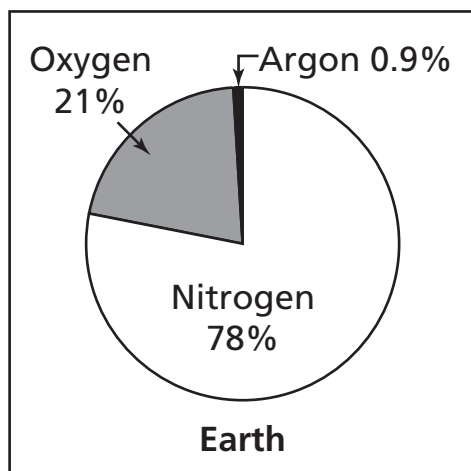
Standard Text: Select information from a complex data representation to draw conclusions about the planets.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: C

DOK Level: 2

The charts below show the main gases in the atmospheres of Earth, Jupiter, Mars, and Venus.

Approximate Percentage of Gases in Atmosphere

(This item continues on the next page.)

(Item 28, continued from the previous page)

The atmospheres of which planets have the most similar compositions?

- A** Earth and Mars
- B** Earth and Jupiter
- C** Mars and Venus
- D** Jupiter and Venus

Item Information

Item Code: TNS10734

Passage Title:

Standard Code: 0507.6.2

Passage Code:

Standard Text: Select information from a complex data representation to draw conclusions about the planets.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

Information about five planets is given.**Planetary Information**

Planet	Distance from the Sun (millions of km)	Period of Rotation	Period of Revolution
Venus	108	243 days	225 days
Earth	150	24 hours	365.25 days
Jupiter	778	10 hours	11.9 years
Uranus	2,871	18 hours	84 years
Neptune	4,497	19 hours	165 years

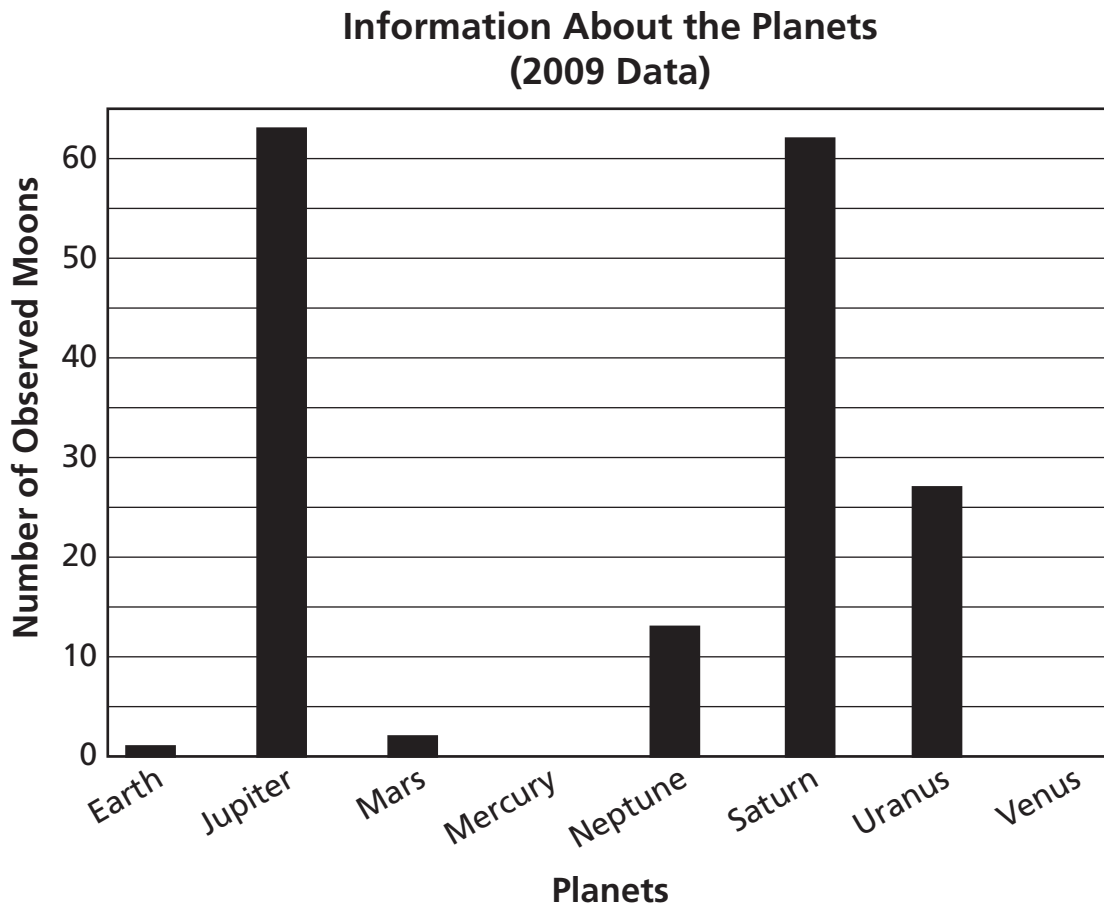
Which planet has a day that is longer than its year?

- A** Venus
- B** Jupiter
- C** Uranus
- D** Neptune

Item Information

Item Code: TNS10607	Passage Title:
Standard Code: 0507.6.2	Passage Code:
Standard Text: Select information from a complex data representation to draw conclusions about the planets.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: A	DOK Level: 1

The graph gives information about the planets.



(This item continues on the next page.)

(Item 30, continued from the previous page)

Which characteristic do Mercury and Venus have in common?

- A** a lack of moons
- B** the smallest size of all the planets
- C** the smallest distance from a planet to its moon
- D** a lunar orbit that takes the shortest time to complete

Item Information

Item Code: TNS10340	Passage Title:
Standard Code: 0507.6.2	Passage Code:
Standard Text: Select information from a complex data representation to draw conclusions about the planets.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: C	DOK Level: 3-4

The average distance of the planets to the sun is given in the table.

Planet Information

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Average Distance to Sun (in millions of kilometers)	58	108	150	228	778	1,434	2,871	4,497

Based on these data, what conclusion can be made about the inner planets compared to the outer planets?

- A** The inner planets are smaller than the outer planets.
- B** The inner planets rotate faster on their axes than the outer planets.
- C** The inner planets are closer to one another than the outer planets.
- D** The inner planets revolve more slowly around the sun than the outer planets.

Item Information

Item Code: TNS30202	Passage Title:
Standard Code: 0507.6.3	Passage Code:
Standard Text: Identify methods and tools for identifying star patterns.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: D	DOK Level: 3-4

Why must a person know the month in order to use a star chart correctly?

- A** because star charts track the motion of stars and galaxies
- B** because constellations take on different shapes at different times
- C** because only a few constellations can be recognized during a year
- D** because stars visible from one location on Earth change with the seasons

Item Information

Item Code: TNS30185	Passage Title:
Standard Code: 0507.6.3	Passage Code:
Standard Text: Identify methods and tools for identifying star patterns.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: C	DOK Level: 2

Students are using a star chart while observing the night sky. A star chart is most similar to a

- A** compass.
- B** satellite.
- C** map.
- D** telescope.

Item Information

Item Code:	TNS30157	Passage Title:	
Standard Code:	0507.7.1	Passage Code:	
Standard Text:	Describe internal forces such as volcanoes, earthquakes, faulting, and plate movements that are responsible for the earth's major geological features such as mountains, valleys, etc.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	B	DOK Level:	2

Which geological feature was formed by the action of volcanoes?

- A** the Grand Canyon
- B** the Hawaiian Islands
- C** the Florida Everglades
- D** the Mississippi River Delta

Item Information

Item Code: TNS20109

Passage Title:

Standard Code: 0507.7.1

Passage Code:

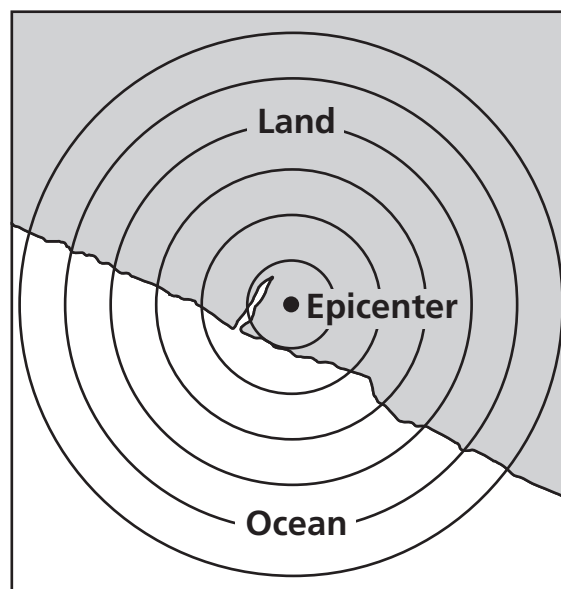
Standard Text: Describe internal forces such as volcanoes, earthquakes, faulting, and plate movements that are responsible for the earth's major geological features such as mountains, valleys, etc.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

The diagram shows the surface waves coming from the epicenter of an earthquake.



What most likely happened to cause these waves?

- A** Movement occurred along a fault.
- B** Water was pumped into the ground.
- C** Liquid rock flowed out of the ground.
- D** Sediments were deposited.

Item Information

Item Code: TNS30376

Passage Title:

Standard Code: 0507.8.1

Passage Code:

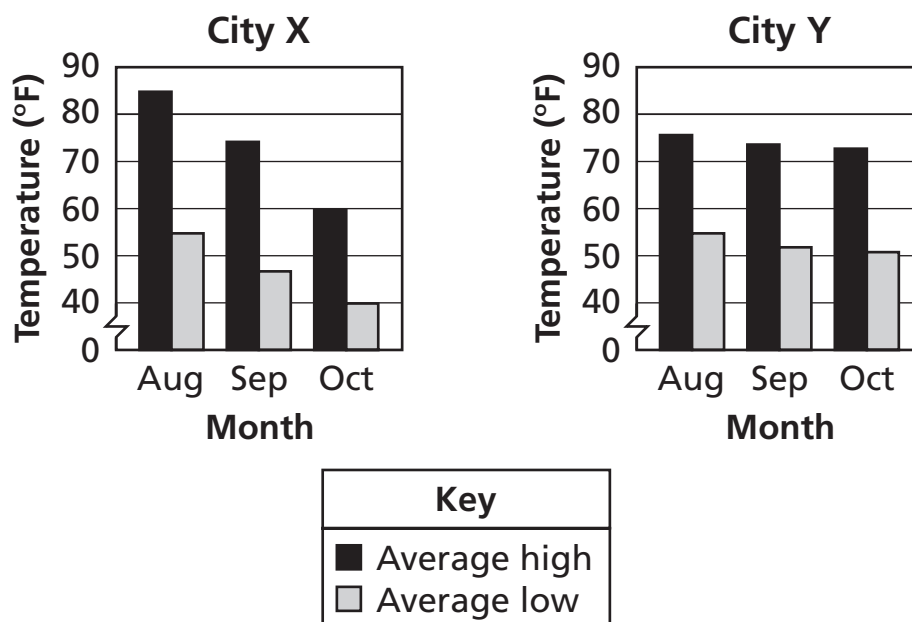
Standard Text: Describe the effects of the oceans on weather and climate.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

The graphs below show average high and low temperatures in two cities over 3 months.



Based on the graphs, what is the best conclusion about the two cities?

- A City X receives more rainfall than City Y.
- B City X has a larger population than City Y.
- C City X has stronger winds than City Y.
- D City X is farther from the ocean than City Y.

Item Information

Item Code: TNS30238

Passage Title:

Standard Code: 0507.8.2

Passage Code:

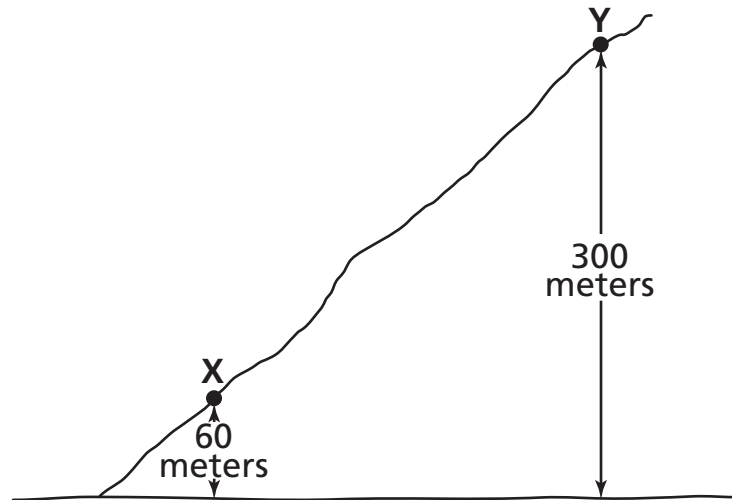
Standard Text: Explain how mountains affect weather and climate.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

A mountain area is shown below.



Which statement best compares the environments at Points X and Y?

- A** Temperatures tend to be lower at Point Y.
- B** The force of gravity is greater at Point Y.
- C** There are fewer hours of daylight at Point X.
- D** The moon appears to change phases quicker at Point X.

Item Information

Item Code: TNS30161

Passage Title:

Standard Code: 0507.8.2

Passage Code:

Standard Text: Explain how mountains affect weather and climate.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

Angela is hiking through the Great Smoky Mountains. How will the weather most likely change as she climbs higher?

- A** temperatures decrease, air becomes thinner
- B** temperatures increase, air becomes thinner
- C** temperatures decrease, air becomes thicker
- D** temperatures increase, air becomes thicker

Item Information

Item Code: TNS20316

Passage Title:

Standard Code: 0507.8.2

Passage Code:

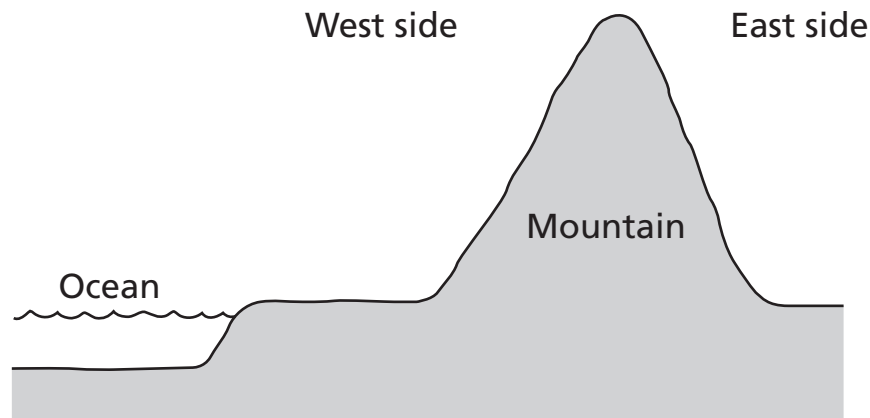
Standard Text: Explain how mountains affect weather and climate.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

The picture shows a mountain near the ocean.



Which statement best describes how temperature and rainfall are affected by the mountain?

- A** Temperatures get colder higher up the mountain, and rainfall is less on the east side of the mountain.
- B** Temperatures get warmer higher up the mountain, and rainfall is less on the east side of the mountain.
- C** Temperatures get colder higher up the mountain, and rainfall is less on the west side of the mountain.
- D** Temperatures get warmer higher up the mountain, and rainfall is less on the west side of the mountain.

Item Information

Item Code: TNS30355
Standard Code: 0507.9.1
Standard Text: Distinguish between physical and chemical properties.
Reporting Category: Matter and Energy
Correct Answer: D

Passage Title:
Passage Code:
DOK Level: 2

Some properties of aluminum are listed below.

Properties of Aluminum

State of matter (at room temperature)	Solid
Color of material	Silver
Reaction to heat	Melts at 660°C
Reaction with acid	Releases a gas

Which row on the chart describes a chemical property of aluminum?

- A State of matter
- B Color of material
- C Reaction to heat
- D Reaction with acid

Item Information

Item Code: TNS30345	Passage Title:
Standard Code: 0507.9.1	Passage Code:
Standard Text: Distinguish between physical and chemical properties.	
Reporting Category: Matter and Energy	
Correct Answer: C	DOK Level: 2

Some properties of different substances are shown in the chart below.

Properties of Substances

Substance	Property
Wood	Burns to ashes
Iron	Rusts in oxygen
Water	Becomes steam at 100°C
Baking Soda	Releases gas bubbles when mixed with vinegar

Which substance is being described by a physical property?

- A** Wood
- B** Iron
- C** Water
- D** Baking Soda

Item Information

Item Code: TNS02360	Passage Title:
Standard Code: 0507.9.1	Passage Code:
Standard Text: Distinguish between physical and chemical properties.	
Reporting Category: Matter and Energy	
Correct Answer: D	DOK Level: 1

Which sentence about physical and chemical changes is true?

- A** Both create a new substance.
- B** Neither creates a new substance.
- C** A physical change creates a new substance, but a chemical change does not.
- D** A chemical change creates a new substance, but a physical change does not.

Item Information

Item Code: TNS30358	Passage Title:
Standard Code: 0507.9.2	Passage Code:
Standard Text: Describe the differences among freezing, melting, and evaporation.	
Reporting Category: Matter and Energy	
Correct Answer: C	DOK Level: 2

Which process happens if enough heat is removed from water?

- A** boiling
- B** melting
- C** freezing
- D** evaporating

Item Information

Item Code: TNS30190

Passage Title:

Standard Code: 0507.9.2

Passage Code:

Standard Text: Describe the differences among freezing, melting, and evaporation.

Reporting Category: Matter and Energy

Correct Answer: B

DOK Level: 3-4

A child took a container of ice cream out of a freezer and placed it on a counter for an hour. Which word equation shows what happened to the ice cream?

- A** liquid – heat = solid
- B** solid + heat = liquid
- C** liquid + heat = gas
- D** solid – heat = liquid

Item Information

Item Code: TNS20266

Passage Title:

Standard Code: 0507.9.2

Passage Code:

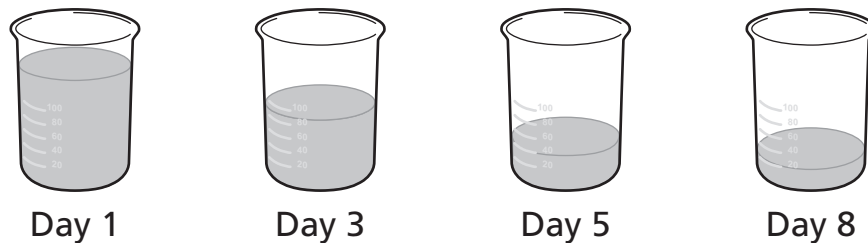
Standard Text: Describe the differences among freezing, melting, and evaporation.

Reporting Category: Matter and Energy

Correct Answer: A

DOK Level: 2

A beaker of water is left on a table and observed over several days. The results are shown below.



The water evaporates between Day 1 and Day 8 because heat is being

- A** added from the environment.
- B** removed by the environment.
- C** removed by the beaker.
- D** absorbed from the liquid.

Item Information

Item Code: TNS00362	Passage Title:
Standard Code: 0507.9.2	Passage Code:
Standard Text: Describe the differences among freezing, melting, and evaporation.	
Reporting Category: Matter and Energy	
Correct Answer: B	DOK Level: 3-4

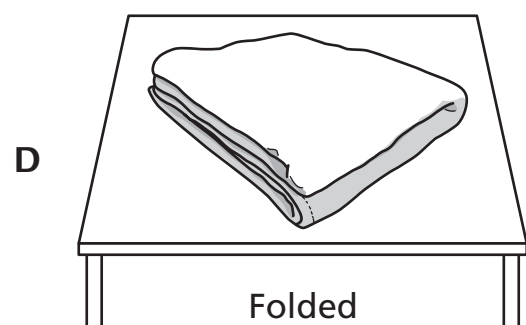
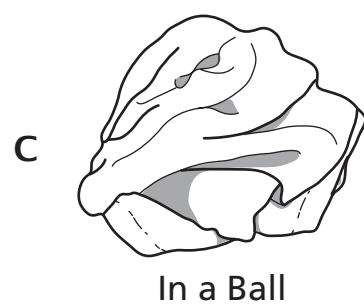
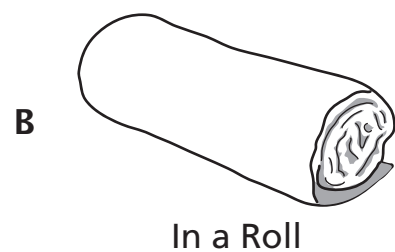
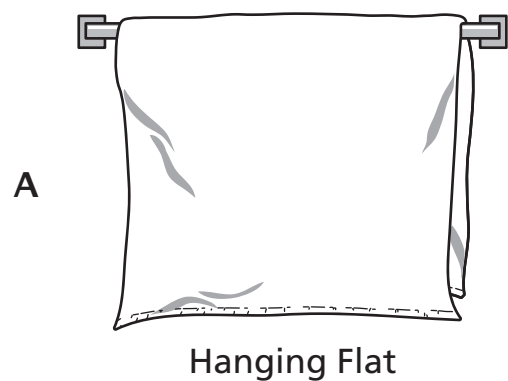
The temperature of an ice cube is raised from -10°C to 100°C . How does its state of matter change?

- A** solid \rightarrow gas \rightarrow liquid
- B** solid \rightarrow liquid \rightarrow gas
- C** liquid \rightarrow solid \rightarrow gas
- D** liquid \rightarrow gas \rightarrow solid

Item Information

Item Code:	TNS30191	Passage Title:	
Standard Code:	0507.9.3	Passage Code:	
Standard Text:	Describe factors that influence the rate at which different types of material freeze, melt, or evaporate.		
Reporting Category:	Matter and Energy		
Correct Answer:	A	DOK Level:	3-4

How should a student arrange a wet bath towel in order to increase the rate of evaporation?



Item Information

Item Code: TNS20134

Passage Title:

Standard Code: 0507.9.3

Passage Code:

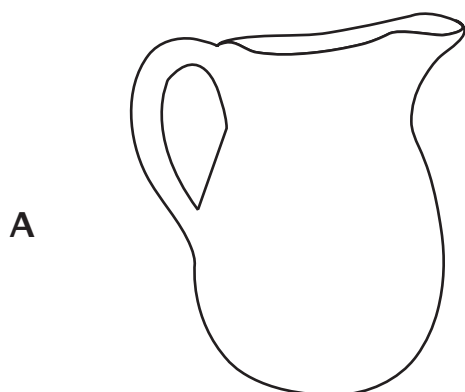
Standard Text: Describe factors that influence the rate at which different types of material freeze, melt, or evaporate.

Reporting Category: Matter and Energy

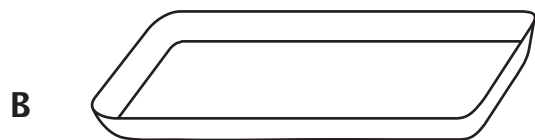
Correct Answer: B

DOK Level: 2

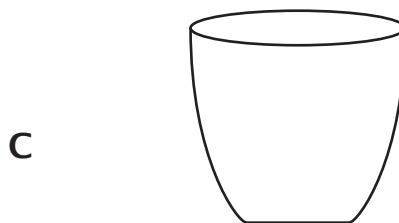
From which container will the same volume of water most likely evaporate the fastest?



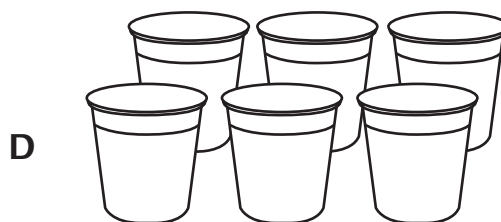
Pitcher



Pan



Bowl



Cups

Item Information

Item Code: TNS10433

Passage Title:

Standard Code: 0507.10.1

Passage Code:

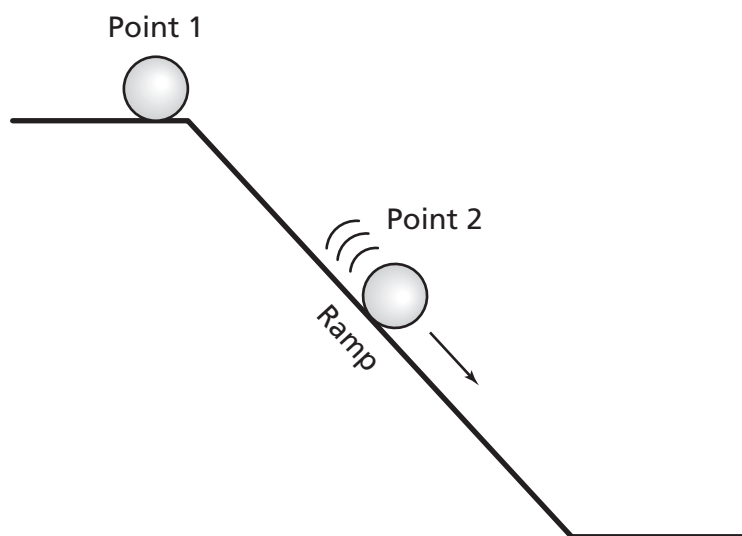
Standard Text: Differentiate between potential and kinetic energy.

Reporting Category: Matter and Energy

Correct Answer: C

DOK Level: 2

The diagram shows a ball at rest at Point 1 and the same ball rolling down the ramp at Point 2.



Compared to Point 1, at Point 2 the ball has greater

- A mass.
- B inertia.
- C kinetic energy.
- D potential energy.

Item Information

Item Code: TNS02339	Passage Title:
Standard Code: 0507.10.1	Passage Code:
Standard Text: Differentiate between potential and kinetic energy.	
Reporting Category: Matter and Energy	
Correct Answer: A	DOK Level: 1

The picture shows a child playing with a pinwheel.



What type of energy is created by the rotation of the pinwheel?

- A** kinetic energy
- B** potential energy
- C** chemical energy
- D** gravitational energy

Item Information

Item Code: TNS30369

Passage Title:

Standard Code: 0507.10.2

Passage Code:

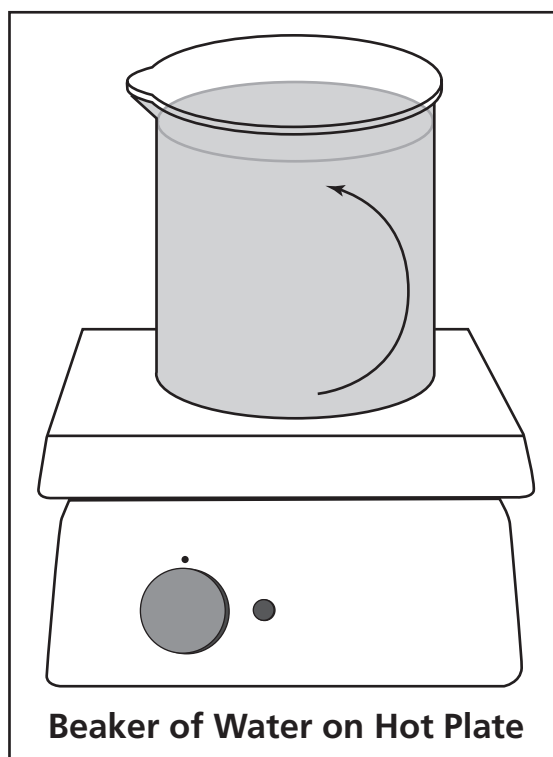
Standard Text: Use data from an investigation to determine the method by which heat energy is transferred from one object or material to another.

Reporting Category: Matter and Energy

Correct Answer: D

DOK Level: 2

Students heat a beaker of water on a hot plate.



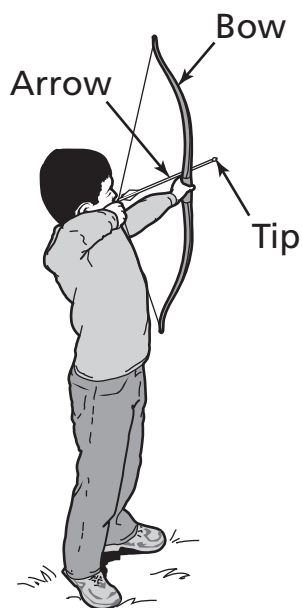
What process is identified by the arrow in the diagram?

- A** radiation
- B** conduction
- C** refraction
- D** convection

Item Information

Item Code: TNS40150	Passage Title:
Standard Code: 0507.11.1	Passage Code:
Standard Text: Explain the relationships that exist among mass, force, and distance traveled.	
Reporting Category: Motion and Forces in Nature	
Correct Answer: D	DOK Level: 2

A student used a bow to shoot four identical arrows. The tip of each arrow had a different mass, as shown in the table below.



Arrow Data

Arrow	Mass of Arrow Tip (grams)
1	65
2	85
3	100
4	125

The student shot each arrow the same way and with the same amount of force each time. Which arrow most likely traveled the shortest distance before hitting the ground?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS30380

Passage Title:

Standard Code: 0507.12.1

Passage Code:

Standard Text: Recognize that the earth attracts objects without touching them.

Reporting Category: Motion and Forces in Nature

Correct Answer: C

DOK Level: 2

Which of these is caused by the gravity of Earth?

- A** water freezing
- B** water evaporating
- C** water falling to the ground
- D** water vapor forming into clouds

Item Information

Item Code: TNS02692	Passage Title:
Standard Code: 0507.12.1	Passage Code:
Standard Text: Recognize that the earth attracts objects without touching them.	
Reporting Category: Motion and Forces in Nature	
Correct Answer: B	DOK Level: 2

Which of these causes objects on Earth to have weight?

- A** Earth's rotation
- B** Earth's gravity
- C** Earth's atmosphere
- D** Earth's magnetism

Item Information

Item Code: TNS02383

Passage Title:

Standard Code: 0507.12.1

Passage Code:

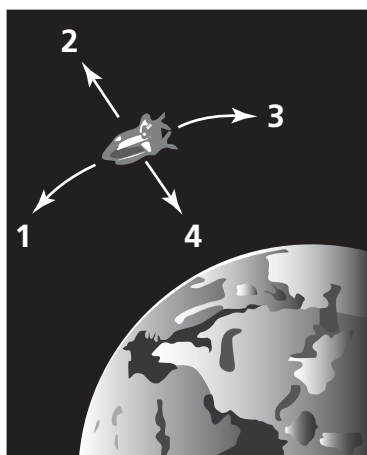
Standard Text: Recognize that the earth attracts objects without touching them.

Reporting Category: Motion and Forces in Nature

Correct Answer: D

DOK Level: 2

The diagram below shows a space shuttle flying high in Earth's outer atmosphere.



Which arrow represents the force of gravity?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS30383

Passage Title:

Standard Code: 0507.12.2

Passage Code:

Standard Text: Identify the force that causes objects to fall to the earth.

Reporting Category: Motion and Forces in Nature

Correct Answer: C

DOK Level: 2

A car is traveling on a road, as shown by the picture below.



Which best explains why the car stays on the ground?

- A** The car is moving fast.
- B** The car has smooth surfaces.
- C** Gravity from Earth pulls on the car.
- D** Friction from the road pushes on the car.

Item Information

Item Code: TNS02707	Passage Title:
Standard Code: 0507.12.2	Passage Code:
Standard Text: Identify the force that causes objects to fall to the earth.	
Reporting Category: Motion and Forces in Nature	
Correct Answer: B	DOK Level: 1

What causes objects thrown into the air to come down again?

- A** the force of friction
- B** the force of gravity
- C** the rotation of Earth on its axis
- D** the pressure of the atmosphere surrounding Earth

Item Information

Item Code: TNS30389

Passage Title:

Standard Code: 0507.12.3

Passage Code:

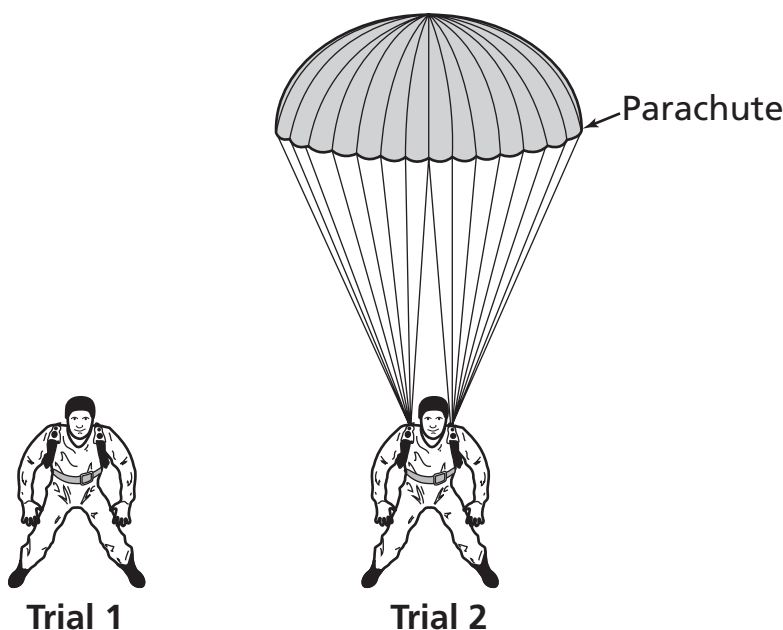
Standard Text: Use data to determine how shape affects the rate at which a material falls to earth.

Reporting Category: Motion and Forces in Nature

Correct Answer: B

DOK Level: 3-4

A student investigates factors that affect the speed of falling objects. The student drops an action figure off a balcony in two trials. In Trial 1, the student drops just the figure. In Trial 2, the student drops the action figure with a parachute.



The action figure falls more slowly during Trial 2 than Trial 1 because the parachute and the action figure

- A have a smaller mass.
- B have a larger surface.
- C have increased gravity.
- D have decreased friction.

Item Information

Item Code: TNS30193 Passage Title:
Standard Code: 0507.12.3 Passage Code:
Standard Text: Use data to determine how shape affects the rate at which a material falls to earth.
Reporting Category: Motion and Forces in Nature
Correct Answer: D DOK Level: 2

Students dropped the objects described in the table below from the same height. The students measured the time it took each object to reach the ground.

Object Drop Times

Material	Shape	Time (seconds)
Metal Foil	Sheet	3.2
Metal Foil	Ball	1.4
Notebook Paper	Sheet	3.8
Notebook Paper	Ball	1.5
Wax Paper	Sheet	3.6
Wax Paper	Ball	1.3

Which is the best conclusion based on the data in the table?





- A Metal objects fall faster than paper objects.
- B Objects dropped from greater heights drop the fastest.
- C The amount of mass in an object affects how fast it falls.
- D The shape of an object affects how fast it falls.

Item Information

Item Code: TNS20069	Passage Title:
Standard Code: 0507.12.3	Passage Code:
Standard Text: Use data to determine how shape affects the rate at which a material falls to earth.	
Reporting Category: Motion and Forces in Nature	
Correct Answer: B	DOK Level: 2

During an investigation, students folded and crumpled identical sheets of notebook paper. The students then compared the time each piece of paper took to drop from the top of a wall to the floor. The data are in the table below.

Data Table

Outline of Paper		Drop Time (seconds)
Crumpled Ball		0.8
Folded Square		1.0
Folded Triangle		1.3
Folded Rectangle		2.0

Which most affects the drop time of each piece of paper?

- A the mass
- B the shape
- C the volume
- D the texture

Item Information

Item Code:	TNS30246	Passage Title:	
Standard Code:	1.0507.TE.2	Passage Code:	
Standard Text:	Recognize the connection between a scientific advance and the development of a new tool or technology.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	B	DOK Level:	3-4

Scientists research the effect of the sun on skin cells in animals. Which product has most likely been developed from this research?

- A** clothing fibers that are extra soft
- B** lotions that block light rays
- C** soaps that destroy disease-causing organisms
- D** powders that absorb large amounts of liquid

Item Information

Item Code: TNS30330

Passage Title:

Standard Code: 2.0507.TE.1

Passage Code:

Standard Text: Select a tool, technology, or invention that was used to solve a human problem.

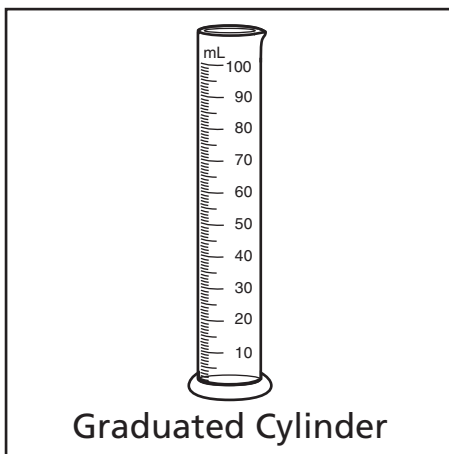
Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

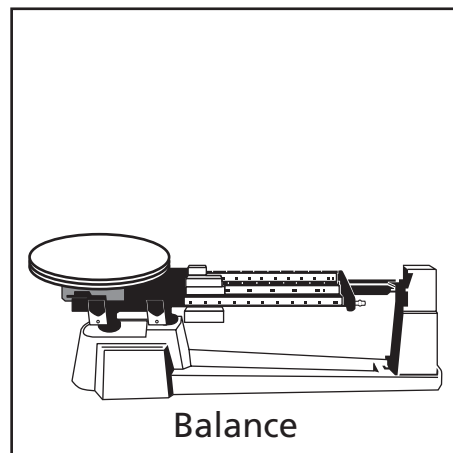
DOK Level: 2

Researchers investigated erosion at a beach after a severe summer storm. Which tool will best help the researchers measure the length of the beach that remains?

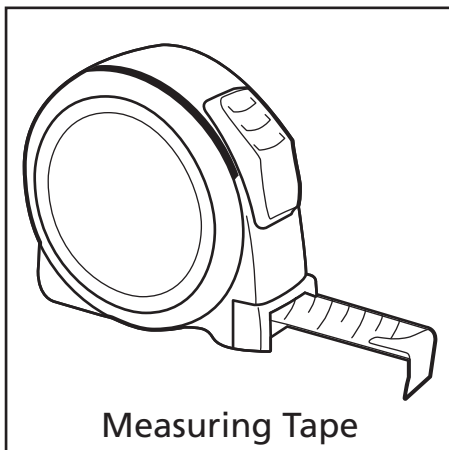
A



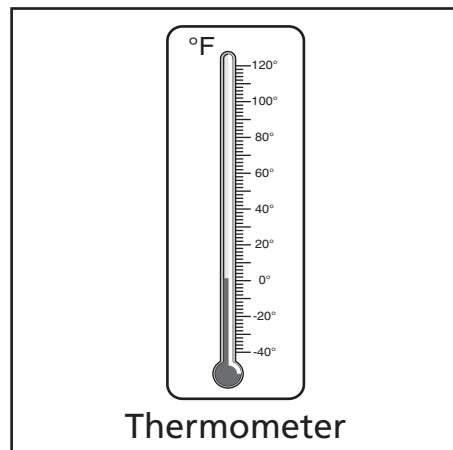
C



B



D



Item Information

Item Code:	TNS30228	Passage Title:	
Standard Code:	3.0507.TE.2	Passage Code:	
Standard Text:	Recognize the connection between a scientific advance and the development of a new tool or technology.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	A	DOK Level:	2

Scientists have invented a device that detects small vibrations under the surface of Earth. What does this instrument help scientists do?

- A** predict earthquakes
- B** improve water quality
- C** increase soil richness
- D** track violent storms

Item Information

Item Code:	TNS30163	Passage Title:	
Standard Code:	5.0507.TE.1	Passage Code:	
Standard Text:	Select a tool, technology, or invention that was used to solve a human problem.		
Reporting Category:	Motion and Forces in Nature		
Correct Answer:	B	DOK Level:	1

Students are investigating different methods of moving a heavy box from one location to another. Which tool should the students use to measure the distance between these two locations?

- A** a compass
- B** a ruler
- C** a beaker
- D** a scale

This page intentionally left blank.

This page intentionally left blank.

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 5 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 6 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 6..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Science Grade 6

Item Information

Item Code: TNS30817

Passage Title:

Standard Code: 0607.2.1

Passage Code:

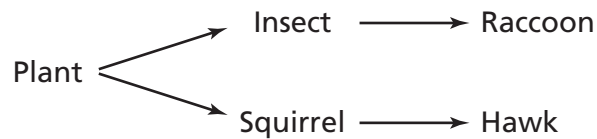
Standard Text: Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.

Reporting Category: Interdependence

Correct Answer: A

DOK Level: 2

A forest food web is shown below.



Which organism is a producer?

- A Plant
- B Squirrel
- C Raccoon
- D Hawk

Item Information

Item Code: TNS10621	Passage Title:
Standard Code: 0607.2.1	Passage Code:
Standard Text: Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.	
Reporting Category: Interdependence	
Correct Answer: A	DOK Level: 2

The diet of a box turtle includes organisms such as insects, worms, fruits, and berries. A box turtle is best described as

- A a consumer.
- B a producer.
- C a decomposer.
- D an herbivore.

Item Information

Item Code: TNS20653

Passage Title:

Standard Code: 0607.2.2

Passage Code:

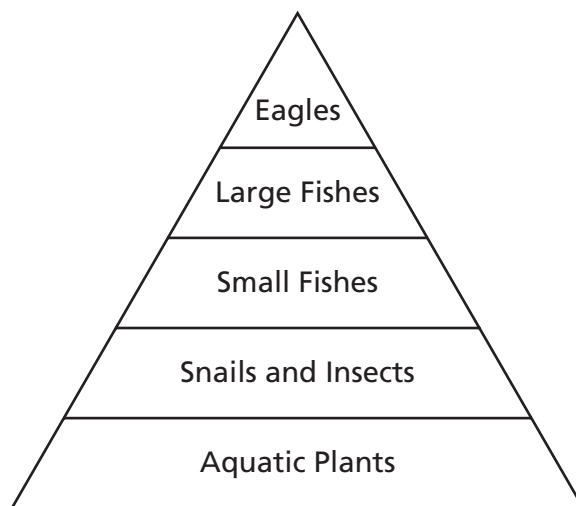
Standard Text: Interpret how materials and energy are transferred through an ecosystem.

Reporting Category: Interdependence

Correct Answer: A

DOK Level: 2

A diagram of an energy pyramid is shown below.



Which consumer receives the least amount of energy from the aquatic plants?

- A Eagles
- B Large Fishes
- C Small Fishes
- D Snails

Item Information

Item Code: TNS30706	Passage Title:
Standard Code: 0607.2.2	Passage Code:
Standard Text: Interpret how materials and energy are transferred through an ecosystem.	
Reporting Category: Interdependence	
Correct Answer: B	DOK Level: 3-4

An insect lays eggs on a leaf. After the insect larvae hatch, the larvae begin to eat the leaves. Then birds consume the larvae. How are these events best described?

- A** the classification of organisms based on their traits
- B** the transfer of energy through an ecosystem
- C** the passing of genetic traits to offspring
- D** the relationship between biotic and abiotic elements

Item Information

Item Code: TNS30746

Passage Title:

Standard Code: 0607.2.2

Passage Code:

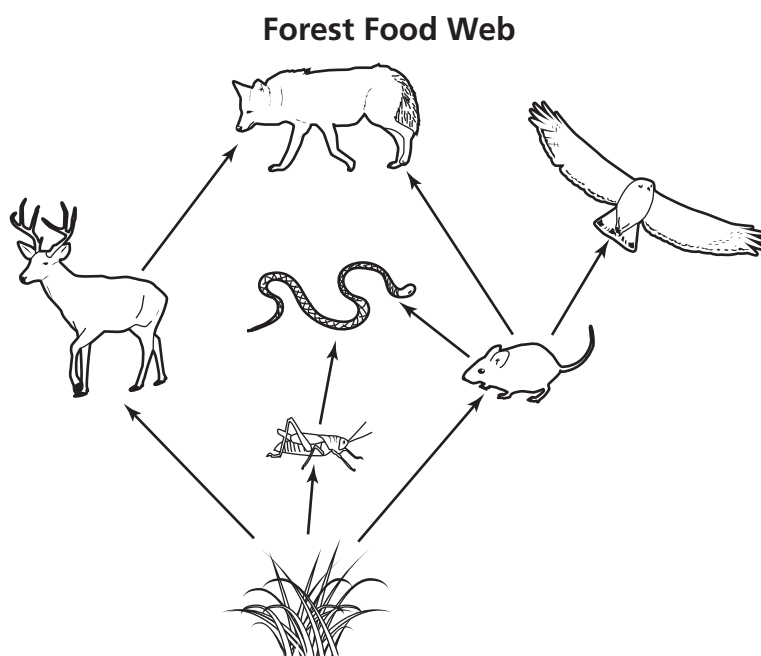
Standard Text: Interpret how materials and energy are transferred through an ecosystem.

Reporting Category: Interdependence

Correct Answer: B

DOK Level: 1

A forest food web is shown below.



Which statement is supported by this food web?

- A** Deer get energy from grasses, and wolves get energy from grasshoppers.
- B** Wolves get energy from deer, and deer get energy from grasses.
- C** Hawks get energy from snakes, and mice get energy from snakes.
- D** Snakes get energy from hawks, and mice get energy from deer.

Item Information

Item Code: TNS20654	Passage Title:
Standard Code: 0607.2.3	Passage Code:
Standard Text: Identify the biotic and abiotic elements of the major biomes.	
Reporting Category: Interdependence	
Correct Answer: D	DOK Level: 2

A chart listing biome characteristics is shown below.

Biome Organisms

Biome	Biotic Elements
Tundra	Polar bears, caribou, moss
Desert	Snakes, lizards, yucca
Grassland	Prairie dogs, zebras, grassy fields
Rain forest	?

Which biotic elements best complete this chart?

- A Arctic foxes, reindeer, lichens
- B Camels, toads, cacti
- C Antelope, buffalo, grass
- D Gorillas, sloths, bamboo

Item Information

Item Code: TNS30707

Passage Title:

Standard Code: 0607.2.3

Passage Code:

Standard Text: Identify the biotic and abiotic elements of the major biomes.

Reporting Category: Interdependence

Correct Answer: B

DOK Level: 2

The diagram shows a forest biome.



Two abiotic elements in this forest biome are the

- A tree and the rabbit.
- B soil and the air.
- C owl and the soil.
- D grass and the tree.

Item Information

Item Code: TNS30777	Passage Title:
Standard Code: 0607.2.3	Passage Code:
Standard Text: Identify the biotic and abiotic elements of the major biomes.	
Reporting Category: Interdependence	
Correct Answer: B	DOK Level: 2

Which is a biotic factor within an ocean biome?

- A** oxygen dissolving in seawater
- B** clams living in the sea floor mud
- C** sunlight heating the seawater
- D** sediment making up the sea floor

Item Information

Item Code: TNS30520

Passage Title:

Standard Code: 0607.2.4

Passage Code:

Standard Text: Identify the environmental conditions and interdependencies among organisms found in the major biomes.

Reporting Category: Interdependence

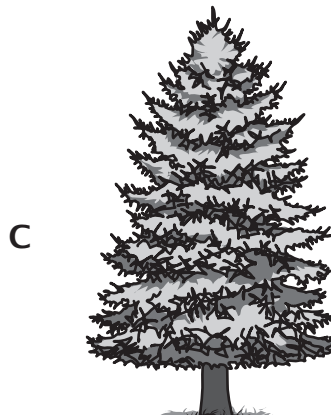
Correct Answer: D

DOK Level: 2

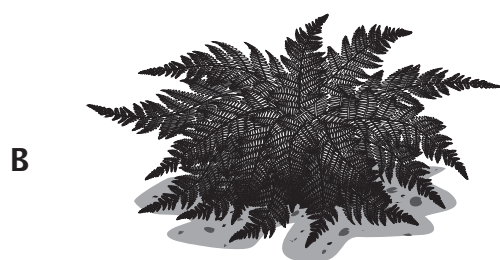
Which plant is most likely found in a dry, hot environment that receives little rainfall?



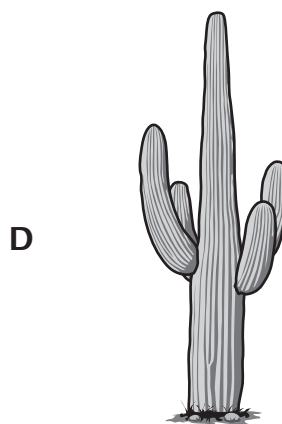
Banana Plant



Pine Tree



Fern Plant



Saguaro Cactus

Item Information

Item Code: TNS30512

Passage Title:

Standard Code: 0607.2.4

Passage Code:

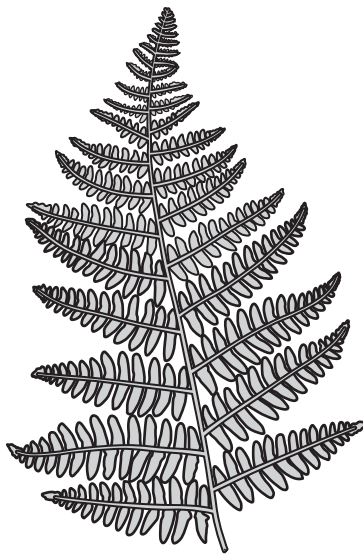
Standard Text: Identify the environmental conditions and interdependencies among organisms found in the major biomes.

Reporting Category: Interdependence

Correct Answer: D

DOK Level: 2

The picture below shows a leaf that belongs to a plant that grows well in shaded areas. It lives in a biome that has many large trees and an average yearly precipitation of 75 – 150 centimeters.



In which type of biome does this type of plant most likely live?

- A Arctic tundra
- B desert
- C grassland
- D rain forest

Item Information

Item Code: TNS30676

Passage Title:

Standard Code: 0607.6.1

Passage Code:

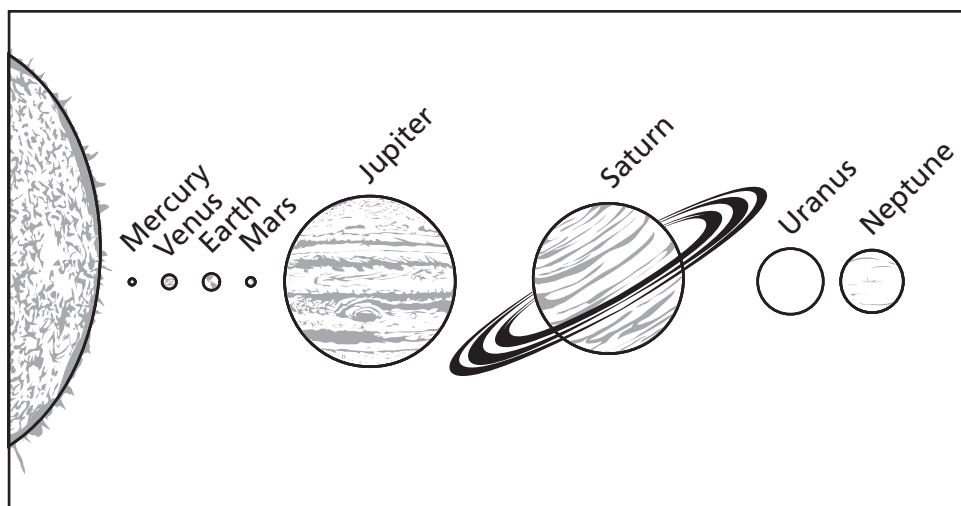
Standard Text: Use data to draw conclusions about the major components of the universe.

Reporting Category: The Universe

Correct Answer: B

DOK Level: 2

The diagram below shows the solar system.



If all the planets started at the same time and traveled at the same speed around the sun, which planet listed below would take the longest time to orbit the sun?

- A Mercury
- B Uranus
- C Earth
- D Venus

Item Information

Item Code: TNS10728	Passage Title:
Standard Code: 0607.6.1	Passage Code:
Standard Text: Use data to draw conclusions about the major components of the universe.	
Reporting Category: The Universe	
Correct Answer: B	DOK Level: 2

The table below compares several objects in the universe.

Objects in the Solar System

Object	Composition	Orbit
Comet	Made of ice and dust	Some orbit the sun on a regular path
Asteroid	Made of rock and metal	Most orbit the sun between Mars and Jupiter
Sun	Made of mostly gas	Orbits the center of the galaxy
Planet	Made of rock and metal, or gas	All orbit the sun

Based on the table, if an object is made of rock and metal and orbits the sun between Mars and Jupiter, the object is most likely

- A a comet.
- B an asteroid.
- C the sun.
- D a planet.

Item Information

Item Code:	TNS10582	Passage Title:	
Standard Code:	0607.6.2	Passage Code:	
Standard Text:	Explain how the relative distance of objects from the earth affects how they appear.		
Reporting Category:	The Universe		
Correct Answer:	D	DOK Level:	1

**The moon appears larger than other objects
in the night sky when viewed from Earth
because the moon is**

- A** reflecting light from the sun
- B** much larger than Earth
- C** orbiting the sun
- D** closer to Earth

Item Information

Item Code: TNS30751	Passage Title:
Standard Code: 0607.6.2	Passage Code:
Standard Text: Explain how the relative distance of objects from the earth affects how they appear.	
Reporting Category: The Universe	
Correct Answer: B	DOK Level: 1

Uranus and Neptune are each approximately 51,000 kilometers in diameter. Which best explains why Neptune looks smaller than Uranus when viewed from the surface of an inner planet?

- A** Neptune has a denser atmosphere than Uranus.
- B** Neptune is at a greater distance than Uranus.
- C** Neptune receives more sunlight than Uranus.
- D** Neptune rotates on its axis more slowly than Uranus.

Item Information

Item Code: TNS20992	Passage Title:
Standard Code: 0607.6.2	Passage Code:
Standard Text: Explain how the relative distance of objects from the earth affects how they appear.	
Reporting Category: The Universe	
Correct Answer: C	DOK Level: 2

Quasars appear as very small objects through telescopes but they are much larger and brighter than any star. How can this size difference be explained?

- A** Light traveling great distances loses energy before it reaches Earth.
- B** Light travels faster from small objects than from large objects.
- C** Objects that are millions of light years away from Earth appear smaller.
- D** Objects closer to Earth appear to be smaller and less bright.

Item Information

Item Code: TNS21209	Passage Title:
Standard Code: 0607.6.3	Passage Code:
Standard Text: Distinguish among a day, lunar cycle, and year based on the movements of the earth, sun, and moon.	
Reporting Category: The Universe	
Correct Answer: C	DOK Level: 2

Which movement is completed in a 24 hour time period?

- A** Earth completing a revolution around the sun
- B** the moon completing a revolution around Earth
- C** Earth completing a rotation on its axis
- D** the outer planets orbiting the sun

Item Information

Item Code: TNS30645

Passage Title:

Standard Code: 0607.6.4

Passage Code:

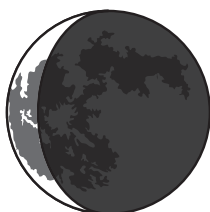
Standard Text: Explain the different phases of the moon using a model of the earth, moon, and sun.

Reporting Category: The Universe

Correct Answer: C

DOK Level: 1

A diagram of a moon phase is shown.

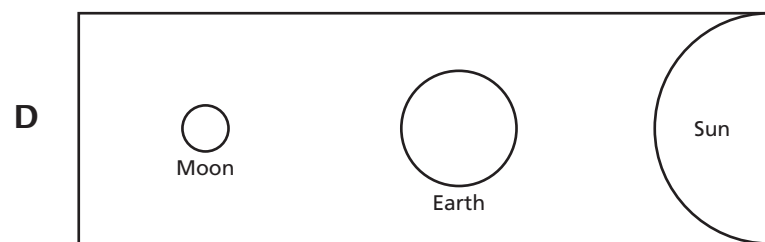
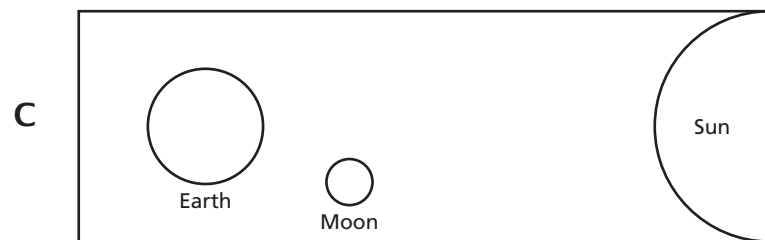
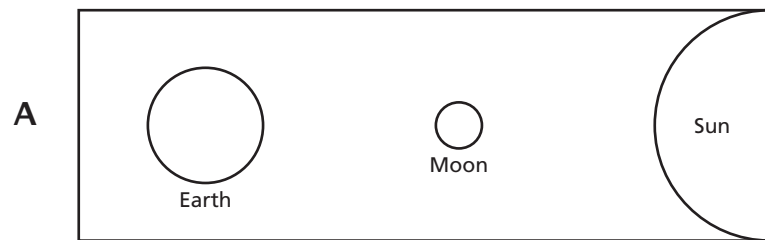


Moon

(This item continues on the next page.)

(Item 18, continued from the previous page)

Which diagram demonstrates the correct positions for the moon, the sun, and Earth for this moon phase?



Item Information

Item Code: TNS30507

Passage Title:

Standard Code: 0607.6.4

Passage Code:

Standard Text: Explain the different phases of the moon using a model of the earth, moon, and sun.

Reporting Category: The Universe

Correct Answer: D

DOK Level: 3-4

A diagram demonstrating a moon phase is shown below.



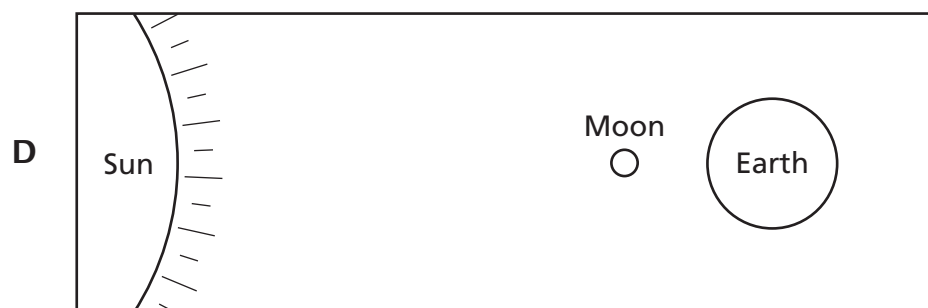
Based on the diagram, which moon phase is visible from Earth?

- A waxing crescent
- B waning crescent
- C waxing gibbous
- D waning gibbous

Item Information

Item Code:	TNS30509	Passage Title:	
Standard Code:	0607.6.5	Passage Code:	
Standard Text:	Predict the types of tides that occur when the earth and moon occupy various positions.		
Reporting Category:	The Universe		
Correct Answer:	D	DOK Level:	2

Which diagram shows how the highest high tides are created on Earth?



Item Information

Item Code: TNS30756

Passage Title:

Standard Code: 0607.6.5

Passage Code:

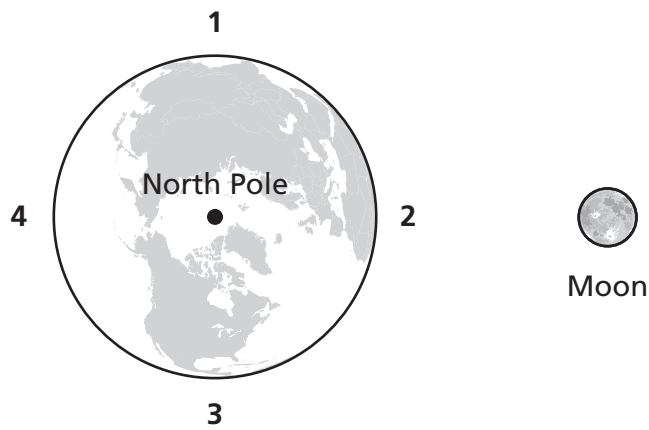
Standard Text: Predict the types of tides that occur when the earth and moon occupy various positions.

Reporting Category: The Universe

Correct Answer: D

DOK Level: 2

The diagram shows Earth and the moon.



At which numbered locations will the tides be the lowest?

- A 1 and 2
- B 3 and 4
- C 2 and 4
- D 1 and 3

Item Information

Item Code: TNS10446

Passage Title:

Standard Code: 0607.6.5

Passage Code:

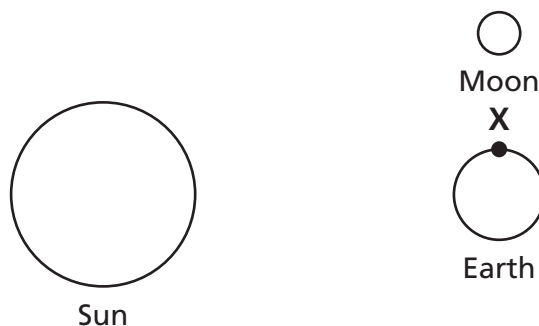
Standard Text: Predict the types of tides that occur when the earth and moon occupy various positions.

Reporting Category: The Universe

Correct Answer: A

DOK Level: 3-4

The relative positions of the sun, the moon, and Earth are shown.



Which event will most likely occur at point X?

- A neap tide
- B spring tide
- C new moon
- D full moon

Item Information

Item Code: TNS30758

Passage Title:

Standard Code: 0607.6.6

Passage Code:

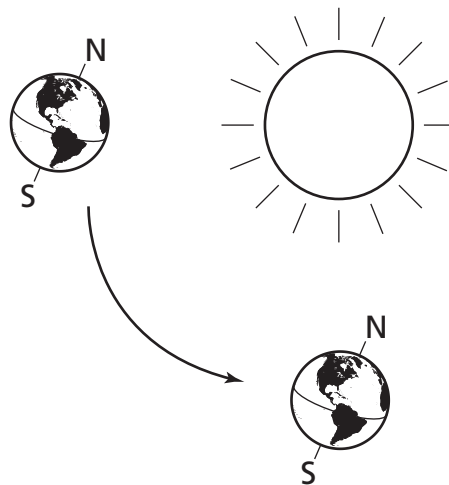
Standard Text: Use a diagram that shows the positions of the earth and sun to explain the four seasons.

Reporting Category: The Universe

Correct Answer: B

DOK Level: 2

The diagram shows Earth at two different positions and the sun.



Which statement best identifies how the seasons in the Northern Hemisphere change as Earth moves, based on the diagram?

- A Winter turns to spring.
- B Summer turns to fall.
- C Fall turns to winter.
- D Spring turns to summer.

Item Information

Item Code: TNS20661

Passage Title:

Standard Code: 0607.6.6

Passage Code:

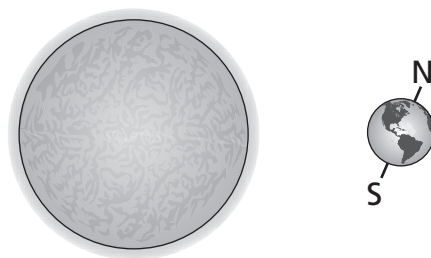
Standard Text: Use a diagram that shows the positions of the earth and sun to explain the four seasons.

Reporting Category: The Universe

Correct Answer: A

DOK Level: 2

A diagram of the sun and Earth is shown below.



According to the diagram, what season is occurring in the Northern Hemisphere of Earth?

- A winter
- B spring
- C summer
- D fall

Item Information

Item Code: TNS20663

Passage Title:

Standard Code: 0607.6.7

Passage Code:

Standard Text: Explain the difference between a solar and a lunar eclipse.

Reporting Category: The Universe

Correct Answer: B

DOK Level: 2

The difference between a solar eclipse and a lunar eclipse is that during a lunar eclipse

- A** the sun is positioned directly above the moon.
- B** Earth blocks the light from the sun.
- C** the sun is positioned between Earth and the moon.
- D** the moon blocks the light to Earth.

Item Information

Item Code: TNS30521

Passage Title:

Standard Code: 0607.6.7

Passage Code:

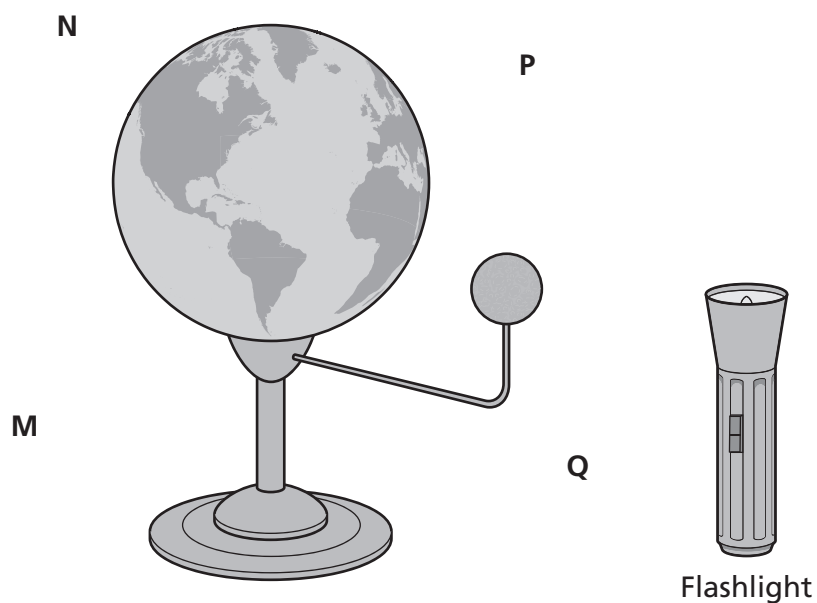
Standard Text: Explain the difference between a solar and a lunar eclipse.

Reporting Category: The Universe

Correct Answer: D

DOK Level: 2

This model can be used to demonstrate a solar eclipse.



A flashlight will represent the sun. In which position should the flashlight go to best demonstrate a solar eclipse?

- A** M
- B** N
- C** P
- D** Q

Item Information

Item Code: TNS10588

Passage Title:

Standard Code: 0607.6.7

Passage Code:

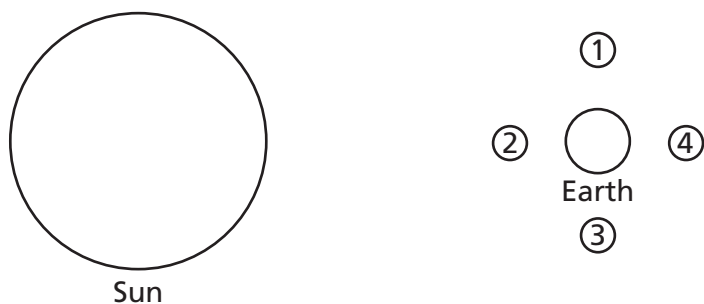
Standard Text: Explain the difference between a solar and a lunar eclipse.

Reporting Category: The Universe

Correct Answer: D

DOK Level: 2

The diagram shows four positions of the moon as viewed from above the North Pole of Earth.



In which position is the moon located when a lunar eclipse occurs?

- A** 1
- B** 2
- C** 3
- D** 4

Item Information

Item Code: TNS30715

Passage Title:

Standard Code: 0607.8.1

Passage Code:

Standard Text: Analyze data to identify events associated with heat convection in the atmosphere.

Reporting Category: The Atmosphere

Correct Answer: B

DOK Level: 1

The table below shows wind speed forecasts. The barometric pressure at the time of the forecast was 729 mmHg and rising.

Wind Speed Forecasts

Time	Speed (kph)
1.0 hr	67
1.5 hr	56
2.0 hr	53
2.5 hr	45
3.0 hr	40
3.5 hr	27
4.0 hr	17

Which type of weather is most likely to occur when the time equals 5 hours?

- A partly cloudy skies and strong winds
- B clear skies and light winds
- C strong thunderstorms and light winds
- D clear skies and strong winds

Item Information

Item Code: TNS30651

Passage Title:

Standard Code: 0607.8.1

Passage Code:

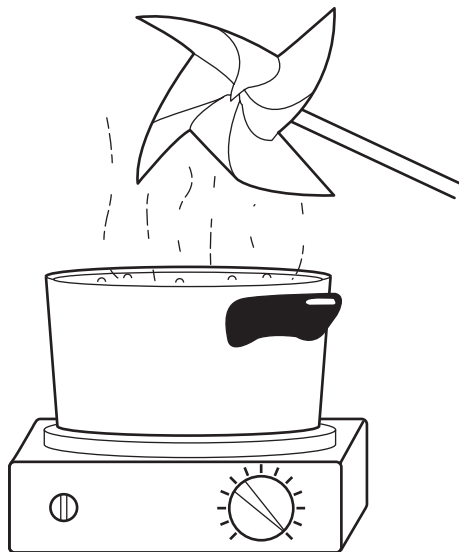
Standard Text: Analyze data to identify events associated with heat convection in the atmosphere.

Reporting Category: The Atmosphere

Correct Answer: A

DOK Level: 2

A student held a pinwheel above a pot of boiling water. The student observed the pinwheel spinning.



Which of these is best demonstrated by this activity?

- A** convection currents
- B** potential energy
- C** chemical energy
- D** magnetic fields

Item Information

Item Code: TNS30529

Passage Title:

Standard Code: 0607.8.2

Passage Code:

Standard Text: Recognize the connection between the sun's energy and the wind.

Reporting Category: The Atmosphere

Correct Answer: C

DOK Level: 1

Which action produces wind?

- A** the rotation of Earth on its axis
- B** the revolution of Earth around the sun
- C** the uneven heating of Earth by the sun's energy
- D** the pull of the sun's gravity on Earth

Item Information

Item Code: TNS21120	Passage Title:
Standard Code: 0607.8.2	Passage Code:
Standard Text: Recognize the connection between the sun's energy and the wind.	
Reporting Category: The Atmosphere	
Correct Answer: A	DOK Level: 1

What is the primary energy source needed to create wind on Earth?

- A** sunlight
- B** tides
- C** fossil fuels
- D** volcanic eruptions

Item Information

Item Code: TNS10525

Passage Title:

Standard Code: 0607.8.2

Passage Code:

Standard Text: Recognize the connection between the sun's energy and the wind.

Reporting Category: The Atmosphere

Correct Answer: A

DOK Level: 2

Air over land changes temperature at a different rate than air over water. Which statement best describes how this difference causes wind?

- A** The warmer air over land rises as cooler air over water takes its place.
- B** The cooler air over water moves toward land to mix with the warmer air.
- C** The cooler air over water rises and the warmer air over land sinks.
- D** The warmer air over land moves toward the water, forcing the cooler air to rise.

Item Information

Item Code: TNS30762

Passage Title:

Standard Code: 0607.8.3

Passage Code:

Standard Text: Describe how temperature differences in the ocean account for currents.

Reporting Category: The Atmosphere

Correct Answer: A

DOK Level: 1

The diagram shows the Norwegian Current, which is located in the Northern Hemisphere.



Which statement best describes the type of water carried by the Norwegian Current as it moves from the tropics toward the North Pole?

- A The water is warm and near the surface.
- B The water is cold and dense.
- C The water is cold and comes up to the surface.
- D The water is warm and deep.

Item Information

Item Code: TNS10665	Passage Title:
Standard Code: 0607.8.3	Passage Code:
Standard Text: Describe how temperature differences in the ocean account for currents.	
Reporting Category: The Atmosphere	
Correct Answer: C	DOK Level: 2

Which statement best describes the movement of ocean currents?

- A** Warm currents start flowing at the poles.
- B** Cold currents start flowing at the equator.
- C** Cold currents tend to flow under warm currents.
- D** Warm currents tend to flow deeper than cold currents.

Item Information

Item Code: TNS30717

Passage Title:

Standard Code: 0607.8.3

Passage Code:

Standard Text: Describe how temperature differences in the ocean account for currents.

Reporting Category: The Atmosphere

Correct Answer: B

DOK Level: 2

The Gulf Stream current is found in the Atlantic Ocean and flows from the tropics to the northern latitudes. Which best explains the movement of the Gulf Stream current?

- A** The warm current is more dense and pushes cold waters toward the equator.
- B** The warm current flows toward the poles where it cools and sinks.
- C** The warm current contains an electrical charge that is attracted to the magnetic poles.
- D** The warm current contains sediment that is heavier than cold currents and pushes them downward.

Item Information

Item Code: TNS30763	Passage Title:
Standard Code: 0607.8.4	Passage Code:
Standard Text: Interpret meteorological data to make predictions about the weather.	
Reporting Category: The Atmosphere	
Correct Answer: A	DOK Level: 2

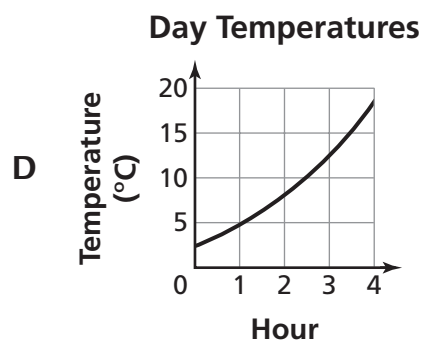
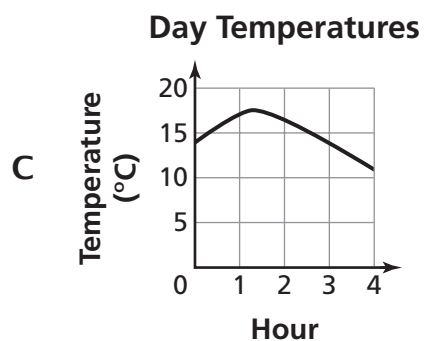
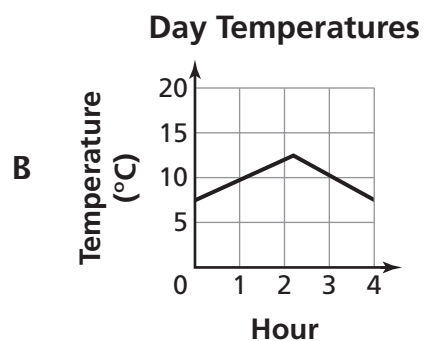
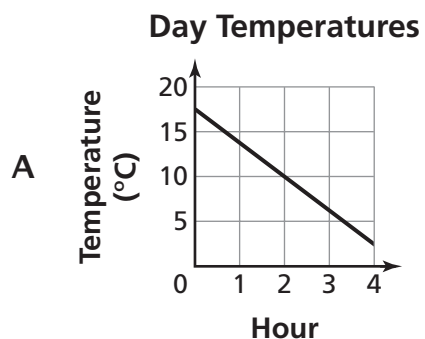
A student notices that the reading on the barometer is 754 mmHg and falling slowly. Which other weather observation is the student most likely to make?

- A** thunderstorms
- B** clear skies
- C** drier conditions
- D** decreasing winds

Item Information

Item Code: TNS30526	Passage Title:
Standard Code: 0607.8.4	Passage Code:
Standard Text: Interpret meteorological data to make predictions about the weather.	
Reporting Category: The Atmosphere	
Correct Answer: D	DOK Level: 2

Which graph best shows the temperatures for a day that started very cool before a warm front moved through the area?



Item Information

Item Code:	TNS30764	Passage Title:	
Standard Code:	0607.10.1	Passage Code:	
Standard Text:	Distinguish among gravitational potential energy, elastic potential energy, and chemical potential energy.		
Reporting Category:	Energy, Forces in Nature		
Correct Answer:	B	DOK Level:	1

Which action is most likely to increase the gravitational potential energy of an object?

- A stretching a spring
- B lifting a crate
- C spinning a turbine
- D charging a battery

Item Information

Item Code: TNS30719	Passage Title:
Standard Code: 0607.10.1	Passage Code:
Standard Text: Distinguish among gravitational potential energy, elastic potential energy, and chemical potential energy.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: B	DOK Level: 3-4

Which activity results in a decrease in chemical potential energy?

- A** The shape of an ice cube changes as it melts.
- B** A battery-operated device is turned on.
- C** The leaves of a tomato plant photosynthesize.
- D** A hillside is weathered by wind and rain.

Item Information

Item Code: TNS30670

Passage Title:

Standard Code: 0607.10.2

Passage Code:

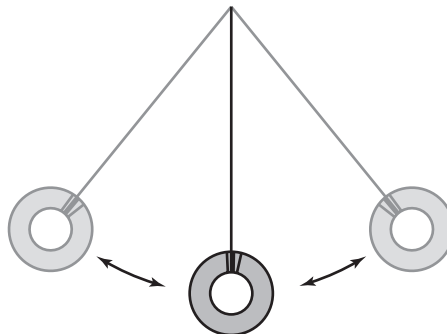
Standard Text: Interpret the relationship between potential and kinetic energy.

Reporting Category: Energy, Forces in Nature

Correct Answer: A

DOK Level: 2

A swinging pendulum is shown below.



Which statement best explains the motion of the pendulum?

- A The potential energy decreases as the kinetic energy increases.
- B The chemical energy decreases as the sound energy increases.
- C The kinetic energy increases as the electrical energy decreases.
- D The electrical energy increases as the potential energy decreases.

Item Information

Item Code: TNS30780	Passage Title:
Standard Code: 0607.10.2	Passage Code:
Standard Text: Interpret the relationship between potential and kinetic energy.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: C	DOK Level: 3-4

Which change best shows the potential energy increasing while the kinetic energy is decreasing?

- A a rock rolling down a hill
- B a windup toy moving across a floor
- C a bicycle slowing as it coasts up a hill
- D an airplane lifting off a runway

Item Information

Item Code: TNS21219	Passage Title:
Standard Code: 0607.10.2	Passage Code:
Standard Text: Interpret the relationship between potential and kinetic energy.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: A	DOK Level: 2

Which best describes the relationship between kinetic energy and potential energy?

- A** Potential energy can be changed into kinetic energy.
- B** Both require gravitational forces to cause change.
- C** Both require a chemical reaction to cause a change.
- D** Potential energy is stored as kinetic energy.

Item Information

Item Code: TNS30516

Passage Title:

Standard Code: 0607.10.3

Passage Code:

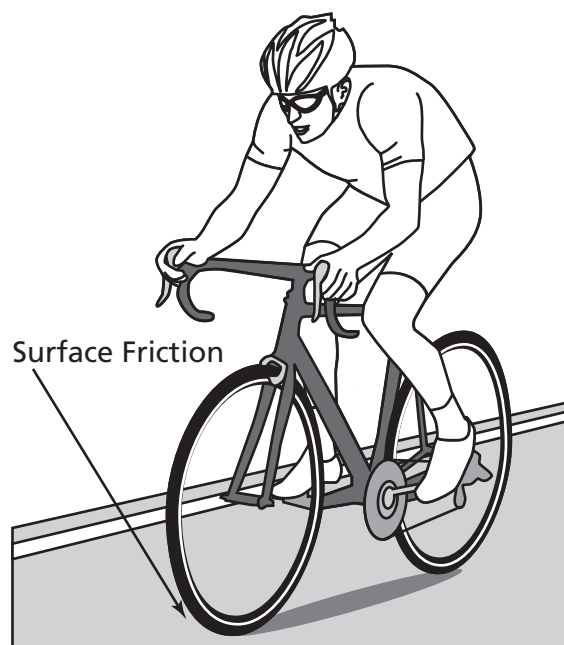
Standard Text: Recognize that energy can be transformed from one type to another.

Reporting Category: Energy, Forces in Nature

Correct Answer: C

DOK Level: 2

The diagram below shows a bicycle being ridden over a surface.



Which of these will occur when a bicycle is slowed down by surface friction?

- A Light will be produced.
- B Mass will be increased.
- C Heat will be produced.
- D Gravity will be increased.

Item Information

Item Code: TNS02032	Passage Title:
Standard Code: 0607.10.3	Passage Code:
Standard Text: Recognize that energy can be transformed from one type to another.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: B	DOK Level: 2

Green plants store energy by changing

- A** chemical energy into light energy
- B** light energy into chemical energy
- C** chemical energy into heat energy
- D** heat energy into chemical energy

Item Information

Item Code: TNS30783	Passage Title:
Standard Code: 0607.10.3	Passage Code:
Standard Text: Recognize that energy can be transformed from one type to another.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: A	DOK Level: 1

A student rubs a metal coin against a rock and notices the coin becomes warmer. Which best describes this energy transformation?

- A** mechanical energy to heat energy
- B** electromagnetic energy to chemical energy
- C** heat energy to mechanical energy
- D** chemical energy to electromagnetic energy

Item Information

Item Code:	TNS10730	Passage Title:	
Standard Code:	0607.10.4	Passage Code:	
Standard Text:	Explain the Law of Conservation of Energy using data from a variety of energy transformations.		
Reporting Category:	Energy, Forces in Nature		
Correct Answer:	D	DOK Level:	2

A toy car has a metal spring inside that can be wound. As the spring unwinds, it moves the wheels, causing the toy car to roll forward. How does this demonstrate the law of conservation of energy?

- A** The mass of the spring stayed constant, so its energy also stayed constant.
- B** The mass of the spring changed when wound, so the energy of the car changed.
- C** The energy in the spring increased as the motion of the car increased.
- D** The energy in the spring was transferred to the car, causing it to move.

Item Information

Item Code:	TNS30658	Passage Title:	
Standard Code:	0607.10.4	Passage Code:	
Standard Text:	Explain the Law of Conservation of Energy using data from a variety of energy transformations.		
Reporting Category:	Energy, Forces in Nature		
Correct Answer:	B	DOK Level:	2

A pencil slowed as it rolled across a student's desk. What happened to the kinetic energy of the pencil as it rolled across the desk?

- A** It increased.
- B** It transformed into heat and sound.
- C** It was destroyed.
- D** It transformed into mechanical energy.

Item Information

Item Code: TNS30680	Passage Title:
Standard Code: 0607.12.1	Passage Code:
Standard Text: Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: B	DOK Level: 2

A student made a simple circuit that included a buzzer. Which type of energy transformation will take place when he closes the switch and the buzzer is activated?

- A** heat energy to electrical energy
- B** electrical energy to sound energy
- C** sound energy to chemical energy
- D** sound energy to heat energy

Item Information

Item Code: TNS30768

Passage Title:

Standard Code: 0607.12.1

Passage Code:

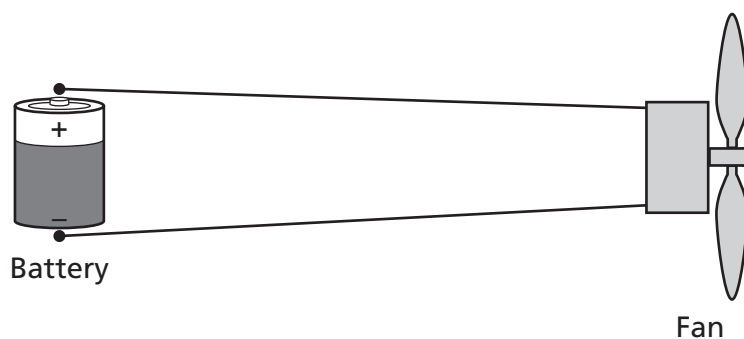
Standard Text: Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.

Reporting Category: Energy, Forces in Nature

Correct Answer: A

DOK Level: 2

The diagram shows an electrical circuit that operates a fan.



Which of these best describes the energy transformations that will occur when the battery is attached to this circuit?

- A chemical energy to electrical energy to mechanical energy
- B electrical energy to chemical energy to mechanical energy
- C chemical energy to heat energy to electrical energy
- D electrical energy to chemical energy to heat energy

Item Information

Item Code:	TNS10457	Passage Title:	
Standard Code:	0607.12.1	Passage Code:	
Standard Text:	Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.		
Reporting Category:	Energy, Forces in Nature		
Correct Answer:	C	DOK Level:	2

A battery powers an alarm in a toy. Which is an energy transformation that takes place in this device?

- A** electrical to sound to kinetic
- B** kinetic to sound to chemical
- C** chemical to electrical to sound
- D** sound to chemical to electrical

Item Information

Item Code: TNS30788	Passage Title:
Standard Code: 0607.12.2	Passage Code:
Standard Text: Identify materials that can conduct electricity.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: C	DOK Level: 1

What do the objects aluminum foil, a nickel, and an iron rod all have in common?

- A** They are made of the same material.
- B** They can be bent easily.
- C** They are good conductors of electric current.
- D** They are good insulators of heat energy.

Item Information

Item Code: TNS30769	Passage Title:
Standard Code: 0607.12.2	Passage Code:
Standard Text: Identify materials that can conduct electricity.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: A	DOK Level: 1

Tools with rubber handles are frequently used when performing electrical repairs. Which best explains why it is helpful to use tools with rubber handles when working with electricity?

- A** The rubber is a poor conductor of electricity.
- B** The rubber has a high melting point.
- C** The rubber is a good conductor of electricity.
- D** The rubber has properties that allow it to be flexible.

Item Information

Item Code: TNS30770	Passage Title:
Standard Code: 0607.12.2	Passage Code:
Standard Text: Identify materials that can conduct electricity.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: B	DOK Level: 2

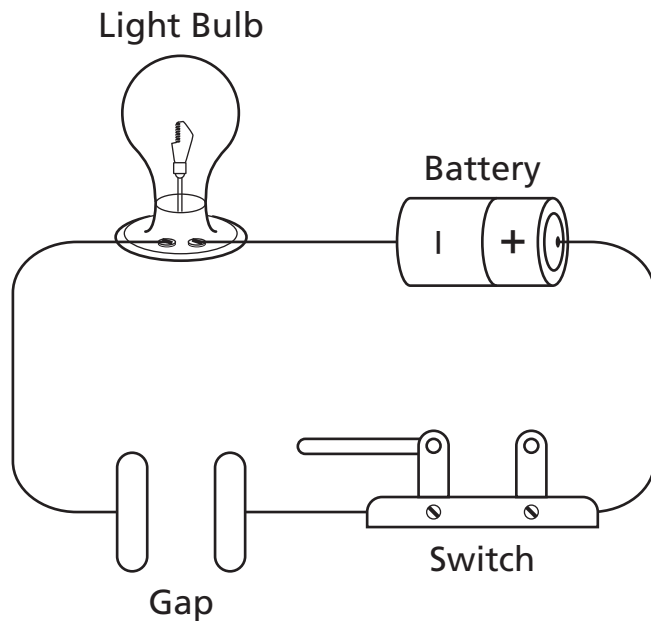
Which cup is made of a material that would perform as a good electrical conductor?

- A** a wooden cup
- B** a metal cup
- C** a plastic cup
- D** a paper cup

Item Information

Item Code: TNS10802	Passage Title:
Standard Code: 0607.12.2	Passage Code:
Standard Text: Identify materials that can conduct electricity.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: C	DOK Level: 3-4

Students are using this setup for an investigation.



The students place different objects, one at a time, in the gap and turn on the switch to see if the light bulb lights. Which object will best conduct electricity?

- A glass bead
- B plastic button
- C copper coin
- D wooden toothpick

Item Information

Item Code: TNS30740

Passage Title:

Standard Code: 0607.Inq.1

Passage Code:




Standard Text: Design a simple experimental procedure with an identified control and appropriate variables.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: B

DOK Level: 2

A fertilizer company tested a new type of fertilizer on pepper plants. Several rows of pepper plants were planted. Each row of plants received a different amount of the fertilizer. Each plant received 20 milliliters of water daily. The company collected all ripe peppers from the plants for 60 days, and the mass of the peppers was recorded.

Rows of Pepper Plants	Amount of Water Daily (mL)	Amount of Fertilizer (g)
	20	20
	20	40
	20	60

Which question is this investigation most likely designed to test?

- A Which type of fertilizer produces the greatest mass of peppers?
- B Which amount of fertilizer produces the greatest mass of peppers?
- C Which type of fertilizer produces the greatest number of pepper plants?
- D Which amount of fertilizer produces the greatest number of pepper plants?

Item Information

Item Code: TNS30771

Passage Title:

Standard Code: 0607.Inq.2

Passage Code:

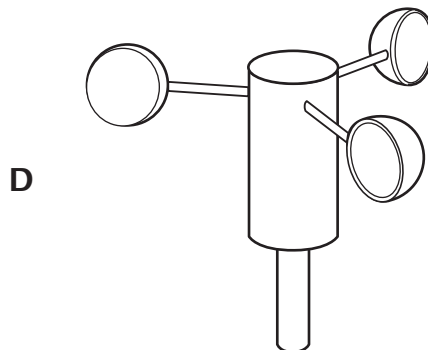
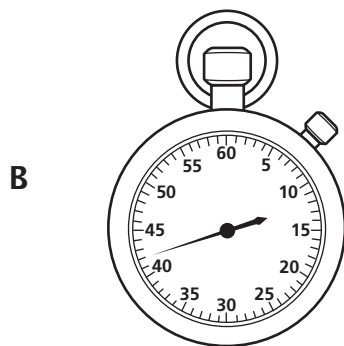
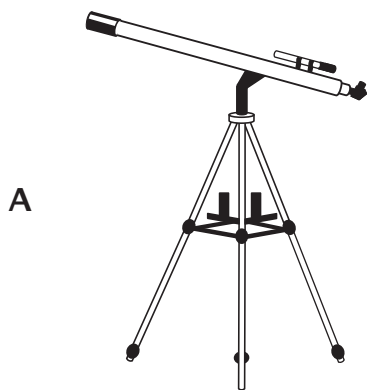
Standard Text: Select tools and procedures needed to conduct a moderately complex experiment.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: D

DOK Level: 2

A science lab group is building a weather station to study how forecasts are made. Which instrument will best help students measure weather conditions?



Item Information

Item Code: TNS20972

Passage Title:

Standard Code: 0607.Inq.3

Passage Code:

Standard Text: Interpret and translate data into a table, graph, or diagram.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: C

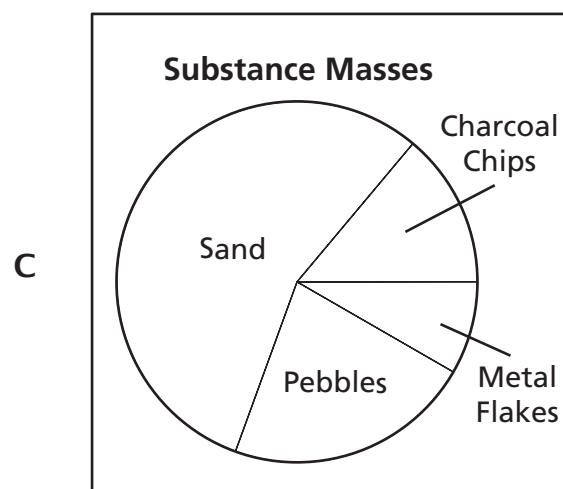
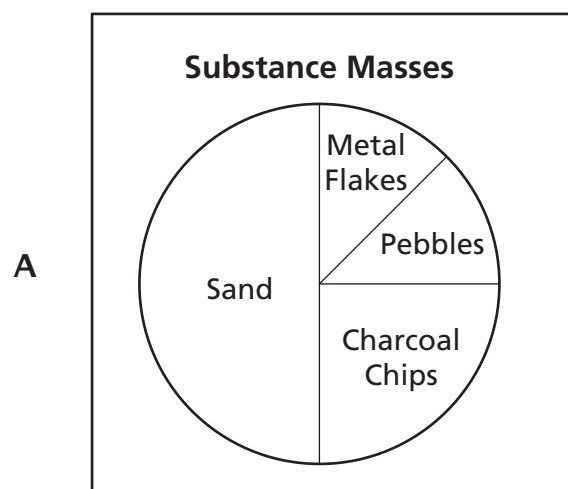
DOK Level: 2

A student collected a 100-gram soil sample near a pond. The masses of the materials found in the soil sample are listed in the table below.

Mixture Masses

Substance	Mass (grams)
Sand	57
Metal Flakes	9
Pebbles	21
Charcoal Chips	13

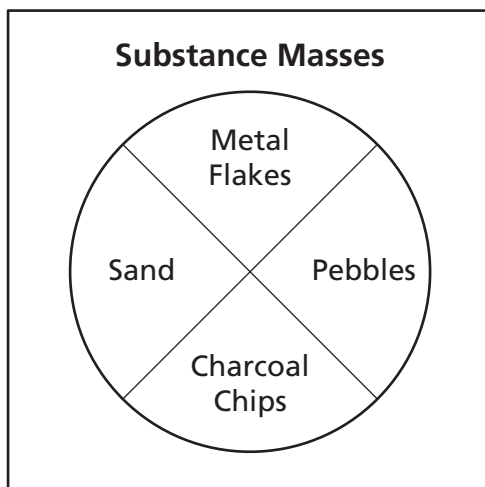
Which best displays the data in the table?



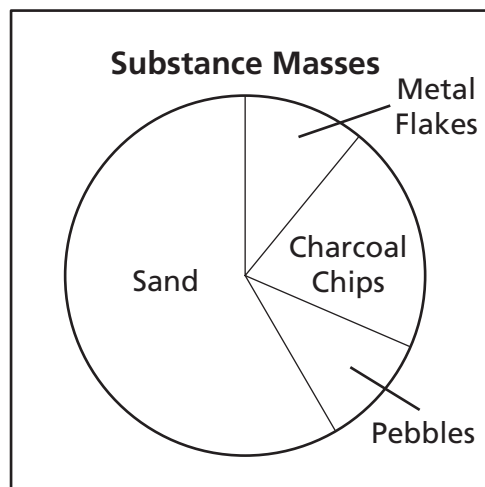
(This item continues on the next page.)

(Item 58, continued from the previous page)

B



D



Item Information

Item Code: TNS30741

Passage Title:

Standard Code: 0607.Inq.3

Passage Code:

Standard Text: Interpret and translate data into a table, graph, or diagram.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: C

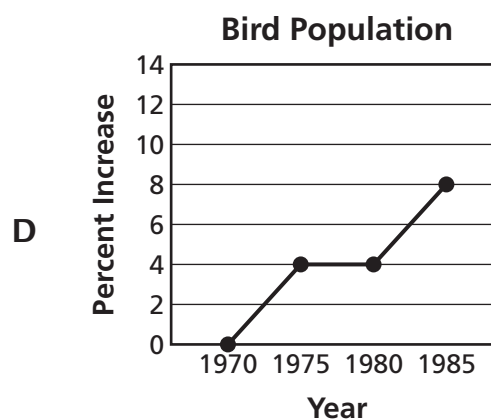
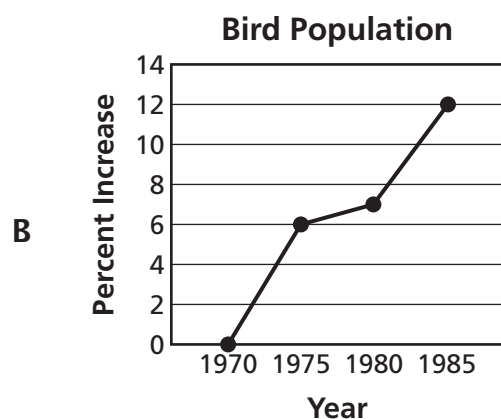
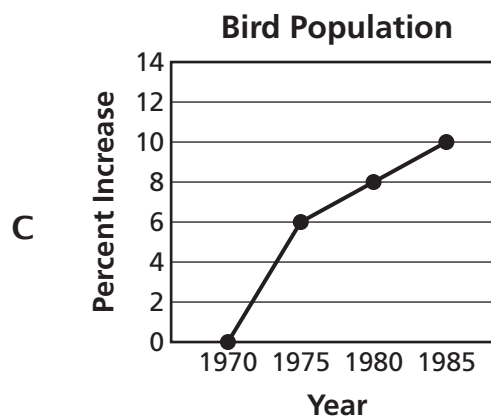
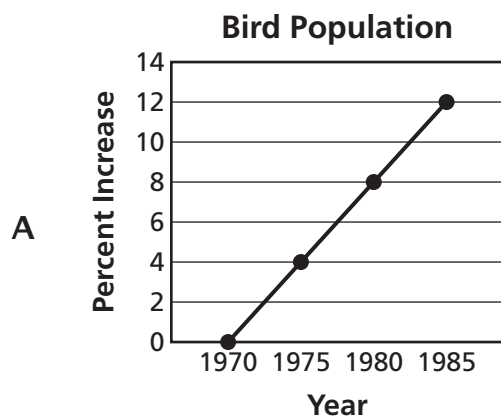
DOK Level: 2

Researchers observed the bird population in a forest over time. The table shows an increase in population over a fifteen-year period.

Percent Increase in Bird Population

Year	Percent Increase
1970	0%
1975	6%
1980	8%
1985	10%

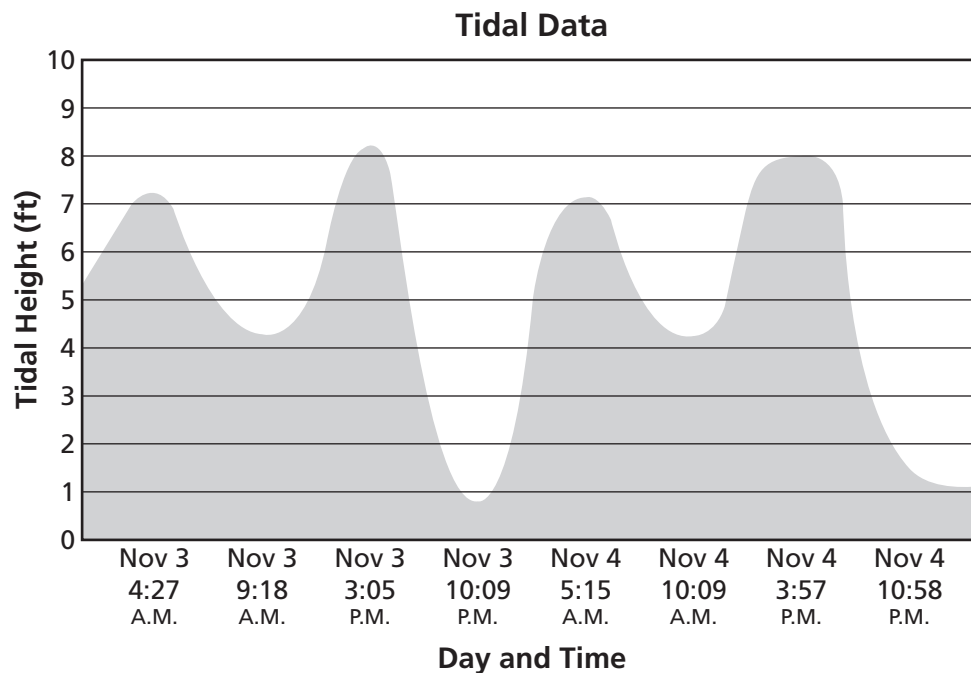
Which graph best shows these data?



Item Information

Item Code: TNS21103	Passage Title:
Standard Code: 0607.Inq.5	Passage Code:
Standard Text: Identify a faulty interpretation of data that is due to bias or experimental error.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: C	DOK Level: 2

The graph shows high and low tide times that occurred at the same location.



Students concluded that high tides in this location will always be at least seven feet in height. Which best identifies an error in their conclusion?

- A More data need to be collected at night.
- B Students should collect data at different locations.
- C Data need to be collected over a longer period of time.
- D Different units of measurement need to be used when collecting data.

Item Information

Item Code:	TNS20974	Passage Title:	
Standard Code:	0607.TE.1	Passage Code:	
Standard Text:	Identify the tools and procedures needed to test the design features of a prototype		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	D	DOK Level:	2

Engineers designed a new battery-operated, remote-controlled car that can be driven over many different road conditions without flipping over. How should the car be tested before it is mass-produced and sold?

- A** drive the car on a straight track
- B** time the car to find its average speed
- C** test the car by jumping on ramps
- D** drive the car over uneven surfaces

Item Information

Item Code:	TNS30531	Passage Title:	
Standard Code:	0607.TE.4	Passage Code:	
Standard Text:	Differentiate between adaptive and assistive engineered products (e.g., food, biofuels, medicines, integrated pest management).		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	B	DOK Level:	2

Which statement best describes how assistive engineering is beneficial?

- A** Temperature-controlled storage keeps foods fresh longer.
- B** People with disabilities use new technologies to perform tasks.
- C** Biofuels are more available to consumers.
- D** Genetically engineered food crops are more likely to resist diseases.

This page intentionally left blank.

This page intentionally left blank.

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 6 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 7 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 7..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS20520

Passage Title:

Standard Code: 0707.1.1

Passage Code:

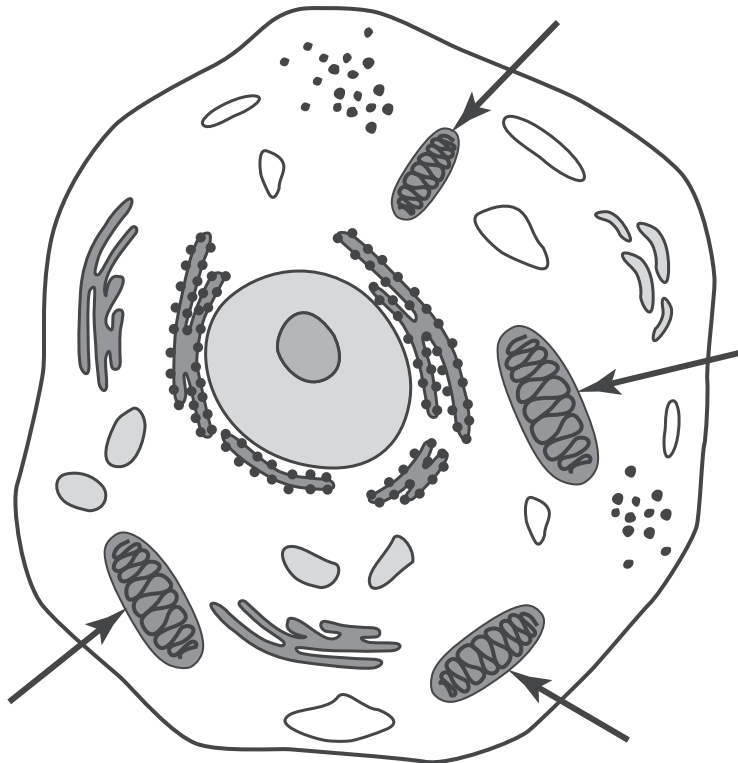
Standard Text: Identify and describe the function of the major plant and animal cell organelles.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: C

DOK Level: 2

The diagram below represents an animal cell.



Which function is carried out by the organelles indicated by the arrows?

- A assembling amino acids in the proper sequence
- B controlling the activities of the cell
- C generating chemical energy for the cell
- D preparing proteins and lipids to leave the cell

Item Information

Item Code:	TNS20409	Passage Title:	
Standard Code:	0707.1.1	Passage Code:	
Standard Text:	Identify and describe the function of the major plant and animal cell organelles.		
Reporting Category:	Cells, Flow of Matter & Energy		
Correct Answer:	C	DOK Level:	1

Which is a function of the cell membrane?

- A** translating genetic material into protein
- B** packaging substances for use within the cell
- C** regulating substances that enter and exit the cell
- D** digesting food particles and worn-out organelles

Item Information

Item Code: TNS30007

Passage Title:

Standard Code: 0707.1.2

Passage Code:

Standard Text: Interpret a chart to explain the integrated relationships that exist among cells, tissues, organs, and organ systems.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: B

DOK Level: 2

Which of the lists below shows parts of the skeletal system in order of increasing complexity?

- A** bone → cell → skeleton → bone tissue
- B** cell → bone tissue → bone → skeleton
- C** bone tissue → bone → cell → skeleton
- D** skeleton → bone tissue → bone → cell

Item Information

Item Code:	TNS30008	Passage Title:	
Standard Code:	0707.1.2	Passage Code:	
Standard Text:	Interpret a chart to explain the integrated relationships that exist among cells, tissues, organs, and organ systems.		
Reporting Category:	Cells, Flow of Matter & Energy		
Correct Answer:	A	DOK Level:	2

The chart below lists different levels of organization for a mammal in no particular order.

Lung Cells	Mammal	Respiratory System	Lungs
------------	--------	--------------------	-------

Which level is an organ that is mostly made of tissues?

- A Lungs
- B Lung Cells
- C Respiratory System
- D Mammal

Item Information

Item Code: TNS10785 Passage Title:
Standard Code: 0707.1.3 Passage Code:
Standard Text: Explain the basic functions of a major organ system.
Reporting Category: Cells, Flow of Matter & Energy
Correct Answer: B DOK Level: 2

The table below describes some functions of four different organ systems in the human body.

Human Body Organ System Functions

System	Main Functions
1	Digest food and absorb nutrients into the body
2	Bring oxygen from the environment into the body
3	Circulate gases and nutrients throughout the body
4	Process sensory input and send signals to the body

Which of these best describes a function of the respiratory system?

- A System 1
- B System 2
- C System 3
- D System 4

Item Information

Item Code: TNS20080	Passage Title:
Standard Code: 0707.1.3	Passage Code:
Standard Text: Explain the basic functions of a major organ system.	
Reporting Category: Cells, Flow of Matter & Energy	
Correct Answer: A	DOK Level: 2

A scientist is trying to determine the speed at which an animal can travel by studying the organism's body. Which organ system should the scientist analyze to estimate the speed at which the organism can travel?

- A** skeletal
- B** excretory
- C** nervous
- D** digestive

Item Information

Item Code: TNS30614	Passage Title:
Standard Code: 0707.1.3	Passage Code:
Standard Text: Explain the basic functions of a major organ system.	
Reporting Category: Cells, Flow of Matter & Energy	
Correct Answer: C	DOK Level: 1

Which human body system is directly responsible for sensing the heat produced by a stove?

- A** circulatory
- B** muscular
- C** nervous
- D** skeletal

Item Information

Item Code: TNS20327

Passage Title:

Standard Code: 0707.1.4

Passage Code:

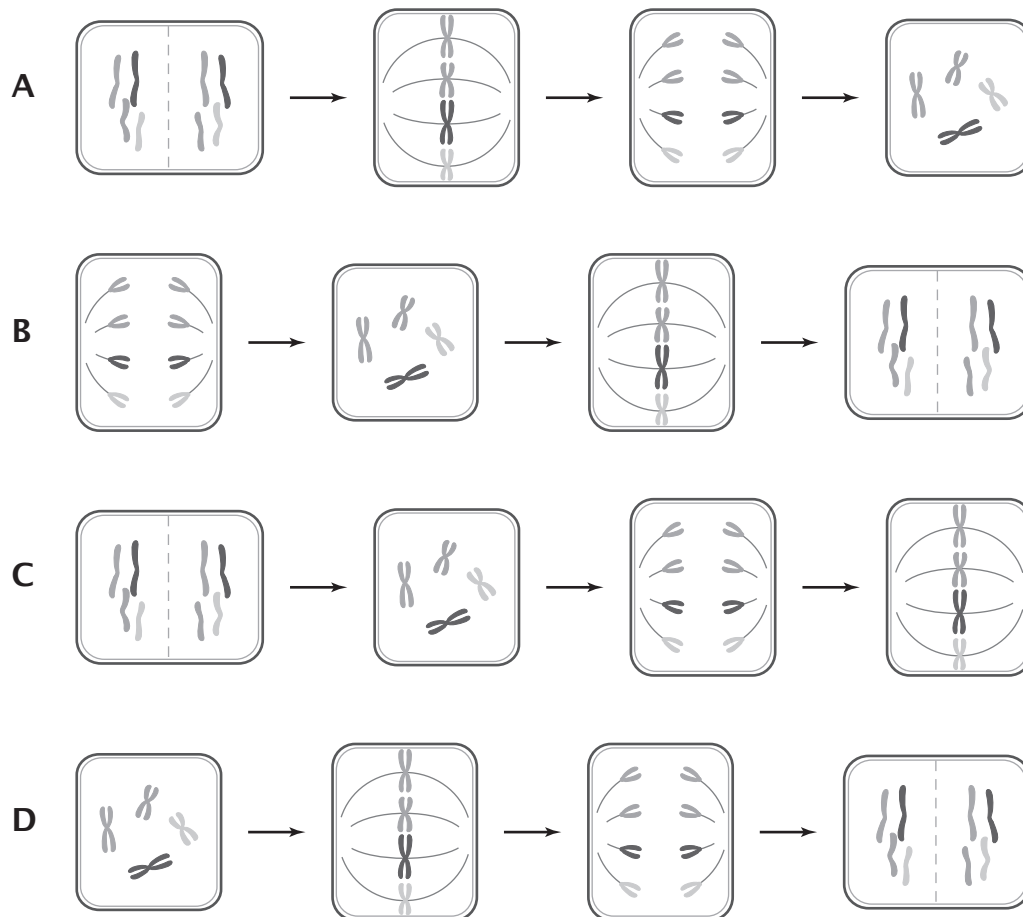
Standard Text: Sequence a series of diagrams that depict chromosome movement during plant cell division.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: D

DOK Level: 2

Which diagram shows the correct sequence for a plant cell dividing?



Item Information

Item Code: TNS10028

Passage Title:

Standard Code: 0707.1.4

Passage Code:

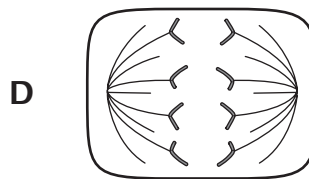
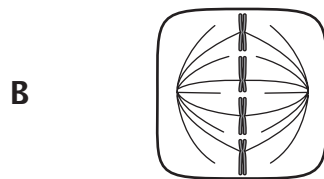
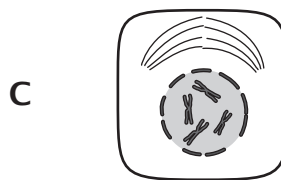
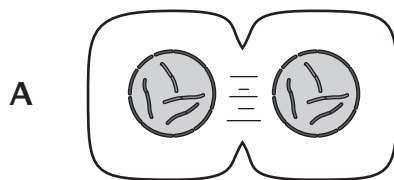
Standard Text: Sequence a series of diagrams that depict chromosome movement during plant cell division.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: A

DOK Level: 3-4

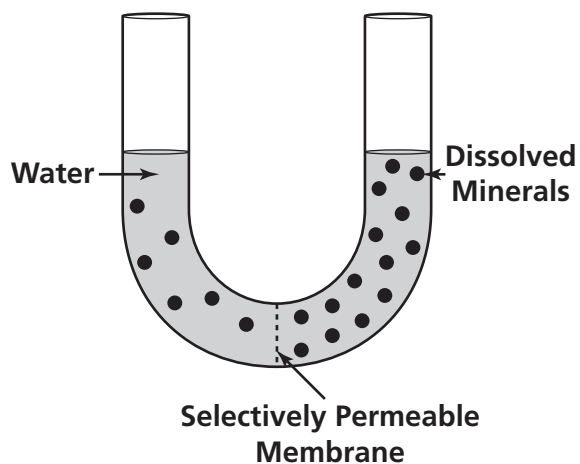
Some phases of plant cell division are shown. Which diagram shows the last phase just before cell division is completed?



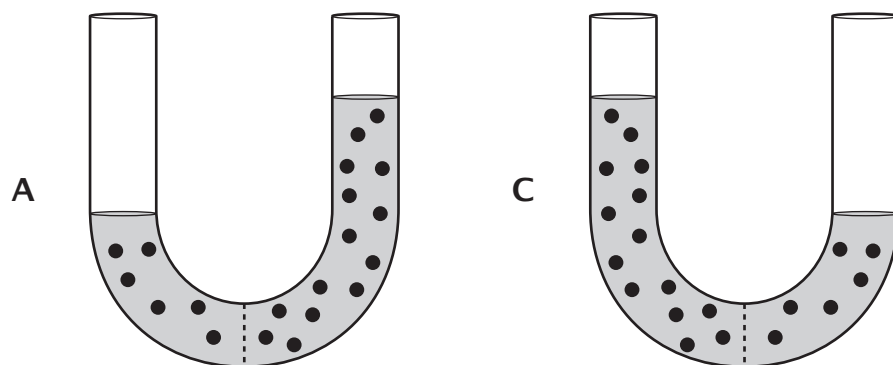
Item Information

Item Code: TNS30794	Passage Title:
Standard Code: 0707.1.5	Passage Code:
Standard Text: Explain how materials move through simple diffusion.	
Reporting Category: Cells, Flow of Matter & Energy	
Correct Answer: A	DOK Level: 3-4

The diagram below shows a curved tube divided by a selectively permeable membrane that only allows water to pass through it. There are different amounts of dissolved minerals on either side.

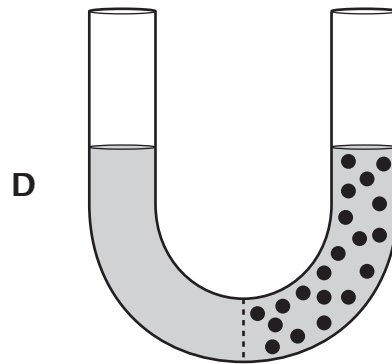
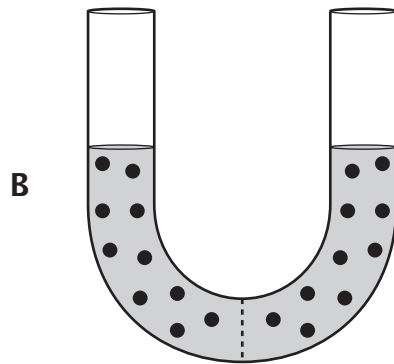


Which diagram best represents how the tube will look after 24 hours?



(This item continues on the next page.)

(Item 12, continued from the previous page)



Item Information

Item Code:	TNS10361	Passage Title:	
Standard Code:	0707.3.1	Passage Code:	
Standard Text:	Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.		
Reporting Category:	Cells, Flow of Matter & Energy		
Correct Answer:	C	DOK Level:	2

Which statement most accurately describes chemical compounds produced by photosynthesis and respiration?

- A** Photosynthesis produces carbon dioxide, while respiration produces oxygen.
- B** Photosynthesis produces water, while respiration produces carbon dioxide.
- C** Photosynthesis produces oxygen, while respiration produces carbon dioxide.
- D** Photosynthesis produces oxygen, while respiration produces glucose.

Item Information

Item Code: TNS10371

Passage Title:

Standard Code: 0707.3.1

Passage Code:

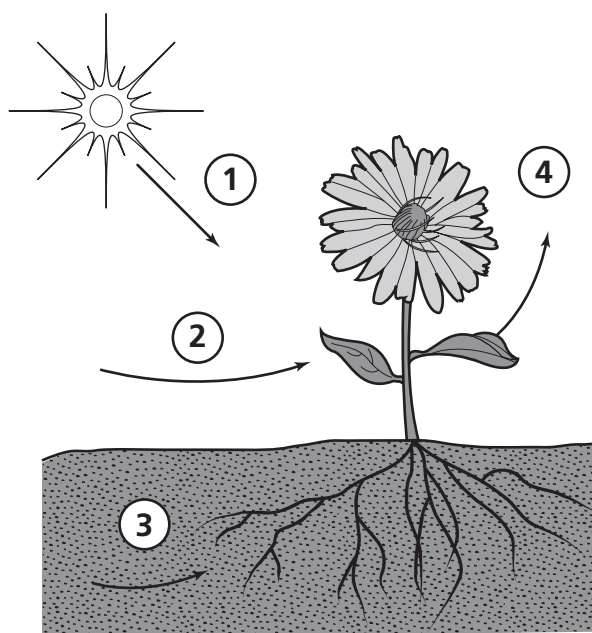
Standard Text: Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: D

DOK Level: 2

The numbers in the diagram represent the energy and substances involved when a plant photosynthesizes.



Which number represents a substance animal cells need for respiration?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS02820

Passage Title:

Standard Code: 0707.3.2

Passage Code:

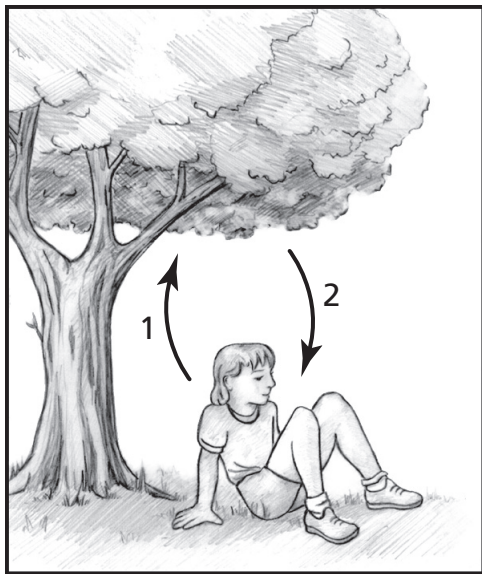
Standard Text: Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: B

DOK Level: 2

The exchange of gasses between plants and animals is shown in the diagram below.



Arrow 2 represents

- A** oxygen produced by cellular respiration
- B** oxygen produced by photosynthesis
- C** carbon dioxide produced by cellular respiration
- D** carbon dioxide produced by photosynthesis

Item Information

Item Code: TNS20447

Passage Title:

Standard Code: 0707.4.1

Passage Code:

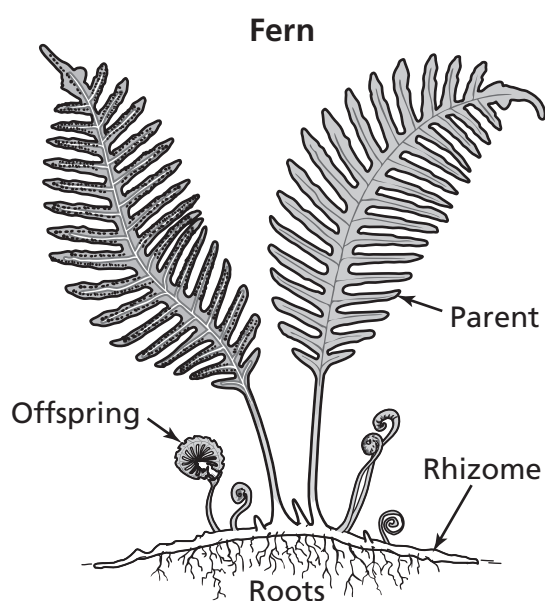
Standard Text: Classify methods of reproduction as sexual or asexual.

Reporting Category: Heredity

Correct Answer: C

DOK Level: 2

Some ferns can reproduce by sending out shoots called rhizomes. The rhizomes produce offspring that grow near the parent. The rhizomes produce a new plant that is genetically identical to the parent, as shown below.



Which of these best describes the method by which these ferns reproduce?

- A sexual, because more than one new plant can be produced
- B sexual, because ferns are multicellular organisms
- C asexual, because there is only one parent plant
- D asexual, because the new plant performs photosynthesis

Item Information

Item Code: TNS20462	Passage Title:
Standard Code: 0707.4.1	Passage Code:
Standard Text: Classify methods of reproduction as sexual or asexual.	
Reporting Category: Heredity	
Correct Answer: C	DOK Level: 2

Which of these is the best example of sexual reproduction in a plant?

- A** An onion shoots a stem up from a bulb.
- B** A potato grows buds that become new potato plants.
- C** A pollinated apple flower produces seeds in fruit.
- D** A strawberry plant sends out a runner that produces a clone.

Item Information

Item Code: TNS10780

Passage Title:

Standard Code: 0707.4.1

Passage Code:

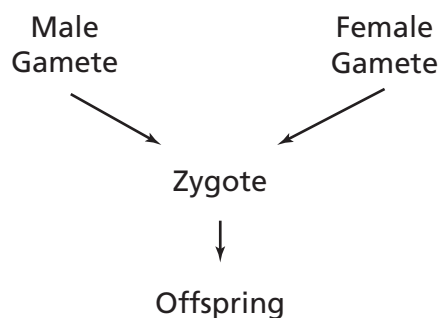
Standard Text: Classify methods of reproduction as sexual or asexual.

Reporting Category: Heredity

Correct Answer: C

DOK Level: 2

One method of reproduction is shown in the diagram below.



Which statement best explains this method of reproduction?

- A sexual reproduction, because the zygote divides by meiosis
- B asexual reproduction, because only one offspring is produced
- C sexual reproduction, because the gametes of two parents combine
- D asexual reproduction, because the offspring looks similar to the parents

Item Information

Item Code: TNS01662	Passage Title:
Standard Code: 0707.4.2	Passage Code:
Standard Text: Match flower parts with their reproductive functions.	
Reporting Category: Heredity	
Correct Answer: A	DOK Level: 1

Which list contains only the female parts of a flower?

- A** stigma, style, pistil, ovary
- B** anther, stigma, pollen, pistil
- C** style, stamen, ovary, filament
- D** stigma, filament, anther, stamen

Item Information

Item Code: TNS30694

Passage Title:

Standard Code: 0707.4.2

Passage Code:

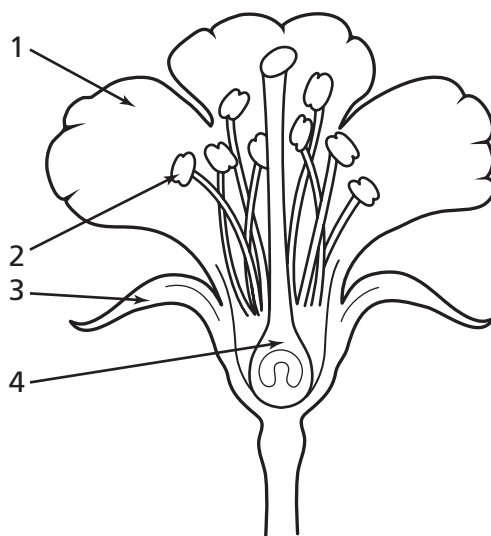
Standard Text: Match flower parts with their reproductive functions.

Reporting Category: Heredity

Correct Answer: B

DOK Level: 3-4

A cross section of a flower is shown below.



Which number represents the part of the flower where pollen is produced?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS30617	Passage Title:
Standard Code: 0707.4.2	Passage Code:
Standard Text: Match flower parts with their reproductive functions.	
Reporting Category: Heredity	
Correct Answer: A	DOK Level: 1

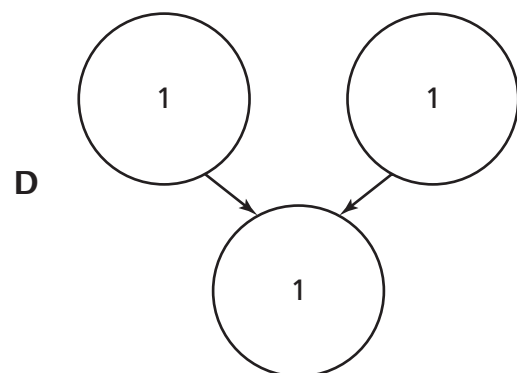
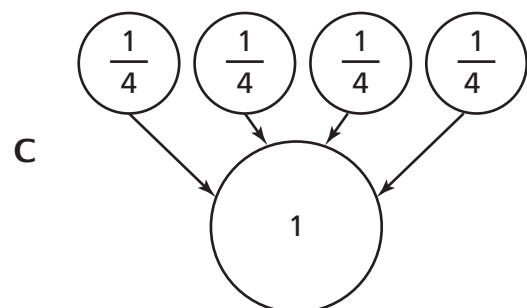
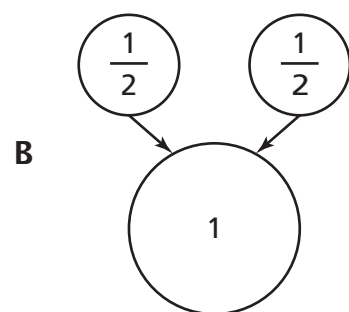
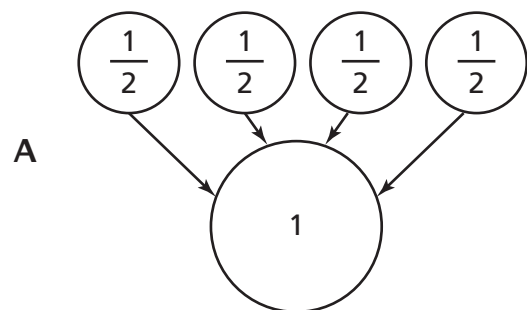
Which statement best describes the role of the flower petal in plant reproduction?

- A** attracts pollinators
- B** produces pollen
- C** collects water
- D** produces eggs

Item Information

Item Code:	TNS30799	Passage Title:	
Standard Code:	0707.4.3	Passage Code:	
Standard Text:	Describe the relationship among genes, chromosomes, and inherited traits.		
Reporting Category:	Heredity		
Correct Answer:	B	DOK Level:	2

Which diagram best represents the total number of chromosomes that are passed from parents to offspring during sexual reproduction?



Item Information

Item Code: TNS30619	Passage Title:
Standard Code: 0707.4.3	Passage Code:
Standard Text: Describe the relationship among genes, chromosomes, and inherited traits.	
Reporting Category: Heredity	
Correct Answer: B	DOK Level: 2

In humans, dimples are a dominant trait. Which statement is accurate about this trait?

- A** A child will not have dimples if one dominant gene for dimples is received.
- B** A child will have dimples if at least one dominant gene for dimples is received.
- C** A child will not have dimples if the child receives two dominant genes for dimples.
- D** A child will have dimples if the child has two recessive genes for dimples.

Item Information

Item Code: TNS20087	Passage Title:
Standard Code: 0707.4.3	Passage Code:
Standard Text: Describe the relationship among genes, chromosomes, and inherited traits.	
Reporting Category: Heredity	
Correct Answer: D	DOK Level: 2

Which statement best describes a dominant gene?

- A** Only dominant genes are passed from parent to offspring.
- B** Dominant genes are always expressed as beneficial traits.
- C** Dominant genes remove recessive genes from chromosomes.
- D** Dominant genes mask the expression of recessive genes.

Item Information

Item Code: TNS30012

Passage Title:

Standard Code: 0707.4.4

Passage Code:

Standard Text: Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.

Reporting Category: Heredity

Correct Answer: C

DOK Level: 3-4

One flower that is heterozygous red (Rr) is crossed with another that is homozygous white (rr). The cross of the parents produces a red offspring.

	R	r
r		
r		

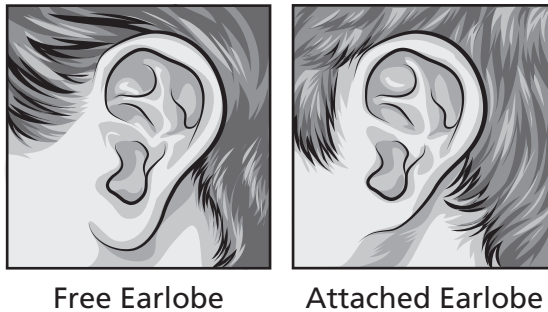
Which statement best explains why the offspring expresses the red color trait?

- A Red color is a recessive trait.
- B White color is a seasonal trait.
- C Red color is a dominant trait.
- D White color can only be expressed by females.

Item Information

Item Code: TNS20566	Passage Title:
Standard Code: 0707.4.4	Passage Code:
Standard Text: Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.	
Reporting Category: Heredity	
Correct Answer: D	DOK Level: 2

In humans, free earlobes (F) are dominant to attached earlobes (f).



A female with attached earlobes has an offspring with a male who is homozygous for free earlobes.

	F	F
f	Ff	Ff
f	Ff	Ff

What is the probability that the offspring will have free earlobes?

- A 0%
- B 25%
- C 50%
- D 100%

Item Information

Item Code: TNS30013

Passage Title:

Standard Code: 0707.4.4

Passage Code:

Standard Text: Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.

Reporting Category: Heredity

Correct Answer: A

DOK Level: 2

The trait for straight thumbs (T) is dominant to the trait for curved thumbs (t). A parent that is homozygous for straight thumbs and a heterozygous parent produce an offspring.

	T	T
T		
t		

Based on the Punnett square, what are the possible genotypes for the offspring?

- A TT and Tt
- B TT and tt
- C Tt only
- D TT only

Item Information

Item Code: TNS20845	Passage Title:
Standard Code: 0707.7.1	Passage Code:
Standard Text: Use a table of physical properties to classify minerals.	
Reporting Category: The Earth	
Correct Answer: B	DOK Level: 2

Mohs Hardness Scale is shown below.

Mohs Hardness Scale

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Feldspar	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Which mineral will scratch calcite and be scratched by feldspar?

- A** Gypsum
- B** Fluorite
- C** Quartz
- D** Diamond

Item Information

Item Code: TNS20759

Passage Title:

Standard Code: 0707.7.1

Passage Code:

Standard Text: Use a table of physical properties to classify minerals.

Reporting Category: The Earth

Correct Answer: D

DOK Level: 2

Some students on a field trip found an unknown yellow mineral. The mineral had a distinct odor and was scratched by quartz. The students compared the mineral to the table below.

Mineral Characteristics

Mineral	Common Color(s)	Hardness	Odor
Diamond	Variable—colorless, yellow, white, blue, black	10	None
Gold	Yellow	2.5–3	None
Gypsum	Colorless	2	None
Quartz	Variable—white, purple, pink, yellow, gray	7	None
Sulfur	Yellow	1.5–2.5	Rotten Eggs

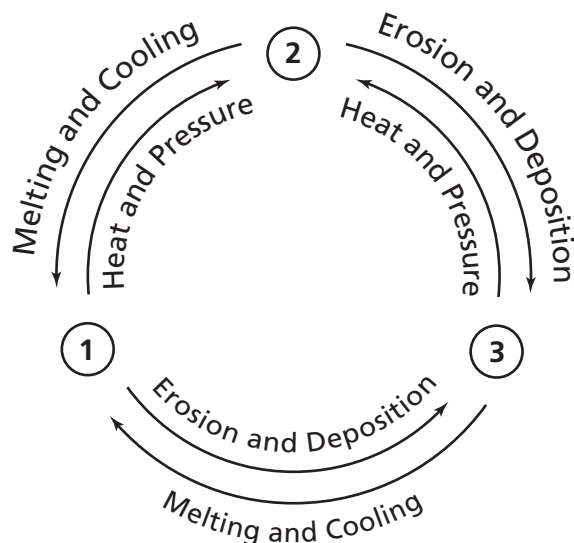
Compared to the characteristics from the table, which mineral did the students find?

- A Diamond
- B Gold
- C Gypsum
- D Sulfur

Item Information

Item Code: TNS20848	Passage Title:
Standard Code: 0707.7.2	Passage Code:
Standard Text: Label a diagram that depicts the three different rock types.	
Reporting Category: The Earth	
Correct Answer: B	DOK Level: 2

Part of the rock cycle is shown in the diagram.



Which correctly identifies each type of rock?

- A 1 – Sedimentary, 2 – Igneous, 3 – Metamorphic
- B 1 – Igneous, 2 – Metamorphic, 3 – Sedimentary
- C 1 – Metamorphic, 2 – Igneous, 3 – Sedimentary
- D 1 – Igneous, 2 – Sedimentary, 3 – Metamorphic

Item Information

Item Code: TNS30802

Passage Title:

Standard Code: 0707.7.2

Passage Code:

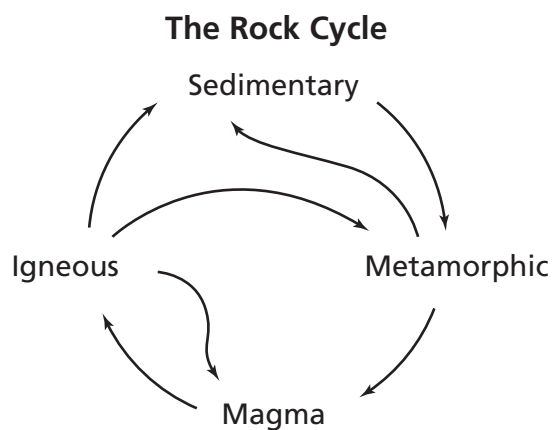
Standard Text: Label a diagram that depicts the three different rock types.

Reporting Category: The Earth

Correct Answer: D

DOK Level: 2

The diagram below shows part of the rock cycle.



Which is needed for igneous rock to become sedimentary rock?

- A melting
- B evaporating
- C solidifying
- D weathering

Item Information

Item Code: TNS30806	Passage Title:
Standard Code: 0707.7.3	Passage Code:
Standard Text: Identify the major processes that drive the rock cycle.	
Reporting Category: The Earth	
Correct Answer: A	DOK Level: 1

What is produced when existing rock is weathered and eroded?

- A** sediment
- B** magma
- C** igneous rock
- D** metamorphic rock

Item Information

Item Code: TNS30623

Passage Title:

Standard Code: 0707.7.3

Passage Code:

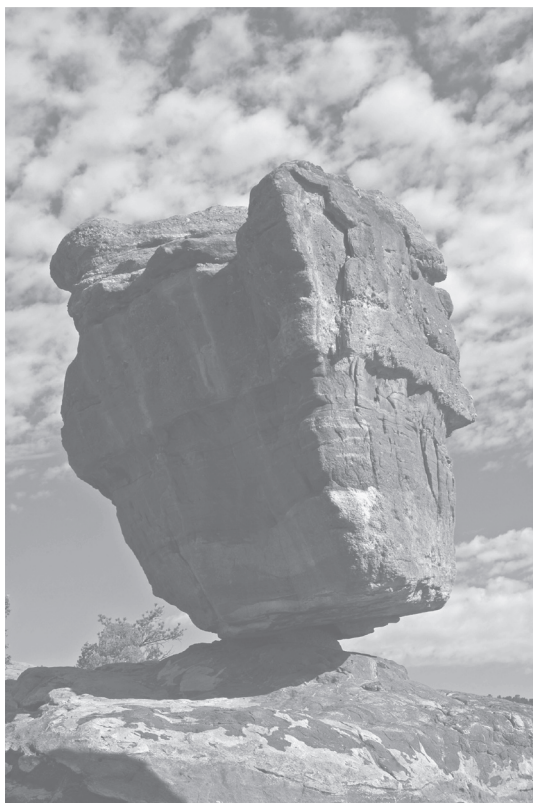
Standard Text: Identify the major processes that drive the rock cycle.

Reporting Category: The Earth

Correct Answer: A

DOK Level: 1

The picture below shows a rock formation.



Which process most likely created this formation?

- A erosion
- B deposition
- C faulting
- D pressure

Item Information

Item Code: TNS20491

Passage Title:

Standard Code: 0707.7.4

Passage Code:

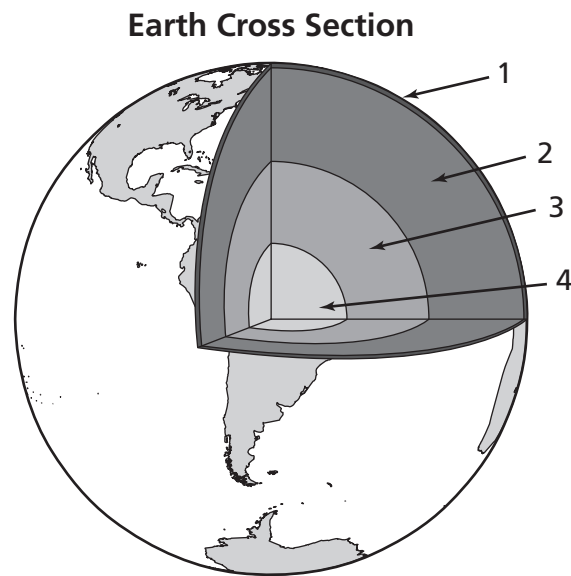
Standard Text: Differentiate among the characteristics of the earth's three layers.

Reporting Category: The Earth

Correct Answer: B

DOK Level: 2

A teacher draws a diagram that shows the layers of Earth.



The teacher asks the students to describe Layer 2. Which of these best describes Layer 2?

- A** the layer between the mantle and crust
- B** the layer between the crust and outer core
- C** the layer between the mantle and core
- D** the layer between the inner core and outer core

Item Information

Item Code: TNS30803

Passage Title:

Standard Code: 0707.7.4

Passage Code:

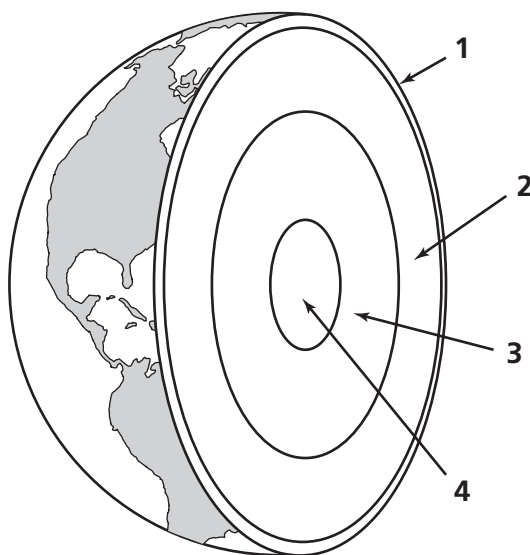
Standard Text: Differentiate among the characteristics of the earth's three layers.

Reporting Category: The Earth

Correct Answer: A

DOK Level: 2

The diagram shows layers of Earth.



Which layer is least dense?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS10480

Passage Title:

Standard Code: 0707.7.4

Passage Code:

Standard Text: Differentiate among the characteristics of the earth's three layers.

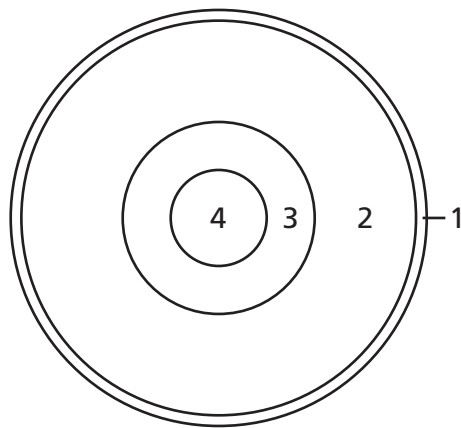
Reporting Category: The Earth

Correct Answer: B

DOK Level: 2

This diagram shows a cross section of Earth.

Cross Section of Earth



Which layer is composed of materials that have soft, plastic-like properties?

- A** 1
- B** 2
- C** 3
- D** 4

Item Information

Item Code:	TNS30804	Passage Title:	
Standard Code:	0707.7.5	Passage Code:	
Standard Text:	Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.		
Reporting Category:	The Earth		
Correct Answer:	C	DOK Level:	1

Which of these moves only a few centimeters per year?

- A** lava flow
- B** ocean tide
- C** tectonic plate
- D** weather system

Item Information

Item Code: TNS20762

Passage Title:

Standard Code: 0707.7.6

Passage Code:

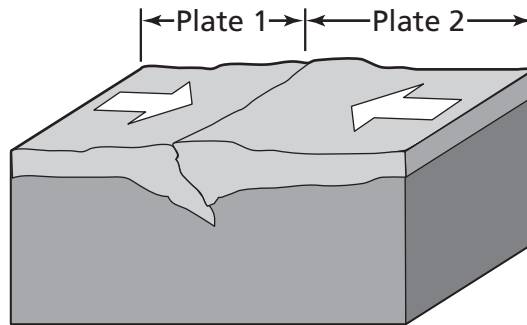
Standard Text: Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.

Reporting Category: The Earth

Correct Answer: B

DOK Level: 2

The diagram represents the collision of continental plates.



Which is most likely to form at the site of the collision?

- A an ocean trench
- B a mountain range
- C a wetlands area
- D a dry lakebed

Item Information

Item Code: TNS30805	Passage Title:
Standard Code: 0707.7.6	Passage Code:
Standard Text: Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.	
Reporting Category: The Earth	
Correct Answer: D	DOK Level: 2

Which of these do earthquakes and volcanoes have in common?

- A** They occur only in oceans.
- B** They produce lava.
- C** They are forecasted using weather tools.
- D** They are usually caused by plate movements.

Item Information

Item Code: TNS20468

Passage Title:

Standard Code: 0707.7.6

Passage Code:

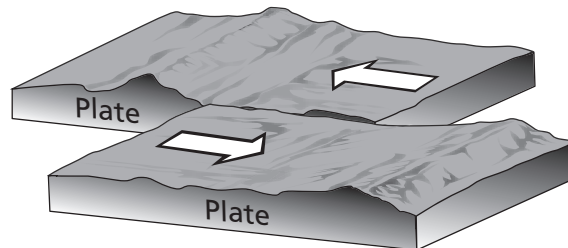
Standard Text: Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.

Reporting Category: The Earth

Correct Answer: D

DOK Level: 2

Two tectonic plates slide past each other, as pictured below.



Which is most likely to occur because of the friction between the plates?

- A a volcanic eruption
- B rift valley formation
- C mountain building
- D an earthquake

Item Information

Item Code:	TNS30807	Passage Title:	
Standard Code:	0707.7.7	Passage Code:	
Standard Text:	Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.		
Reporting Category:	The Earth		
Correct Answer:	D	DOK Level:	1

Which characteristic of Earth is partially influenced by humans?

- A** rotation rate
- B** volcanic eruptions
- C** plate movement
- D** air temperature

Item Information

Item Code: TNS30627	Passage Title:
Standard Code: 0707.7.7	Passage Code:
Standard Text: Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.	
Reporting Category: The Earth	
Correct Answer: D	DOK Level: 2

Some household products have labels indicating they should be properly disposed of rather than thrown out with regular trash. Which reason best states why these products should be disposed of properly?

- A** to prevent the products from entering the rock cycle
- B** to prevent the products from being resold
- C** to prevent the products from entering the inner core of Earth
- D** to prevent the products from contaminating natural resources

Item Information

Item Code: TNS30700

Passage Title:

Standard Code: 0707.11.1

Passage Code:

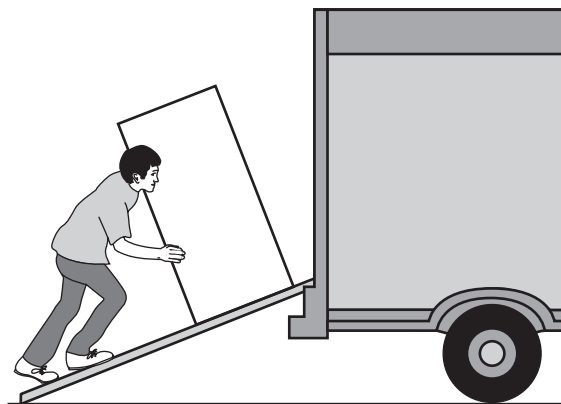
Standard Text: Differentiate between the six simple machines.

Reporting Category: Motion

Correct Answer: C

DOK Level: 1

This diagram shows a box being pushed into a van.



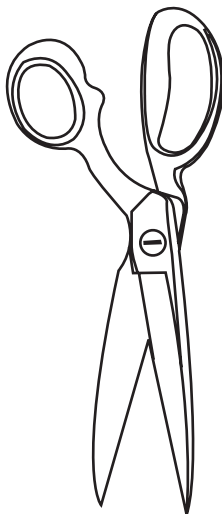
Which simple machine is being used to reduce the amount of force needed to move the box?

- A** lever
- B** pulley
- C** inclined plane
- D** wheel and axle

Item Information

Item Code: TNS30808	Passage Title:
Standard Code: 0707.11.1	Passage Code:
Standard Text: Differentiate between the six simple machines.	
Reporting Category: Motion	
Correct Answer: D	DOK Level: 1

The picture shows a pair of scissors.



Which two simple machines make up this pair of scissors?

- A** pulley and wedge
- B** lever and pulley
- C** wheel and axle
- D** wedge and lever

Item Information

Item Code: TNS20451

Passage Title:

Standard Code: 0707.11.1

Passage Code:

Standard Text: Differentiate between the six simple machines.

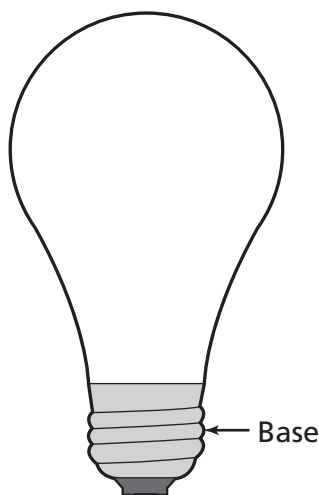
Reporting Category: Motion

Correct Answer: A

DOK Level: 2

A light bulb is shown below.

Light Bulb



The base of the light bulb is a simple machine designed to hold the light bulb in a light socket.
What type of simple machine is the base of the light bulb?

- A screw
- B lever
- C pulley
- D wheel and axle

Item Information

Item Code: TNS10356	Passage Title:
Standard Code: 0707.11.2	Passage Code:
Standard Text: Determine the amount of force needed to do work using different simple machines.	
Reporting Category: Motion	
Correct Answer: B	DOK Level: 1

Use the equation to solve the problem.

$\text{distance } (d) = \text{work } (w) \div \text{Force } (F)$
--

A gardener performed 2000 joules (J) of work when pushing a 200-newton (N) wheelbarrow. What distance did the gardener push the wheelbarrow?

- A 0.1 meter
- B 10 meters
- C 1800 meters
- D 2200 meters

Item Information

Item Code: TNS30632

Passage Title:

Standard Code: 0707.11.3

Passage Code:

Standard Text: Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.

Reporting Category: Motion

Correct Answer: D

DOK Level: 2

A dog ran 10 meters per second.

$\text{Distance}(d) = \text{Rate}(r) \times \text{Time}(t)$

How far did the dog run over an 11-second time period?

- A** 1 meter
- B** 11 meters
- C** 21 meters
- D** 110 meters

Item Information

Item Code: TNS10366	Passage Title:
Standard Code: 0707.11.3	Passage Code:
Standard Text: Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.	
Reporting Category: Motion	
Correct Answer: A	DOK Level: 1

A group of hikers traveled 12 kilometers in 3 hours.

$s = \frac{d}{t}$
s = speed, in kilometers per hour d = distance, in kilometers t = time, in hours

How fast were the hikers traveling?

- A** 4 kilometers per hour
- B** 9 kilometers per hour
- C** 15 kilometers per hour
- D** 36 kilometers per hour

Item Information

Item Code: TNS10365	Passage Title:
Standard Code: 0707.11.3	Passage Code:
Standard Text: Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.	
Reporting Category: Motion	
Correct Answer: A	DOK Level: 1

Use the equation to solve the problem.

$$\text{time } (t) = \text{distance } (d) \div \text{speed } (s)$$

How long would it take a bicyclist traveling at a speed of 25 kilometers per hour (km/hr) to travel 100 kilometers?

- A 4 hours
- B 75 hours
- C 125 hours
- D 2,500 hours

Item Information

Item Code: TNS30811

Passage Title:

Standard Code: 0707.11.4

Passage Code:

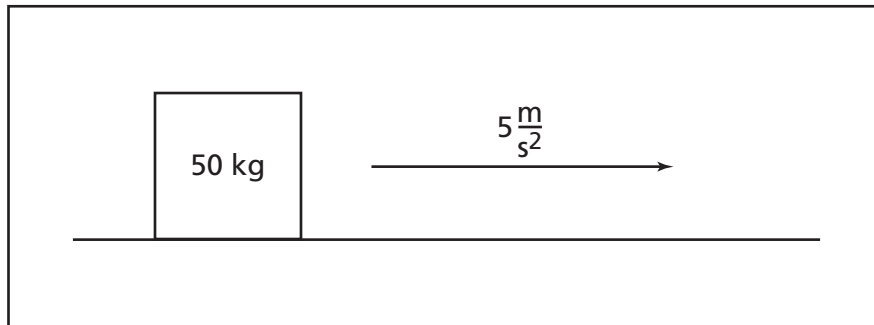
Standard Text: Identify and explain how Newton's laws of motion relate to the movement of objects.

Reporting Category: Motion

Correct Answer: D

DOK Level: 2

The diagram shows a 50-kilogram block of ice at rest on the ice of a hockey rink.



$$\text{Force}(F) = \text{Mass}(m) \times \text{Acceleration}(a)$$

Assuming no forces of friction, how much force is needed to accelerate this block across the ice at

5 meters per second² ?

- A** 0.1 newton
- B** 10.0 newtons
- C** 45.0 newtons
- D** 250.0 newtons

Item Information

Item Code: TNS10484	Passage Title:
Standard Code: 0707.11.4	Passage Code:
Standard Text: Identify and explain how Newton's laws of motion relate to the movement of objects.	
Reporting Category: Motion	
Correct Answer: A	DOK Level: 2

An object travels along a frictionless surface in a vacuum. Based on Newton's first law of motion, what will happen to the object?

- A** The speed of the object will remain constant.
- B** The speed of the object will increase over time.
- C** The object will slow down due to the force of gravity.
- D** The object will be acted upon by unequal forces from the opposite direction.

Item Information

Item Code: TNS20492

Passage Title:

Standard Code: 0707.11.5

Passage Code:

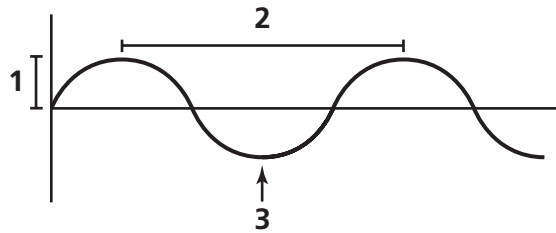
Standard Text: Compare and contrast the different parts of a wave.

Reporting Category: Motion

Correct Answer: B

DOK Level: 2

Students were asked to label a diagram of a wave.



Which correctly labels the wave diagram?

- A 1 – wavelength, 2 – amplitude, 3 – rest
- B 1 – amplitude, 2 – wavelength, 3 – trough
- C 1 – crest, 2 – amplitude, 3 – trough
- D 1 – rest, 2 – wavelength, 3 – crest

Item Information

Item Code: TNS30635

Passage Title:

Standard Code: 0707.11.5

Passage Code:

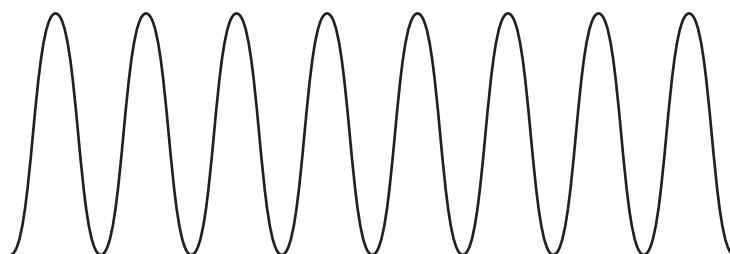
Standard Text: Compare and contrast the different parts of a wave.

Reporting Category: Motion

Correct Answer: C

DOK Level: 2

This diagram shows a wave.

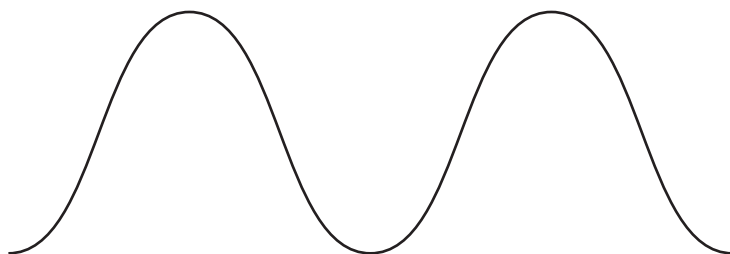


(This item continues on the next page.)

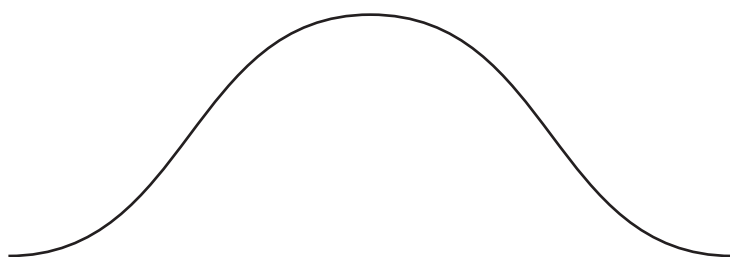
(Item 54, continued from the previous page)

Which wave best shows a wavelength that is twice as long as the wavelength shown above?

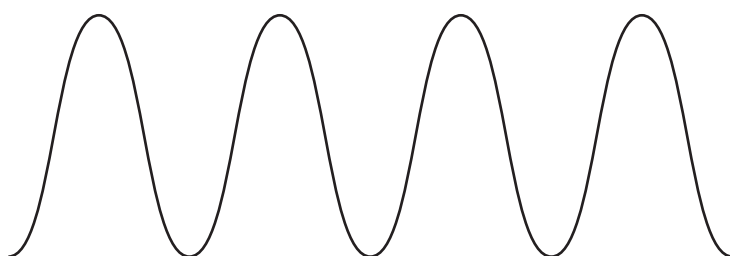
A



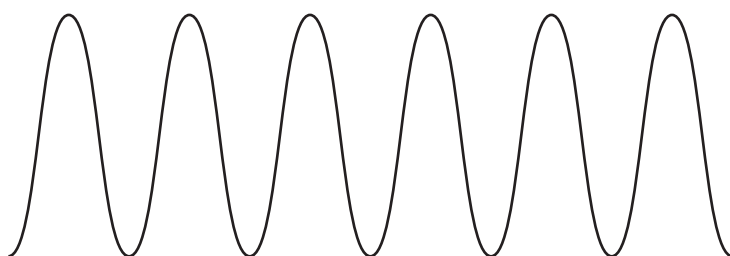
B



C



D



Item Information

Item Code: TNS30704	Passage Title:
Standard Code: 0707.11.6	Passage Code:
Standard Text: Differentiate between transverse and longitudinal waves in terms of how they are produced and transmitted.	
Reporting Category: Motion	
Correct Answer: A	DOK Level: 2

Which best describes the motion of particles within a longitudinal wave?

- A** a back-and-forth motion
- B** a counterclockwise motion
- C** a rotation on an axis
- D** a direction opposite the wave

Item Information

Item Code: TNS30606

Passage Title:

Standard Code: 0707.Inq.1

Passage Code:

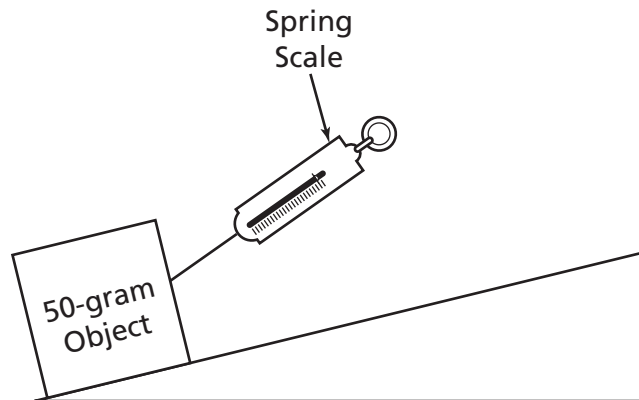
Standard Text: Design a simple experimental procedure with an identified control and appropriate variables.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: D

DOK Level: 2

Students performed an investigation using the setup below.



Students measured the minimum amount of force needed to pull the object up the ramp. The students repeated the process four more times, increasing the height of the ramp after each trial. What was the independent variable in this investigation?

- A the force needed to move the object
- B the mass of the object
- C the distance to the end of the ramp
- D the height of the ramp

Item Information

Item Code: TNS20550	Passage Title:
Standard Code: 0707.Inq.2	Passage Code:
Standard Text: Select tools and procedures needed to conduct a moderately complex experiment.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: B	DOK Level: 2

Students were investigating if water evaporation rates depend on the color of the container. The students put equal amounts of water in pans that had the same dimensions but were different colors. They left the pans in the sun for equal amounts of time. Which tool will be most helpful to compare the amount of water that evaporated from each pan?

- A** stopwatch
- B** graduated cylinder
- C** hot plate
- D** test tube

Item Information

Item Code: TNS20442
Standard Code: 0707.Inq.3
Standard Text: Interpret and translate data into a table, graph, or diagram.
Reporting Category: Inquiry and Technology & Engineering
Correct Answer: C

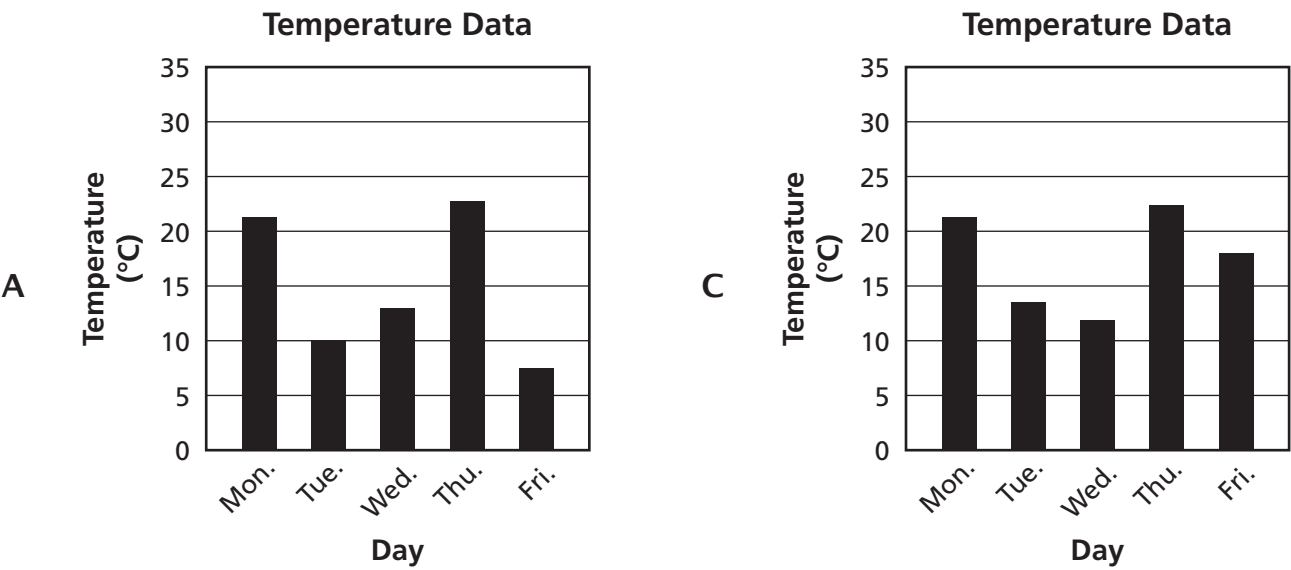
Passage Title:
Passage Code:
DOK Level: 2

A student recorded the high and low temperatures for five days in the data table below.

Temperature Table

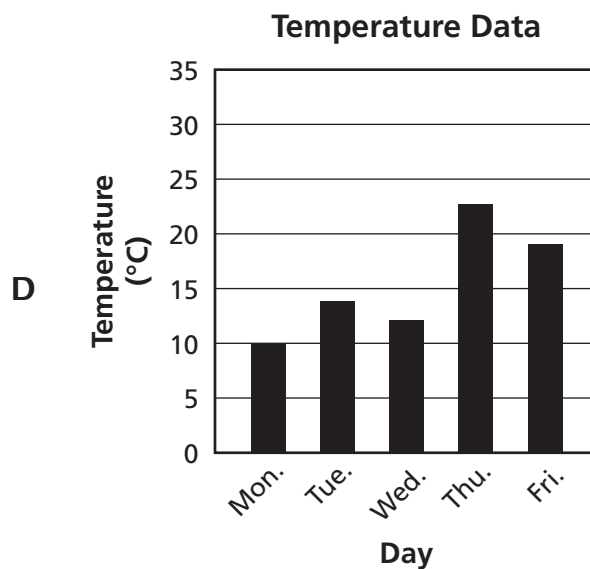
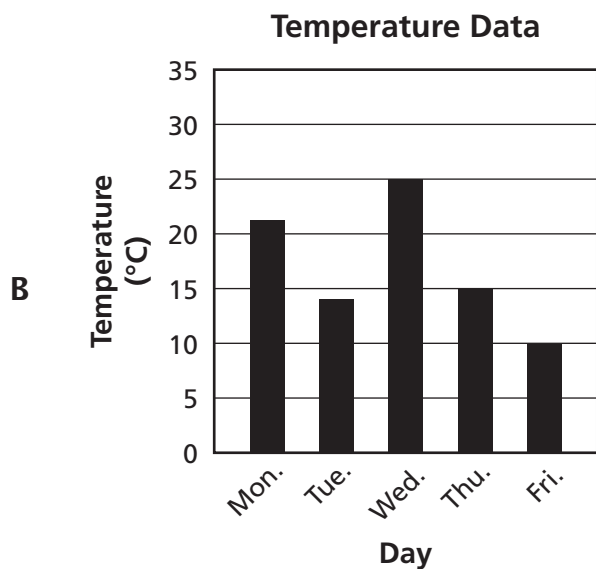
Day	Temperature	
	High (°C)	Low (°C)
Mon.	21	10
Tue.	13	9
Wed.	12	11
Thu.	22	10
Fri.	18	7

Which graph correctly shows the high temperatures from the data table?



(This item continues on the next page.)

(Item 58, continued from the previous page)



Item Information

Item Code: TNS30002	Passage Title:
Standard Code: 0707.Inq.4	Passage Code:
Standard Text: Draw a conclusion that establishes a cause and effect relationship supported by evidence.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: A	DOK Level: 3-4

Students recorded tide data from Location X in the table below.

Moon and Tide Chart at Location X

Date	Percent of Moon Visible	Tide Height (meters) Low
Jul. 1	64%	0.15
Jul. 10	100%	0.12
Jul. 20	55%	0.18
Aug. 9	100%	0.12

Based on these data, what is the best conclusion?

- A** Full moons produce the lowest low tides at Location X.
- B** When the sun is closest to Earth, the lowest low tides are produced at Location X.
- C** Crescent moons produce the lowest low tides at Location X.
- D** When the sun, Earth, and the moon are in line, the highest high tides are produced at Location X.

Item Information

Item Code: TNS10803

Passage Title:

Standard Code: 0707.Inq.5

Passage Code:

Standard Text: Identify a faulty interpretation of data that is due to bias or experimental error.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: C

DOK Level: 2

Students wanted to find out which fertilizer produced the tallest bean plants. They grew four bean plants in the same conditions except for the type of fertilizer used. Their data table is shown below.

Bean Plant Investigation

Type of Fertilizer	Amount of Fertilizer (mL)	Plant Height Week 1 (cm)	Plant Height Week 2 (cm)	Plant Height Week 3 (cm)
W	5	5	6	8
X	10	5	8	10
Y	15	5	9	13
Z	20	5	7	9

The students concluded that Fertilizer Y produced the greatest amount of plant growth. Which best explains why their conclusion is invalid?

- A Measurements of the plants were only taken three times.
- B Different types of plants should have been investigated.
- C The plants were given different amounts of fertilizer.
- D The plants should all have grown at the same rate.

Item Information

Item Code: TNS21137	Passage Title:
Standard Code: 0707.TE.1	Passage Code:
Standard Text: Identify the tools and procedures needed to test the design features of a prototype.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: D	DOK Level: 2

Which of these would best test a new type of paint that is designed to prevent rusting?

- A** Apply the new paint to iron pieces of different sizes and place them in dry conditions.
- B** Apply the new paint to objects and measure the changes in temperature of each object.
- C** Apply the new paint to objects made of different materials, and then observe if the materials react.
- D** Apply the new paint to iron pieces, and then expose the pieces to different humidity conditions.

Item Information

Item Code: TNS30003

Passage Title:

Standard Code: 0707.TE.2

Passage Code:

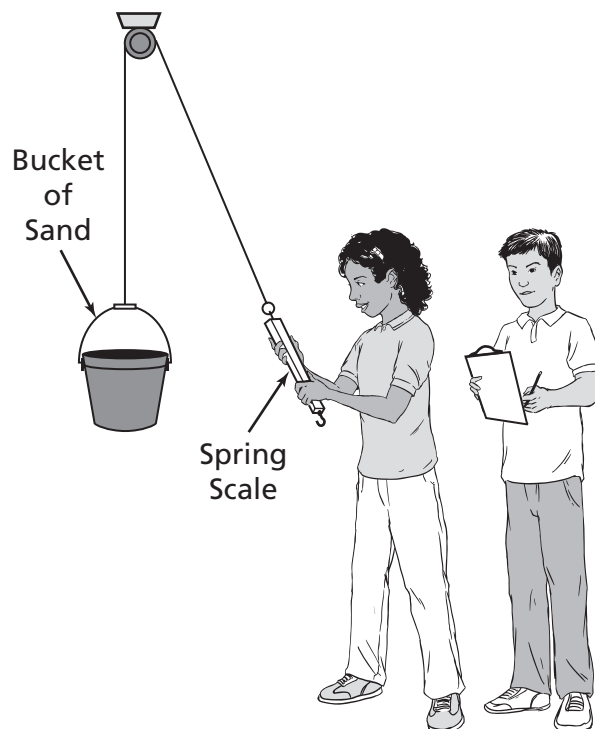
Standard Text: Evaluate a protocol to determine if the engineering design process was successfully applied.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: C

DOK Level: 2

For an investigation, students measured the force of gravity acting on a bucket by using a spring scale. Then they attached a rope to the bucket and wrapped it around a simple machine. They pulled on the spring scale until the bucket was lifted into the air. They compared the measured forces. A diagram of the experiment is shown below.



Which is the best way for the students to make sure their results were accurate?

- A fill the bucket with different substances
- B draw a diagram of the experiment
- C run the experiment multiple times
- D use different lengths of rope

Item Information

Item Code:	TNS30611	Passage Title:	
Standard Code:	0707.TE.3	Passage Code:	
Standard Text:	Distinguish between the intended benefits and the unintended consequences of a new technology.		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	C	DOK Level:	2

To meet energy needs, large amounts of desert land could be covered with solar cells to capture energy from the sun. Which statement describes an unintended consequence of using this method to capture energy?

- A** Demand for power produced by other sources would decrease.
- B** The sun would provide less light for photosynthesis.
- C** Some animal and plant species would lose their habitat.
- D** Less heat is available for tectonic plate movement.

Item Information

Item Code: TNS30612	Passage Title:
Standard Code: 0707.TE.4	Passage Code:
Standard Text: Differentiate between adaptive and assistive engineered products (e.g., food, biofuels, medicines, integrated pest management).	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: A	DOK Level: 1

Scientists genetically engineered aspen trees to absorb harmful chemicals that pollute underground water. Which statement best explains the type of product these scientists have made?

- A** It is an adaptive engineered product because the trees were altered for a new purpose.
- B** It is an adaptive engineered product because the trees help a person perform a task.
- C** It is an assistive engineered product because the trees are used for a new purpose.
- D** It is an assistive engineered product because the trees benefit from the change.

This page intentionally left blank.

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 7 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 8 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2018 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 8..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS30540

Passage Title:

Standard Code: 0807.5.1

Passage Code:

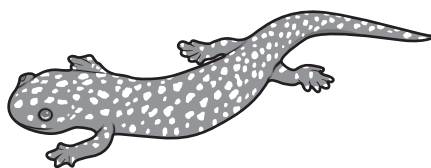
Standard Text: Use a simple classification key to identify an unknown organism.

Reporting Category: Biodiversity & Change

Correct Answer: A

DOK Level: 2

Students found the unfamiliar, adult salamander shown below in a nearby pond. The students noticed white spots on its skin and that it did not have external gills. They used the classification key shown below to help identify the organism.



Salamander Classification

1	Back legs absent	<i>Siren intermedia</i>
	Back legs present	Go to 2
2	External gills present in adults	<i>Necturus maculosus</i>
	External gills absent in adults	Go to 3
3	Body background black with white spots	Go to 4
	Body background light with dark spots and/or lines on body	Go to 5
4	Small white spots in rows on the sides from head to tail	<i>Ambystoma jeffersonianum</i>
	Small white spots scattered throughout a black background from head to tail	<i>Plethodon glutinosus</i>
5	Light stripe running length of body with dark color extending downward on sides	<i>Plethodon cinereus</i>
	Light stripe running length of body without dark color extending downward on sides	<i>Hemidactylium scutatum</i>

(This item continues on the next page.)

(Item 1, continued from the previous page)

According to the classification key, what is the genus and species of this salamander?

- A** *Plethodon glutinosus*
- B** *Hemidactylium scutatum*
- C** *Necturus maculosus*
- D** *Ambystoma jeffersonianum*

Item Information

Item Code: TNS02559

Passage Title:

Standard Code: 0807.5.1

Passage Code:

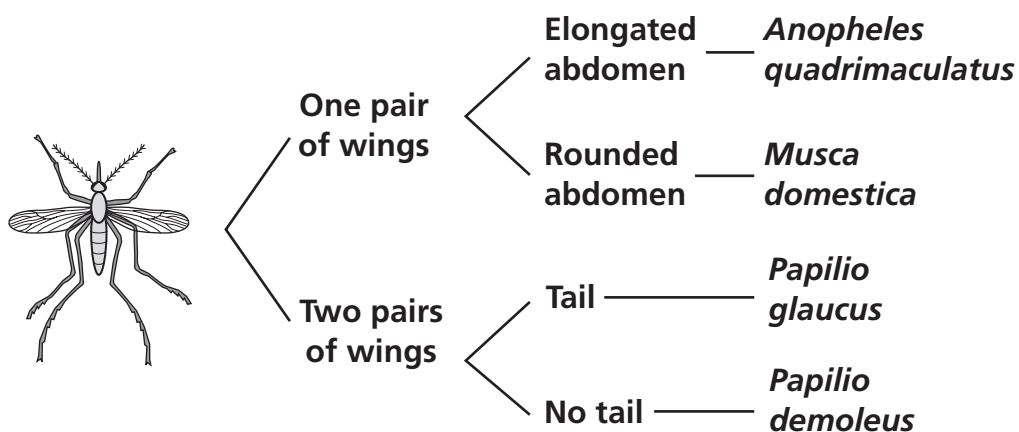
Standard Text: Use a simple classification key to identify an unknown organism.

Reporting Category: Biodiversity & Change

Correct Answer: D

DOK Level: 2

An organism and its classification key are shown below.



Based on the classification key, what is the name of the organism?

- A *Musca domestica*
- B *Papilio glaucus*
- C *Papilio demoleus*
- D *Anopheles quadrimaculatus*

Item Information

Item Code:	TNS20713	Passage Title:	
Standard Code:	0807.5.2	Passage Code:	
Standard Text:	Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	A	DOK Level:	2

Which type of leaves will most likely help a plant survive in a cold area with heavy snowfall?

- A** long, needle-like leaves
- B** feather-like leaves
- C** large, broad leaves
- D** hand-shaped leaves

Item Information

Item Code:	TNS30590	Passage Title:	
Standard Code:	0807.5.2	Passage Code:	
Standard Text:	Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

Which example of a physiological adaptation best helps an organism survive in a desert environment?

- A** having thick layers of blubber for insulation
- B** having fins that act as paddles
- C** storing water for long periods of time
- D** laying eggs in water environments

Item Information

Item Code:	TNS30542	Passage Title:	
Standard Code:	0807.5.2	Passage Code:	
Standard Text:	Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	A	DOK Level:	2

Many mammal species have fur coats of different colors that match their environments during different seasons. A certain species of hare has a coat of brown in the summer and white in the winter. In which environment does this hare species most likely live?

- A** arctic tundra
- B** grassland
- C** rain forest
- D** desert

Item Information

Item Code:	TNS30543	Passage Title:	
Standard Code:	0807.5.2	Passage Code:	
Standard Text:	Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

To survive during one part of the year, monarch butterflies migrate 2,500 miles from the United States to Mexico. Which environmental factor initiates this migration?

- A** gentle winds
- B** few predators
- C** cold temperatures
- D** clean water

Item Information

Item Code: TNS30591	Passage Title:
Standard Code: 0807.5.3	Passage Code:
Standard Text: Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions.	
Reporting Category: Biodiversity & Change	
Correct Answer: D	DOK Level: 2

The data table below shows the speeds at which certain species of penguins travel while swimming.

Penguin Data

Penguin Groups	Average Swimming Speed of the Group of Penguins (in km/hr)
Emperor Penguins	10.0
King Penguins	7.5
Rockhopper Penguins	7.5
Adélie Penguins	12.0

According to these data, which penguin species would be the most difficult to catch by a swimming sea lion?

- A Emperor
- B King
- C Rockhopper
- D Adélie

Item Information

Item Code: TNS00100

Passage Title:

Standard Code: 0807.5.3

Passage Code:

Standard Text: Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions.

Reporting Category: Biodiversity & Change

Correct Answer: D

DOK Level: 2

A river that contains several snail populations has developed an increasingly forceful current over the past three years. A scientist takes a sample from the same part of the river at the end of every year in order to monitor each snail population. He classifies the snails by their different shell types. The scientist's results are shown in the data table below.

Snail Population Samples Based on River Current Speed (miles per hour)

	Year One–2 mph	Year Two–4 mph	Year Three–6 mph
Number of Pointed Shell Snails	41	32	8
Number of Thin Shell Snails	42	25	6
Number of Large Shell Snails	41	36	15
Number of Thick Shell Snails	40	41	38

According to the data table, which type of snail shell is associated with higher survival rates as the river has developed a more forceful current?

- A snails with pointed shells
- B snails with thin shells
- C snails with large shells
- D snails with thick shells

Item Information

Item Code: TNS30889	Passage Title:
Standard Code: 0807.5.4	Passage Code:
Standard Text: Identify several reasons for the importance of maintaining the earth's biodiversity.	
Reporting Category: Biodiversity & Change	
Correct Answer: A	DOK Level: 2

Which of these will most likely occur if global pollution levels continue to rise?

- A** Biodiversity will decline.
- B** Only marine species will benefit.
- C** Human health will improve.
- D** Only endangered species will prosper.

Item Information

Item Code:	TNS30592	Passage Title:	
Standard Code:	0807.5.4	Passage Code:	
Standard Text:	Identify several reasons for the importance of maintaining the earth's biodiversity.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

Which factor will most likely reduce the biodiversity in a protected area that contains grasslands, forests, and streams?

- A limiting the growth of new housing developments
- B regulating hunting practices, hunting seasons, and hunting licenses
- C increasing the amount of contaminated wastewater in an area stream
- D controlling the introduction of non-native plants

Item Information

Item Code:	TNS30545	Passage Title:	
Standard Code:	0807.5.4	Passage Code:	
Standard Text:	Identify several reasons for the importance of maintaining the earth's biodiversity.		
Reporting Category:	Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

Which outcome will most likely occur when native fish populations in a certain habitat decline?

- A** Every fish species within the habitat will become extinct.
- B** Disease will weaken the remaining fish species.
- C** Predator populations will decrease along with the prey populations.
- D** Native fish populations will stop their reproductive cycles.

Item Information

Item Code: TNS10680

Passage Title:

Standard Code: 0807.5.5

Passage Code:









Standard Text: Compare fossils found in sedimentary rock to determine their relative age.

Reporting Category: Biodiversity & Change

Correct Answer: D

DOK Level: 2

Two groups of students were studying fossils in two different sections of exposed rock from the same area. These sets of layers were from the same location, and the layers overlapped.

Set 1	Set 2
Layer 4 	Layer 6 
Layer 3 	Layer 5 
Layer 2 	Layer 4 
Layer 1 	Layer 3 

Which layer contains the most recent fossil?

- A Layer 1
- B Layer 3
- C Layer 4
- D Layer 6

Item Information

Item Code: TNS30594

Passage Title:

Standard Code: 0807.5.5

Passage Code:

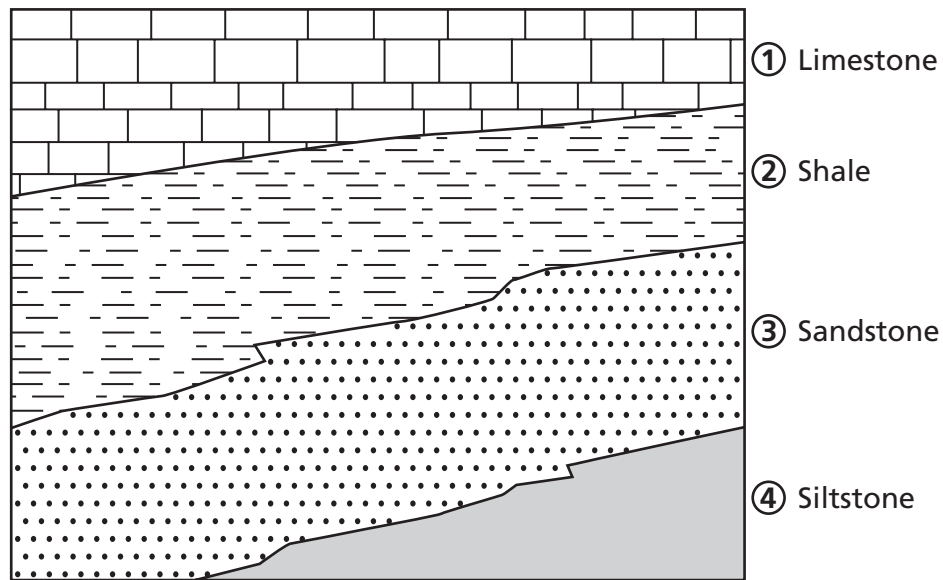
Standard Text: Compare fossils found in sedimentary rock to determine their relative age.

Reporting Category: Biodiversity & Change

Correct Answer: B

DOK Level: 2

The diagram below identifies four different rock layers.



Which best describes a fossil found in rock layer 2?

- A The fossil is older than a fossil found in layer 3.
- B The fossil is younger than a fossil found in layer 4.
- C The fossil is older than a fossil found in layer 4.
- D The fossil is younger than a fossil found in layer 1.

Item Information

Item Code: TNS30876

Passage Title:

Standard Code: 0807.5.5

Passage Code:

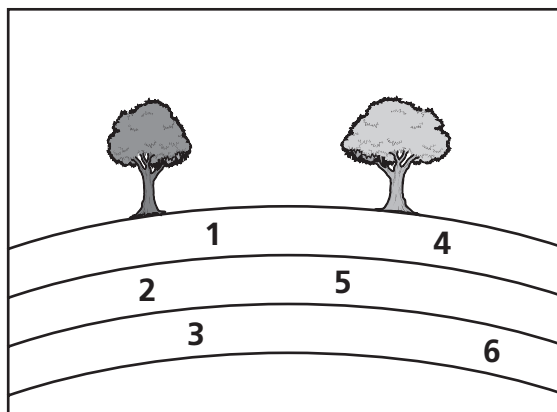
Standard Text: Compare fossils found in sedimentary rock to determine their relative age.

Reporting Category: Biodiversity & Change

Correct Answer: C

DOK Level: 2

The diagram below shows where fossils are located in rock layers.



Which two fossils are closest in age?

- A Fossils 1 and 6
- B Fossils 3 and 4
- C Fossils 5 and 6
- D Fossils 1 and 3

Item Information

Item Code: TNS30815	Passage Title:
Standard Code: 0807.9.1	Passage Code:
Standard Text: Recognize that all matter consists of atoms.	
Reporting Category: Properties of Matter	
Correct Answer: C	DOK Level: 2

The chemical formula for the sugar maltose is shown below.



According to the chemical formula, how many atoms are in one molecule of maltose?

- A 1
- B 3
- C 45
- D 2,904

Item Information

Item Code: TNS20785	Passage Title:
Standard Code: 0807.9.1	Passage Code:
Standard Text: Recognize that all matter consists of atoms.	
Reporting Category: Properties of Matter	
Correct Answer: A	DOK Level: 3-4

A student is trying to prove that air has mass and is made up of atoms. Which experiment should the student perform?

- A** take the mass of a soccer ball before and after it has been inflated
- B** use a thermometer to take the classroom's temperature for one week
- C** go outside and record the speed of the wind
- D** attempt to capture air into a large plastic bag

Item Information

Item Code: TNS20814	Passage Title:
Standard Code: 0807.9.2	Passage Code:
Standard Text: Identify the common outcome of all chemical changes.	
Reporting Category: Chemical Reactions	
Correct Answer: A	DOK Level: 2

A description of a reaction is shown below.

Reactive sodium (solid) + Poisonous chlorine (gas) → Non-toxic sodium chloride (solid)

Which statement best explains this reaction?

- A** Sodium and chlorine gas chemically formed a different substance.
- B** Chlorine gas was released when the sodium dissolved in water.
- C** Sodium heated the chlorine gas causing it to rearrange.
- D** Chlorine gas turned solid when it was cooled by the sodium.

Item Information

Item Code: TNS30570	Passage Title:
Standard Code: 0807.9.2	Passage Code:
Standard Text: Identify the common outcome of all chemical changes.	
Reporting Category: Chemical Reactions	
Correct Answer: B	DOK Level: 2

Which example best describes a chemical change?

- A an ice cube melting into water
- B dry wood burning and producing ash
- C a pencil that is broken in half
- D steam produced by boiling water

Item Information

Item Code: TNS30571

Passage Title:

Standard Code: 0807.9.3

Passage Code:

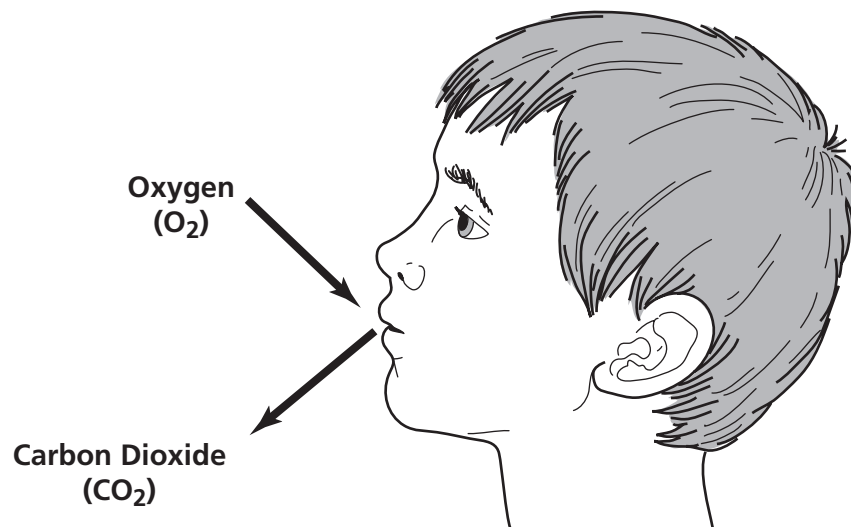
Standard Text: Classify common substances as elements or compounds based on their symbols or formulas.

Reporting Category: Chemical Reactions

Correct Answer: A

DOK Level: 1

The diagram shows the gases inhaled and exhaled during breathing.



Which best identifies the substances shown in this diagram?

- A O₂ is an element and CO₂ is a compound.
- B O₂ is a compound and CO₂ is an element.
- C Both O₂ and CO₂ are elements.
- D Both O₂ and CO₂ are compounds.

Item Information

Item Code: TNS30550 Passage Title:
Standard Code: 0807.9.3 Passage Code:
Standard Text: Classify common substances as elements or compounds based on their symbols or formulas.
Reporting Category: Chemical Reactions
Correct Answer: B DOK Level: 1

The table below shows the chemical formula of several substances.

Chemical Formulas

Substance	Chemical Formula
Carbon Dioxide	CO ₂
Nitrogen	N ₂
Oxygen	O ₂
Table Salt	NaCl
Water	H ₂ O

Which substances in the table are elements?

- A** Carbon Dioxide and Nitrogen
- B** Nitrogen and Oxygen
- C** Oxygen and Table Salt
- D** Table Salt and Water

Item Information

Item Code: TNS30551	Passage Title:
Standard Code: 0807.9.4	Passage Code:
Standard Text: Differentiate between a mixture and a compound.	
Reporting Category: Chemical Reactions	
Correct Answer: C	DOK Level: 2

Which procedure will result in the formation of a new compound?

- A** combining powder with water to make tea
- B** combining lettuce with dressing to make a salad
- C** combining vinegar with baking soda to make bubbles
- D** combining one colored liquid with another to make a new color

Item Information

Item Code: TNS10385

Passage Title:

Standard Code: 0807.9.5

Passage Code:

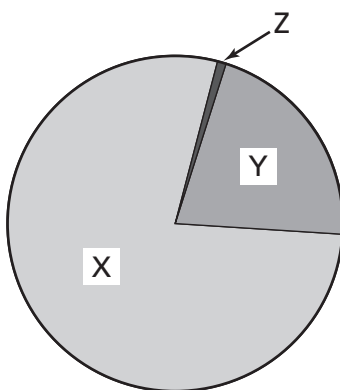
Standard Text: Describe the chemical makeup of the atmosphere.

Reporting Category: Properties of Matter

Correct Answer: C

DOK Level: 2

The circle graph below shows the chemical makeup of the atmosphere of Earth.



What gas is represented by label X?

- A oxygen
- B carbon dioxide
- C nitrogen
- D water vapor

Item Information

Item Code: TNS20927	Passage Title:
Standard Code: 0807.9.5	Passage Code:
Standard Text: Describe the chemical makeup of the atmosphere.	
Reporting Category: Properties of Matter	
Correct Answer: B	DOK Level: 2

The main chemical in the atmosphere of Venus is carbon dioxide. How does this compare with the atmosphere of Earth?

- A** Carbon dioxide is not found in the atmosphere of Earth.
- B** Carbon dioxide makes up a small part of the atmosphere of Earth.
- C** Carbon dioxide is the main chemical in the atmosphere of Earth.
- D** Carbon dioxide is found in the atmosphere of Earth only near volcanoes.

Item Information

Item Code: TNS10501

Passage Title:

Standard Code: 0807.9.5

Passage Code:

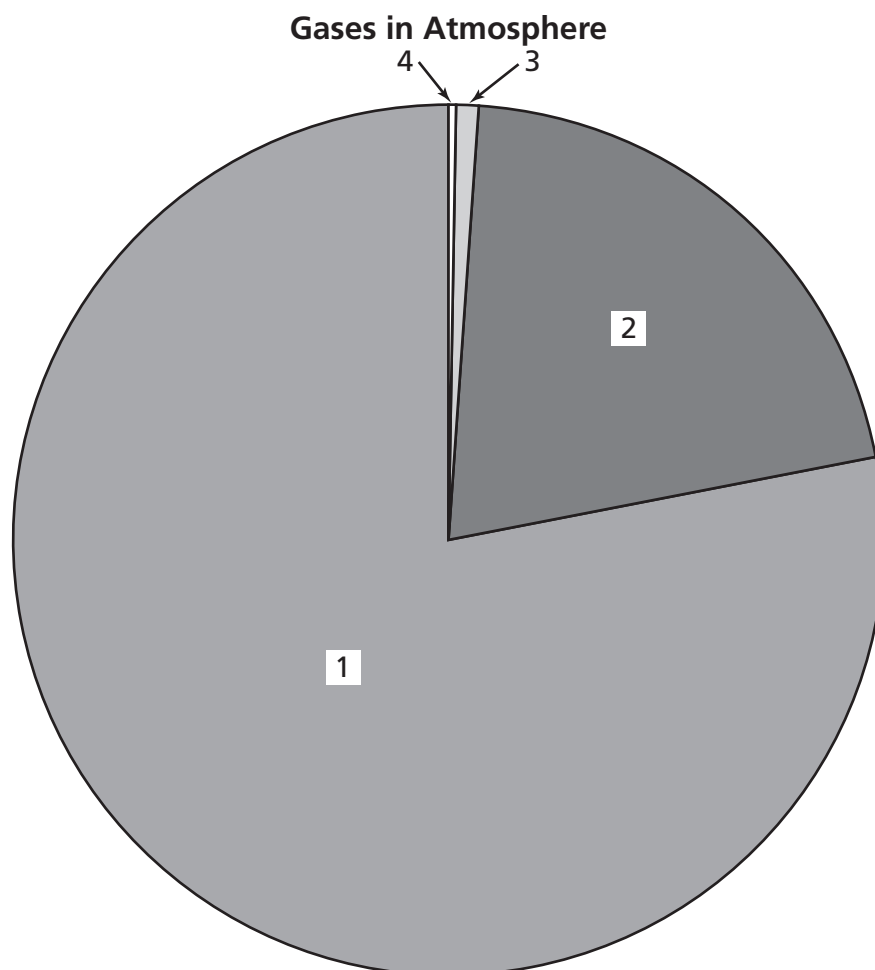
Standard Text: Describe the chemical makeup of the atmosphere.

Reporting Category: Properties of Matter

Correct Answer: B

DOK Level: 2

The circle graph shows the composition of the atmosphere of Earth.



(This item continues on the next page.)

(Item 24, continued from the previous page)

Oxygen gas is included in which section of the pie graph?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS30552	Passage Title:
Standard Code: 0807.9.5	Passage Code:
Standard Text: Describe the chemical makeup of the atmosphere.	
Reporting Category: Properties of Matter	
Correct Answer: A	DOK Level: 1

Which two gases make up most of the air in the atmosphere?

- A** nitrogen and oxygen
- B** hydrogen and nitrogen
- C** carbon dioxide and hydrogen
- D** oxygen and carbon dioxide

Item Information

Item Code: TNS30732	Passage Title:
Standard Code: 0807.9.6	Passage Code:
Standard Text: Compare the particle arrangement and type of particle motion associated with different states of matter.	
Reporting Category: Properties of Matter	
Correct Answer: B	DOK Level: 2

The particles in a substance are moving at a very high rate of speed and colliding with each other. Which of these best demonstrates this type of particle motion?

- A crushing an ice cube
- B boiling water
- C tearing a sheet of paper
- D filling a glass with chocolate milk

Item Information

Item Code:	TNS10856	Passage Title:	
Standard Code:	0807.9.6	Passage Code:	
Standard Text:	Compare the particle arrangement and type of particle motion associated with different states of matter.		
Reporting Category:	Properties of Matter		
Correct Answer:	B	DOK Level:	2

Mercury is the only metal that is a liquid at 25°C. Which of these best describes how mercury particles are different from the particles of most metals at 25°C?

- A** Mercury particles are farther apart and move more slowly.
- B** Mercury particles are farther apart and move more quickly.
- C** Mercury particles are closer together and move more slowly.
- D** Mercury particles are closer together and move more quickly.

Item Information

Item Code: TNS30731	Passage Title:
Standard Code: 0807.9.6	Passage Code:
Standard Text: Compare the particle arrangement and type of particle motion associated with different states of matter.	
Reporting Category: Properties of Matter	
Correct Answer: A	DOK Level: 2

A substance is characterized by the following:

- Its particles are held together by strong forces.
- Its particles are densely packed together.
- Its particles vibrate constantly but cannot move from one place to another.

This substance can best be described as

- A** a solid.
- B** a liquid.
- C** a gas.
- D** an element.

Item Information

Item Code: TNS30554

Passage Title:

Standard Code: 0807.9.7

Passage Code:

Standard Text: Apply an equation to determine the density of an object based on its mass and volume.

Reporting Category: Properties of Matter

Correct Answer: B

DOK Level: 2

A rock has a mass of 200 grams and a density of 5 grams / centimeters³. The equation for volume is shown below.

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}}$$
$$V = \frac{m}{d}$$

What is the volume of the rock?

- A 0.025 centimeters³
- B 40 centimeters³
- C 205 centimeters³
- D 1,000 centimeters³

Item Information

Item Code:	TNS20836	Passage Title:	
Standard Code:	0807.9.7	Passage Code:	
Standard Text:	Apply an equation to determine the density of an object based on its mass and volume.		
Reporting Category:	Properties of Matter		
Correct Answer:	D	DOK Level:	3-4

A student is asked to calculate the density of an unknown sample. The sample has a mass of 33.0 grams and a volume of 3.0 milliliters.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{v}$$

Using the formula above, what is the density of the unknown sample?

- A** 99.0 grams/milliliter
- B** 36.0 grams/milliliter
- C** 30.0 grams/milliliter
- D** 11.0 grams/milliliter

Item Information

Item Code:	TNS30555	Passage Title:	
Standard Code:	0807.9.8	Passage Code:	
Standard Text:	Interpret the results of an investigation to determine whether a physical or chemical change has occurred.		
Reporting Category:	Chemical Reactions		
Correct Answer:	D	DOK Level:	2

Students made a model volcano by putting some baking soda in the bottom of a plastic bottle. They added red food coloring to some vinegar and poured the red vinegar into the plastic bottle to produce foam. Which result would most likely indicate a chemical change took place?

- A The vinegar turned red.
- B The foam made a sound.
- C The bottle became wet.
- D The foam formed in the bottle.

Item Information

Item Code:	TNS30576	Passage Title:	
Standard Code:	0807.9.8	Passage Code:	
Standard Text:	Interpret the results of an investigation to determine whether a physical or chemical change has occurred.		
Reporting Category:	Chemical Reactions		
Correct Answer:	A	DOK Level:	3-4

Using tongs, a teacher puts a magnesium strip into a Bunsen burner flame so that the magnesium burns. Which response correctly identifies and describes the change that occurs during this demonstration?

- A** A chemical change occurs because energy was released.
- B** A chemical change occurs because the size of the magnesium strip changed.
- C** A physical change occurs because gas was released.
- D** A physical change occurs because the state of matter of the magnesium changed.

Passage Title:

Passage Code:

Standard Text: Use the periodic table to determine the properties of an element.

Reporting Category: Properties of Matter

DOK Level: 1

The periodic table of elements is shown below.

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Unq	Unp	Unh	Uns	Uno	Une	Unn								
		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

The element shaded on this periodic table most likely has the characteristic of

- A** a dark liquid.
- B** an inert gas.
- C** a shiny, malleable solid.
- D** a dull, crumbly solid.

Item Information

Item Code: TNS10389

Passage Title:

Standard Code: 0807.9.9

Passage Code:

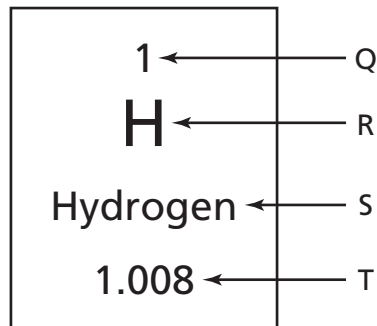
Standard Text: Use the periodic table to determine the properties of an element.

Reporting Category: Properties of Matter

Correct Answer: D

DOK Level: 2

An element from the periodic table is shown.



Which information about the element indicates the atomic mass?

- A Q
- B R
- C S
- D T

Item Information

Item Code: TNS30737

Passage Title:

Standard Code: 0807.9.10

Passage Code:

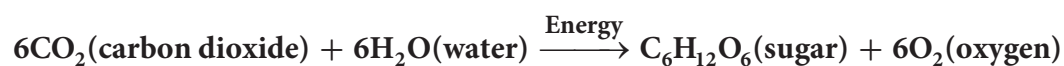
Standard Text: Identify the reactants and products of a chemical reaction.

Reporting Category: Chemical Reactions

Correct Answer: D

DOK Level: 3-4

The equation for photosynthesis is shown below.



Which two substances represent the products in this equation?

- A carbon dioxide and oxygen
- B water and sugar
- C carbon dioxide and water
- D sugar and oxygen

Item Information

Item Code: TNS00123

Passage Title:

Standard Code: 0807.9.10

Passage Code:

Standard Text: Identify the reactants and products of a chemical reaction.

Reporting Category: Chemical Reactions

Correct Answer: B

DOK Level: 1

Look at this chemical equation.



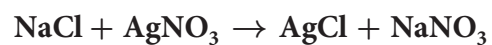
What are the reactants in the chemical equation?

- A** water and ethane
- B** ethane and oxygen
- C** carbon dioxide and water
- D** oxygen and carbon dioxide

Item Information

Item Code: TNS20863	Passage Title:
Standard Code: 0807.9.10	Passage Code:
Standard Text: Identify the reactants and products of a chemical reaction.	
Reporting Category: Chemical Reactions	
Correct Answer: C	DOK Level: 2

The equation below represents a chemical reaction.



Which substance is a product of this chemical reaction?

- A silver (Ag)
- B sodium (Na)
- C silver chloride (AgCl)
- D sodium chloride (NaCl)

Item Information

Item Code: TNS30814

Passage Title:

Standard Code: 0807.9.11

Passage Code:

Standard Text: Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

Reporting Category: Chemical Reactions

Correct Answer: C

DOK Level: 3-4

During an experiment, zinc and sulfur chemically react to form zinc sulfide. According to the law of conservation of mass, which is the correct equation for this experiment?

- A** $\text{Zn} + 2\text{S} \rightarrow 2\text{ZnS}$
- B** $2\text{Zn} + 3\text{S} \rightarrow 5\text{ZnS}$
- C** $\text{Zn} + \text{S} \rightarrow \text{ZnS}$
- D** $3\text{Zn} + 2\text{S} \rightarrow 3\text{ZnS}$

Item Information

Item Code: TNS20810

Passage Title:

Standard Code: 0807.9.11

Passage Code:

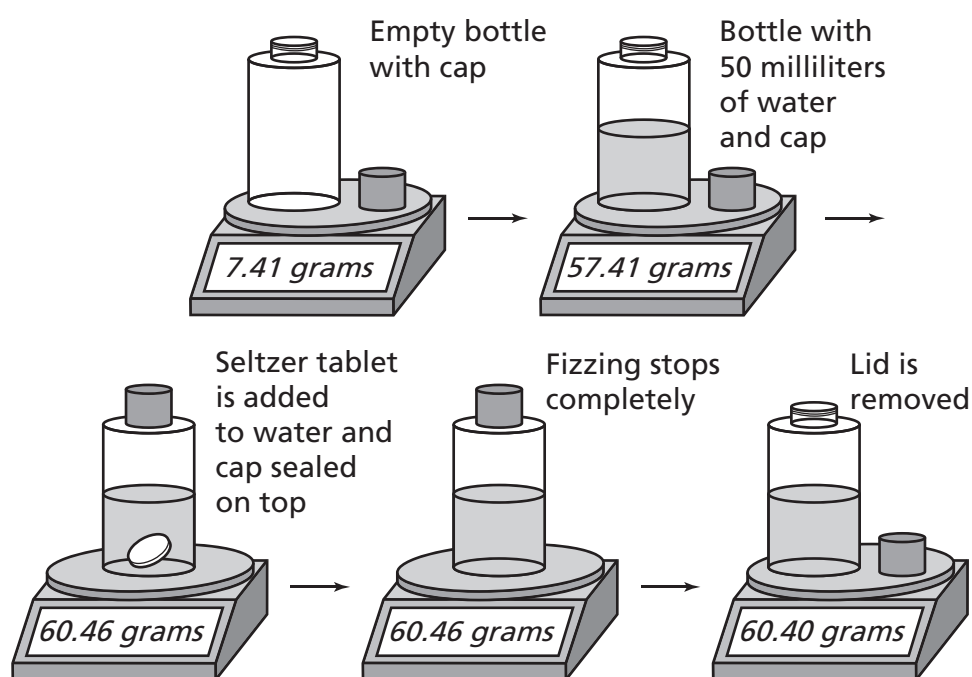
Standard Text: Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

Reporting Category: Chemical Reactions

Correct Answer: C

DOK Level: 2

The diagrams below show the setup for an investigation performed in a classroom where seltzer tablets were added to water.



Which is the best conclusion based on the results of this investigation?

- A The mass of the water is 57.41 grams.
- B Seltzer tablets are made of gas bubbles.
- C Gas was formed when the water and seltzer reacted.
- D The mass of the seltzer tablet increased to 60.46 grams.

Item Information

Item Code: TNS20864

Passage Title:

Standard Code: 0807.9.11

Passage Code:

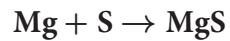
Standard Text: Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

Reporting Category: Chemical Reactions

Correct Answer: D

DOK Level: 3-4

A chemical equation is shown below.



If 48.6 grams of Mg completely react with 64.2 grams of S, what mass of MgS will be produced?

- A** 24.3 grams
- B** 32.1 grams
- C** 56.4 grams
- D** 112.8 grams

Item Information

Item Code: TNS30558

Passage Title:

Standard Code: 0807.9.11

Passage Code:

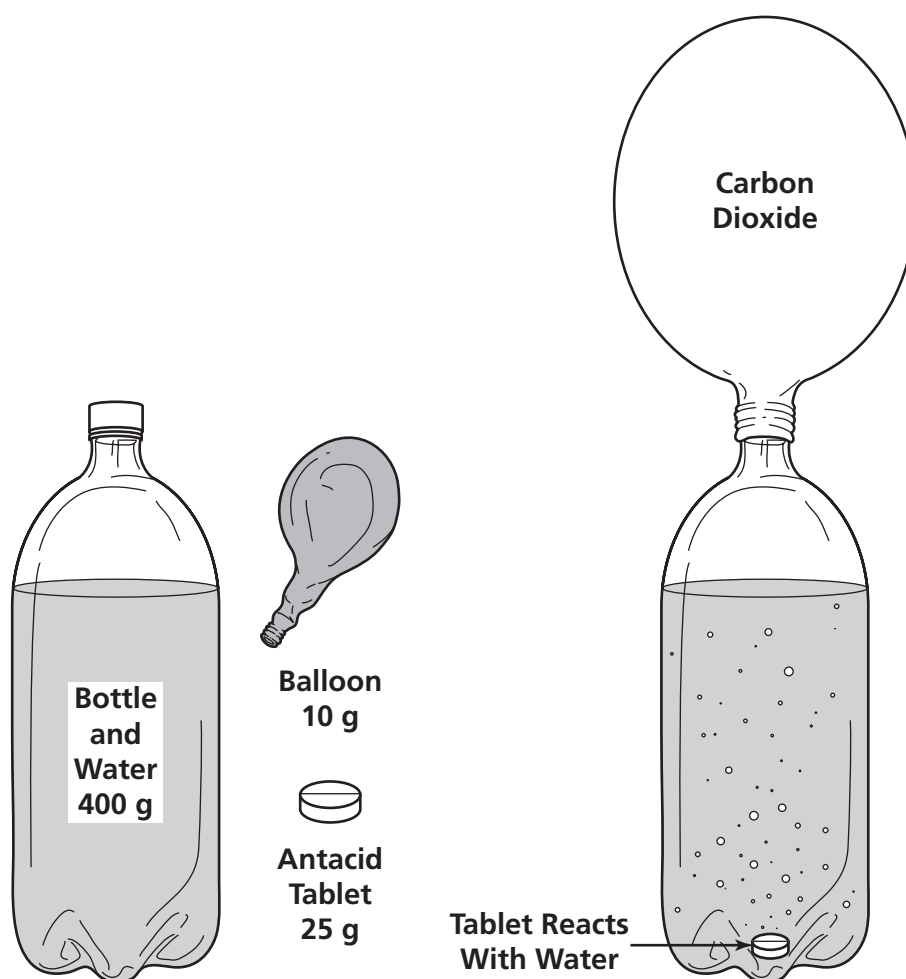
Standard Text: Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

Reporting Category: Chemical Reactions

Correct Answer: D

DOK Level: 2

Students measure the mass of several objects. They determine the bottle filled with water has a mass of 400 grams, the balloon has a mass of 10 grams, and the antacid tablet has a mass of 25 grams. The students calculate that 435 grams is the total mass of these objects before the experiment. They add the antacid to the water in the bottle and quickly place the balloon over the mouth of the bottle.



(This item continues on the next page.)

(Item 41, continued from the previous page)

What is the total mass of the materials when the reaction is complete?

- A** 400 grams
- B** 410 grams
- C** 425 grams
- D** 435 grams

Item Information

Item Code: TNS01804	Passage Title:
Standard Code: 0807.9.12	Passage Code:
Standard Text: Identify the basic properties of acids and bases.	
Reporting Category: Chemical Reactions	
Correct Answer: B	DOK Level: 1

A science teacher must remove any chemicals classified as acids from his classroom. He looks at the container label for the pH of each chemical.

What should the pH be for the chemicals that are removed from the classroom?

- A** equal to 7
- B** less than 7
- C** between 7 and 10
- D** between 10 and 14

Item Information

Item Code: TNS20841	Passage Title:
Standard Code: 0807.9.12	Passage Code:
Standard Text: Identify the basic properties of acids and bases.	
Reporting Category: Chemical Reactions	
Correct Answer: D	DOK Level: 1

A student noticed that a pH strip changed colors and indicated a pH of 10 after testing a substance. Which term best identifies the type of substance tested?

- A** powder
- B** water
- C** acidic
- D** basic

Item Information

Item Code: TNS30595

Passage Title:

Standard Code: 0807.12.1

Passage Code:

Standard Text: Recognize that electricity can be produced using a magnet and wire coil.

Reporting Category: Forces of Nature

Correct Answer: A

DOK Level: 2

The electrons in a wire coil are most likely moved by a magnet when the magnet is

- A** moved back and forth through the wire coil.
- B** repelled by another magnet.
- C** connecting a glass rod to a battery with a wire.
- D** connecting a light bulb to a switch and a wire.

Item Information

Item Code: TNS30598	Passage Title:
Standard Code: 0807.12.2	Passage Code:
Standard Text: Describe the basic principles of an electromagnet.	
Reporting Category: Forces of Nature	
Correct Answer: C	DOK Level: 3-4

Which statement best describes the process of building an electromagnet?

- A** attach two bar magnets together using copper wire
- B** place an iron nail onto each terminal of a battery
- C** attach the ends of a copper wire coiled around an iron nail to the terminals of a battery
- D** connect one end of a copper wire to a battery terminal while placing the other end in a glass of salt water

Item Information

Item Code: TNS30882

Passage Title:

Standard Code: 0807.12.3

Passage Code:

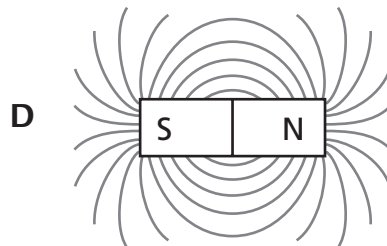
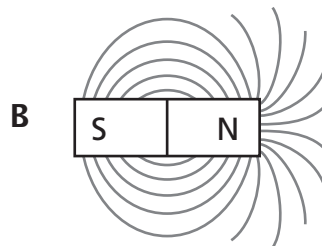
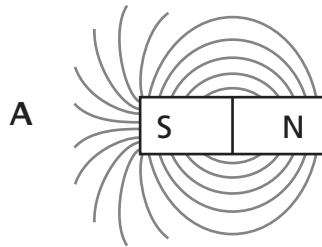
Standard Text: Distinguish among the Earth's magnetic field, a magnet, and the fields that surround a magnet and an electromagnet.

Reporting Category: Forces of Nature

Correct Answer: D

DOK Level: 2

Which diagram best represents a magnetic field?



Item Information

Item Code: TNS20915	Passage Title:
Standard Code: 0807.12.3	Passage Code:
Standard Text: Distinguish among the Earth's magnetic field, a magnet, and the fields that surround a magnet and an electromagnet.	
Reporting Category: Forces of Nature	
Correct Answer: A	DOK Level: 3-4

What do the magnetic field of Earth, a bar magnet, and an electromagnet all have in common?

- A** symmetrical lines of force
- B** attract plastic rods without difficulty
- C** their north poles attract other north poles
- D** they produce electrical current without assistance

Item Information

Item Code: TNS00135

Passage Title:

Standard Code: 0807.12.3

Passage Code:

Standard Text: Distinguish among the Earth's magnetic field, a magnet, and the fields that surround a magnet and an electromagnet.

Reporting Category: Forces of Nature

Correct Answer: C

DOK Level: 1

Which characteristic distinguishes an electromagnet from a bar magnet?

- A** Only a bar magnet repels like poles.
- B** Only a bar magnet attracts iron filings.
- C** Only an electromagnet requires a current.
- D** Only an electromagnet has opposite poles.

Item Information

Item Code:	TNS30566	Passage Title:	
Standard Code:	0807.12.4	Passage Code:	
Standard Text:	Distinguish between mass and weight using appropriate measuring instruments and units.		
Reporting Category:	Forces of Nature		
Correct Answer:	C	DOK Level:	2

The data below show the scale readings of an astronaut on Earth and on the moon.

Scale Readings

Location	Scale Reading (newtons)
Earth	1200
Moon	200

Which of these best explains the relationship between mass and weight?

- A** Mass and weight both remain constant.
- B** Mass and weight both depend upon gravity.
- C** Mass remains constant while weight depends upon gravity.
- D** Mass depends upon gravity while weight remains constant.

Item Information

Item Code:	TNS00146	Passage Title:	
Standard Code:	0807.12.5	Passage Code:	
Standard Text:	Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.		
Reporting Category:	Forces of Nature		
Correct Answer:	C	DOK Level:	2

The planets in our solar system revolve around the sun because

- A** the sun is older than the planets.
- B** the sun is hotter than the planets.
- C** the sun has more mass than the planets.
- D** the sun produces more light than the planets.

Item Information

Item Code:	TNS20917	Passage Title:	
Standard Code:	0807.12.5	Passage Code:	
Standard Text:	Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.		
Reporting Category:	Forces of Nature		
Correct Answer:	D	DOK Level:	3-4

A student sees a box on the ground near a rock. If the box were pushed closer to the rock, what would happen to the gravitational attraction between the box and the rock?

- A** It would decrease.
- B** It would remain the same.
- C** It would cease to exist.
- D** It would increase.

Item Information

Item Code: TNS30896

Passage Title:

Standard Code: 0807.12.6

Passage Code:

Standard Text: Illustrate how gravity controls the motion of objects in the solar system.

Reporting Category: Forces of Nature

Correct Answer: A

DOK Level: 1

The two outermost planets orbiting the sun are Uranus and Neptune. These planets each have many moons. Which of these best explains why the moon Proteus travels in a circular pattern around Neptune?

- A** A gravitational force formed between Proteus and Neptune.
- B** A gravitational force formed between Neptune and the sun.
- C** A gravitational force formed between Neptune and Uranus.
- D** A gravitational force formed between Proteus and the sun.

Item Information

Item Code: TNS20918

Passage Title:

Standard Code: 0807.12.6

Passage Code:

Standard Text: Illustrate how gravity controls the motion of objects in the solar system.

Reporting Category: Forces of Nature

Correct Answer: C

DOK Level: 3-4

Diagrams of Earth and a satellite are shown below.

Diagram 1

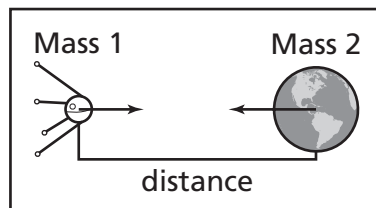


Diagram 2

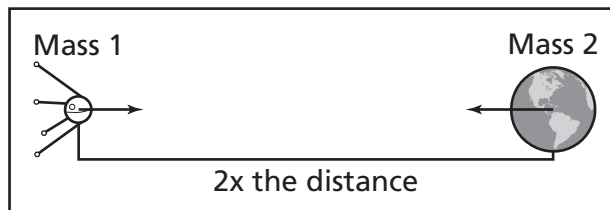
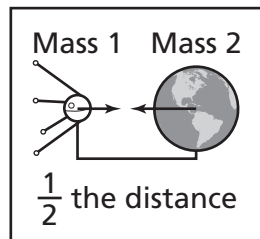


Diagram 3



In which option is the gravitational attraction greatest between the satellite and Earth?

- A Diagrams 1 and 2
- B Diagram 2
- C Diagram 3
- D Diagrams 2 and 3

Item Information

Item Code: TNS10820

Passage Title:

Standard Code: 0807.12.6

Passage Code:

Standard Text: Illustrate how gravity controls the motion of objects in the solar system.

Reporting Category: Forces of Nature

Correct Answer: D

DOK Level: 2

Which best explains why the moon revolves around Earth instead of revolving around the sun independently?

- A** The moon has a lower mass than Earth.
- B** Earth has a smaller mass than that of the sun.
- C** Earth moves a greater distance each year than the sun.
- D** The moon is closer to Earth than it is to the sun.

Item Information

Item Code: TNS30581	Passage Title:
Standard Code: 0807.Inq.1	Passage Code:
Standard Text: Design a simple experimental procedure with an identified control and appropriate variables.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: A	DOK Level: 2

A student designs a simple experiment to test if a variety of substances are acidic. The student uses blue litmus paper to perform the experiment.

Litmus Paper Investigation Data

Tested Substance	Results of the Litmus Paper Test
Orange Juice	Red
Hydrochloric Acid	Red
Apple Vinegar	Red
Shampoo	No Color Change

Based on the data table above, which of these is the dependent variable in this experiment?

- A** color change in litmus paper
- B** amount of apple vinegar tested
- C** number of tests performed
- D** brand of shampoo used

Item Information

Item Code:	TNS50941	Passage Title:	
Standard Code:	0807.Inq.2	Passage Code:	
Standard Text:	Select tools and procedures needed to conduct a moderately complex experiment.		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	B	DOK Level:	2

A student has a collection of small rocks. The student also has a graduated cylinder and a balance. Which question is the student most likely trying to answer?

- A** What is the chemical composition of each rock?
- B** What is the density of each rock?
- C** How many types of rocks are in the collection?
- D** Which is the oldest rock in the collection?

Item Information

Item Code: TNS20871	Passage Title:
Standard Code: 0807.Inq.2	Passage Code:
Standard Text: Select tools and procedures needed to conduct a moderately complex experiment.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: B	DOK Level: 2

Which lab tools would best be used to separate a mixture of sand and water?

- A** electronic balance and a ruler
- B** strainer and a beaker
- C** flask and a glass rod
- D** test tube and an eyedropper

Item Information

Item Code: TNS10697

Passage Title:

Standard Code: 0807.Inq.3

Passage Code:

Standard Text: Interpret and translate data into a table, graph, or diagram.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: A

DOK Level: 2

The data table shows light intensity captured by a sensor from the same light source at different distances.

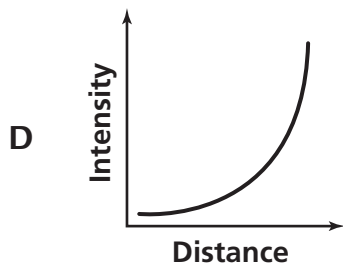
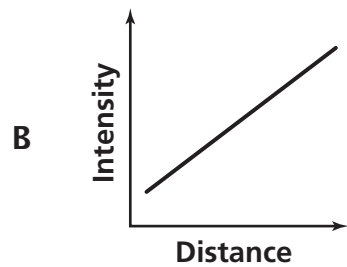
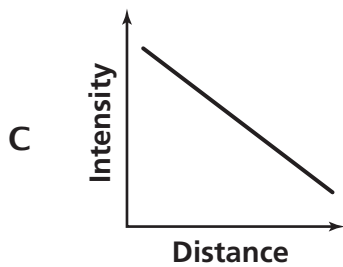
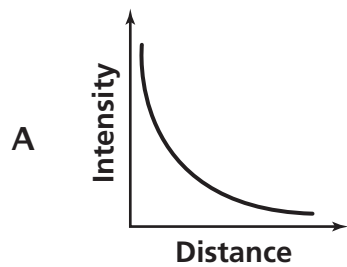
**Intensity of
Classroom Light**

Distance (cm)	Intensity (lux)
10	180.72
15	80.42
20	45.16
25	28.89
30	20.10
35	14.75
40	11.30

Which graph best displays the trend from the data table?

(This item continues on the next page.)

(Item 58, continued from the previous page)



Item Information

Item Code: TNS30583

Passage Title:

Standard Code: 0807.Inq.4

Passage Code:

Standard Text: Draw a conclusion that establishes a cause and effect relationship supported by evidence.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: A

DOK Level: 2

Scientists observed four different freshwater fish that live in Lake Victoria in Tanzania. Scientists observed the interaction between the adult fish and their offspring. The table below shows their collected data.

Freshwater Lake Fish Data

Type of Fish	Number of Young Produced	Method of Protection	Length of Adult Protection	Percentage of Young Surviving After 2 Weeks
Tilapia	75	Adult shelters young under them	2 weeks	85%
Cichlid	200	In-mouth incubation	2 weeks	95%
Dagaa	400	Young released into protective grassy plant area	0 weeks	40%
Nile Perch	500	Fish eggs distributed close to sandy lake bottom	0 weeks	20%

Which conclusion is supported by the information in the table?

- A** Cichlid are most likely to reach reproductive age.
- B** Dagaa produce the largest batches of eggs.
- C** Nile perch are more likely to reach adulthood.
- D** Tilapia are born with traits that repel predators.

Item Information

Item Code:	TNS20880	Passage Title:	
Standard Code:	0807.Inq.5	Passage Code:	
Standard Text:	Identify a faulty interpretation of data that is due to bias or experimental error.		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	D	DOK Level:	2

A student is researching the difference between the terms abiotic and biotic. The student determines that all moving things must be biotic. Which proves the student's assumption to be incorrect?

- A** rabbits hopping
- B** birds flying
- C** turtles swimming
- D** water flowing

Item Information

Item Code: TNS30538

Passage Title:

Standard Code: 0807.TE.2

Passage Code:

Standard Text: Evaluate a protocol to determine if the engineering design process was successfully applied.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: D

DOK Level: 2

After many successful tests in a controlled environment, a company produces and sells a newly designed electric generator. Customers later complain that the new generators used in very hot or very cold environments fail to work properly. Which of these should engineers have performed before mass production of this device?

- A** measure how long it takes for the device to require repair
- B** disassemble the device and replace any worn parts
- C** observe how the device performs at low speeds
- D** repeatedly operate the device under extreme conditions

Item Information

Item Code:	TNS20890	Passage Title:	
Standard Code:	0807.TE.3	Passage Code:	
Standard Text:	Distinguish between the intended benefits and the unintended consequences of a new technology.		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	B	DOK Level:	2

Below is a picture of a windmill farm.



Which statement indicates a benefit of using windmills to produce energy?

- A** Construction of windmills is expensive.
- B** Windmills produce less air pollution.
- C** Large spaces are needed to construct windmills.
- D** Windmills can only be useful when winds blow.

Item Information

Item Code:	TNS20892	Passage Title:	
Standard Code:	0807.TE.4	Passage Code:	
Standard Text:	Differentiate between adaptive and assistive engineered products (e.g., food, biofuels, medicines, integrated pest management).		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	A	DOK Level:	2

Which is an adaptive technology that reduces the use of fossil fuels?

- A** the use of plants to produce ethanol
- B** the use of scent traps to reduce crop pests
- C** the use of lasers to perform eye surgery
- D** the use of cloning to produce transplant organs

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 8 Item Release
Spring 2018



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 3 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 3..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Science Grade 3

Item Information

Item Code: TNS10220

Passage Title:

Standard Code: 0307.1.1

Passage Code:

Standard Text: Identify specific parts of a plant and describe their function.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 2

**Roots are cut from a plant. This will
most likely cause the plant to**

- A** grow taller
- B** take in less water
- C** make more flowers
- D** take in less sunlight

Item Information

Item Code: TNS20945

Passage Title:

Standard Code: 0307.10.1

Passage Code:

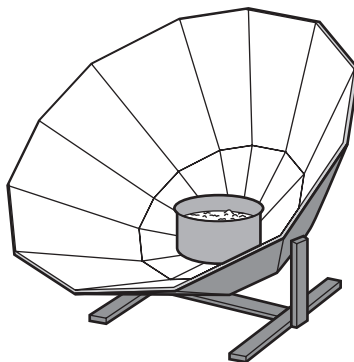
Standard Text: Use an illustration to identify various sources of heat energy.

Reporting Category: Matter and Energy

Correct Answer: B

DOK Level: 1

A group of students uses the solar cooker shown below to heat water outside.



What is the main source of heat for a solar cooker?

- A** gas
- B** sunlight
- C** coal
- D** fire

Item Information

Item Code: TNS10119

Passage Title:

Standard Code: 0307.10.1

Passage Code:

Standard Text: Use an illustration to identify various sources of heat energy.

Reporting Category: Matter and Energy

Correct Answer: C

DOK Level: 1

A kitchen is shown in the picture.



Which object is the main source of heat in this kitchen?

- A** sink
- B** floor
- C** stove
- D** cabinet

Item Information

Item Code: TNS02614

Passage Title:

Standard Code: 0307.11.1

Passage Code:

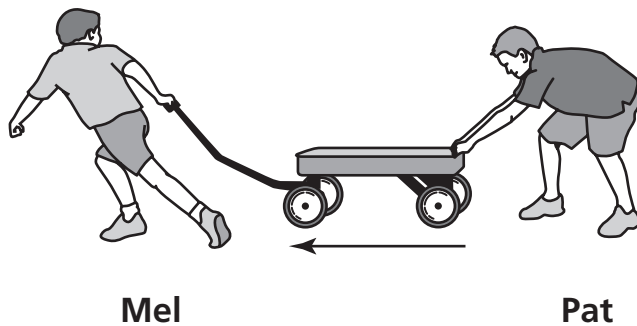
Standard Text: Identify how the direction of a moving object is changed by an applied force.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

Mel and Pat are pulling a wagon. Mel pulls the wagon left as Pat pulls the wagon right. The wagon moves to the left.



Why does the wagon move to the left?

- A** Pat pulls with more force.
- B** Pat is closer to the wagon.
- C** Mel pulls with more force.
- D** Mel is closer to the wagon.

Item Information

Item Code: TNS00063

Passage Title:

Standard Code: 0307.11.1

Passage Code:

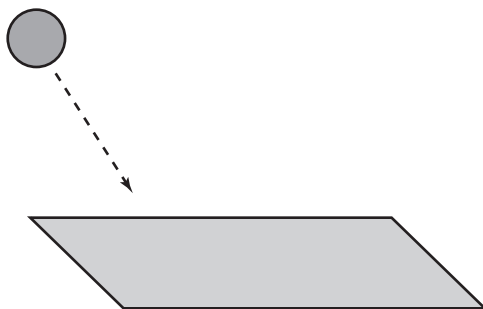
Standard Text: Identify how the direction of a moving object is changed by an applied force.

Reporting Category: Motion, Forces in Nature

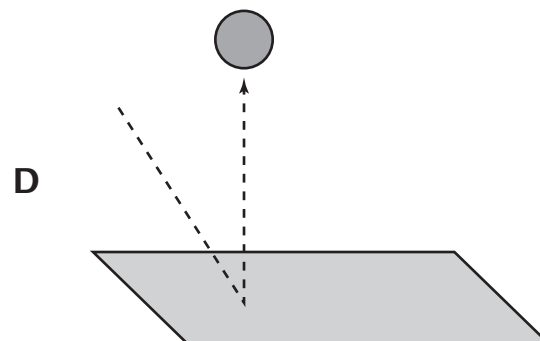
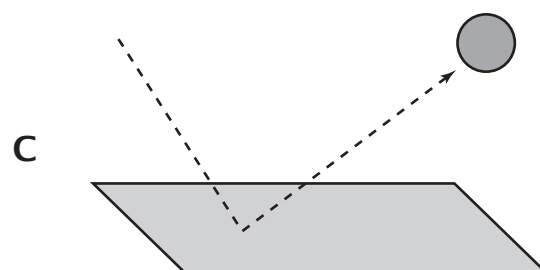
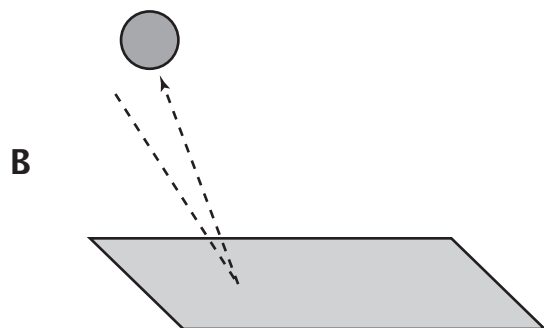
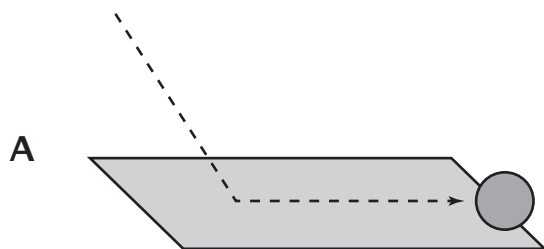
Correct Answer: C

DOK Level: 2

A rubber ball is thrown at an angle towards the floor.



Which diagram shows how the ball will most likely move after it hits the floor?



Item Information

Item Code: TNS20946

Passage Title:

Standard Code: 0307.11.1

Passage Code:

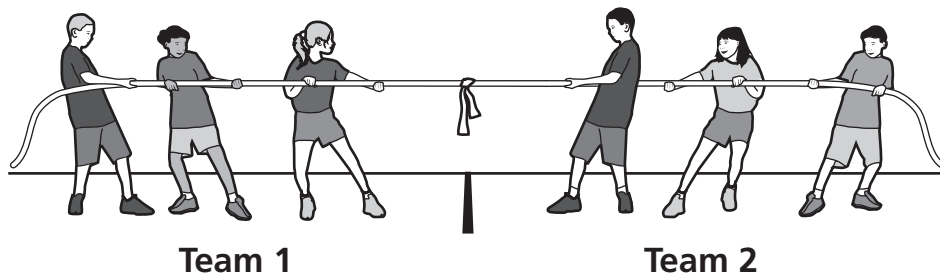
Standard Text: Identify how the direction of a moving object is changed by an applied force.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

Two teams of students are playing tug of war.



What must Team 1 do to pull Team 2 over the line?

- A** push the rope back and forth toward Team 2
- B** pull the rope with less force than Team 2
- C** pull the rope with more force than Team 2
- D** push with the same force as Team 2

Item Information

Item Code: TNS10121

Passage Title:

Standard Code: 0307.11.1

Passage Code:

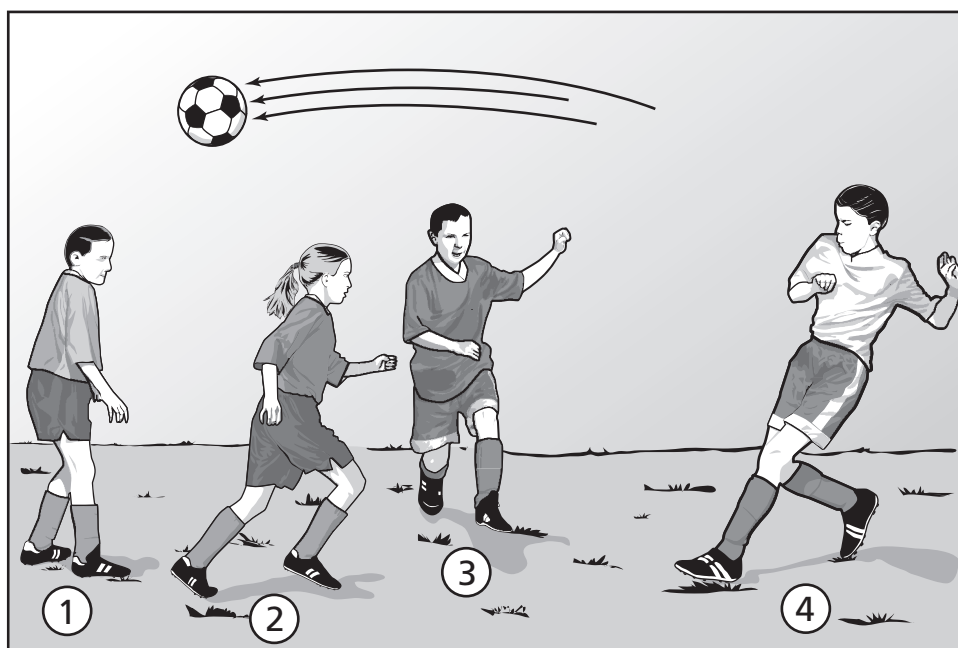
Standard Text: Identify how the direction of a moving object is changed by an applied force.

Reporting Category: Motion, Forces in Nature

Correct Answer: D

DOK Level: 2

A group of students is playing soccer, as shown in the picture.



The arrows show the direction the soccer ball travels when it is kicked. Which student most likely kicked the ball?

- A student 1
- B student 2
- C student 3
- D student 4

Item Information

Item Code: TNS21056

Passage Title:

Standard Code: 0307.11.4

Passage Code:

Standard Text: Identify how sounds with different pitch and volume are produced.

Reporting Category: Motion, Forces in Nature

Correct Answer: D

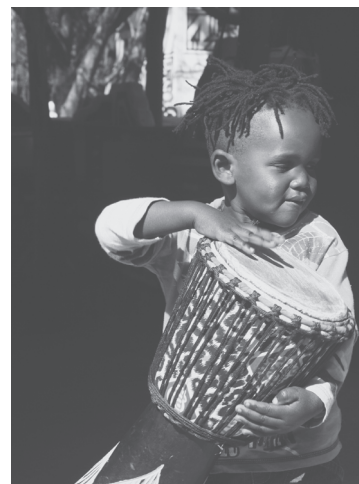
DOK Level: 2

Which drum is most likely to play the lowest pitch?

A



C



B



D



Item Information

Item Code: TNS10061

Passage Title:

Standard Code: 0307.12.1

Passage Code:

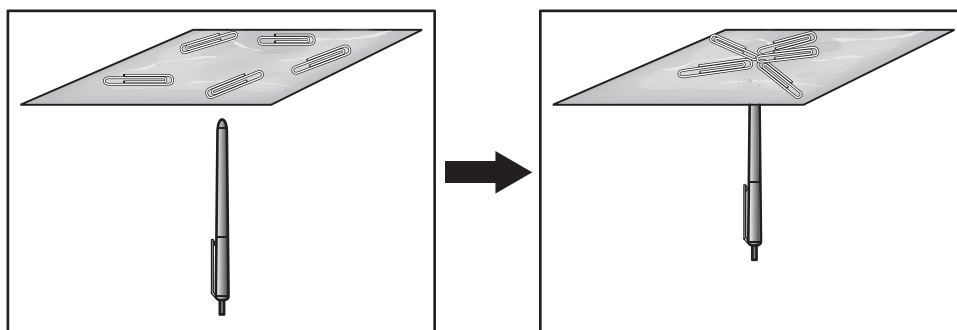
Standard Text: Recognize that magnets can move objects without touching them.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

This piece of paper has paper clips on it. The paper clips move toward the pen when the pen is close to the paper.



What is most likely inside the pen?

- A** a nail
- B** a battery
- C** a magnet
- D** a light bulb

Item Information

Item Code: TNS02240

Passage Title:

Standard Code: 0307.2.1

Passage Code:

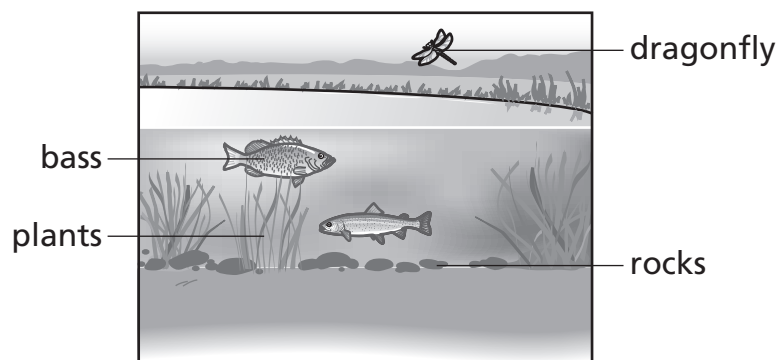
Standard Text: Distinguish between living and non-living things.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

Look at the picture of a pond.



Which of these is a non-living thing?

- A the bass
- B the rocks
- C the dragonfly
- D the plants

Item Information

Item Code: TNS21078 Passage Title:
Standard Code: 0307.2.1 Passage Code:
Standard Text: Distinguish between living and non-living things.
Reporting Category: Interdependence, Biodiversity & Change
Correct Answer: A DOK Level: 2

Students were given questions to answer during science class.

Answer the following questions

	Yes	No
1. Is a seed a living thing?		
2. Is a rock a living thing?		
3. Is rain a living thing?		
4. Is a cloud a living thing?		

Which question would be answered as “Yes”?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS20950

Passage Title:

Standard Code: 0307.2.2

Passage Code:

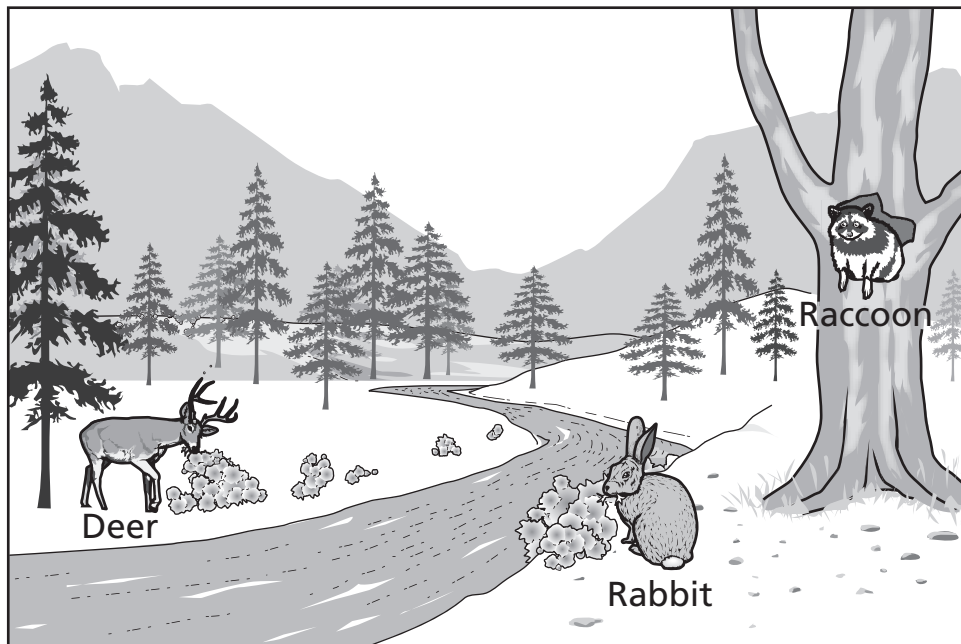
Standard Text: Determine how plants and animals compete for resources such as food, space, water, air, and shelter.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

Animals in a forest are shown below.



What do the deer and rabbit compete for the most?

- A** air
- B** food
- C** water
- D** space

Item Information

Item Code: TNS00018	Passage Title:
Standard Code: 0307.3.1	Passage Code:
Standard Text: Identify the basic needs of plants and animals.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 1

Which list describes the basic needs of all plants?

- A** air, worms, rocks
- B** air, water, sunlight
- C** sunlight, water, rocks
- D** sunlight, worms, water

Item Information

Item Code: TNS10133

Passage Title:

Standard Code: 0307.3.2

Passage Code:

Standard Text: Recognize that animals obtain their food by eating plants and other animals.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: D

DOK Level: 1

Which of these can a bird use as food?

- A** rocks
- B** snow
- C** water
- D** seeds

Item Information

Item Code: TNS10299

Passage Title:

Standard Code: 0307.3.2

Passage Code:

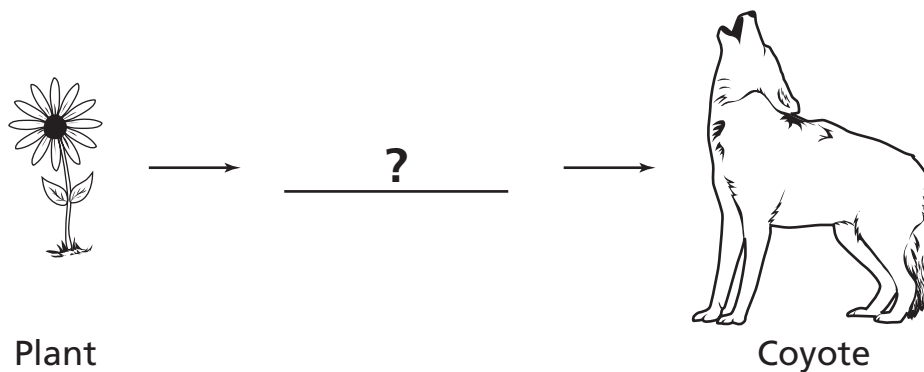
Standard Text: Recognize that animals obtain their food by eating plants and other animals.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

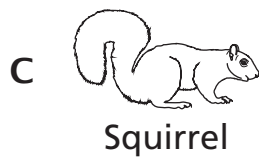
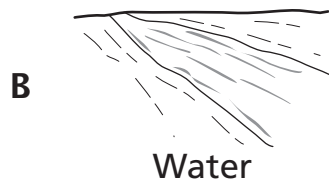
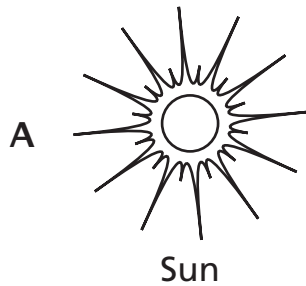
The picture below shows a forest food chain.



(This item continues on the next page.)

(Item 15, continued from the previous page)

Which picture best completes the food chain?



Item Information

Item Code: TNS20952

Passage Title:

Standard Code: 0307.3.2

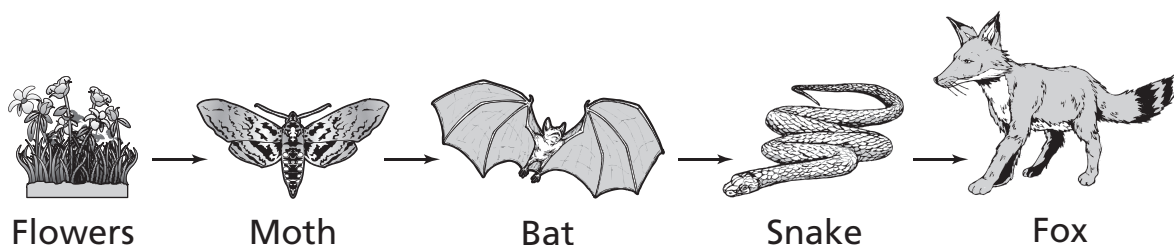
Passage Code:

Standard Text: Recognize that animals obtain their food by eating plants and other animals.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 2

A food chain is shown below.**How does the bat get its food?**

- A** by eating foxes
- B** by eating moths
- C** by eating snakes
- D** by eating flowers

Item Information

Item Code: TNS20678	Passage Title:
Standard Code: 0307.4.2	Passage Code:
Standard Text: Distinguish between characteristics that are transmitted from parents to offspring and those that are not.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: A	DOK Level: 1

A class made lists describing some students.

Has Black Hair
Jane
Bill
Sue

Is Wearing Blue
Pam
James
Bruce

Has Pierced Ears
Jill
Ann
Jordan

Likes To Play Soccer
Liz
Bob
Sarah

Which list shows a trait passed on to the student from the parents?

- A** Has Black Hair
- B** Is Wearing Blue
- C** Has Pierced Ears
- D** Likes To Play Soccer

Item Information

Item Code: TNS20389

Passage Title:

Standard Code: 0307.4.2

Passage Code:

Standard Text: Distinguish between characteristics that are transmitted from parents to offspring and those that are not.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: A

DOK Level: 1

The picture below shows a family pet.



Which trait did this dog inherit from its parents?

- A** having pointed ears
- B** sitting on command
- C** wearing a collar
- D** walking while on a leash

Item Information

Item Code: TNS20515

Passage Title:

Standard Code: 0307.5.1

Passage Code:

Standard Text: Investigate an organism's characteristics and evaluate how these features enable it to survive in a particular environment.

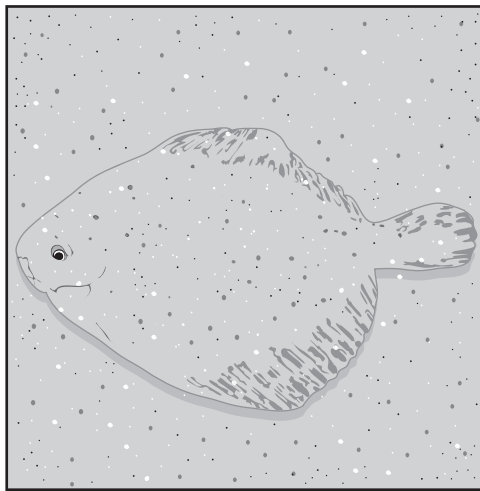
Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

A flounder is shown in the picture below.

Flounder



The flounder is a flat fish that lives in shallow ocean water. Which feature most helps to protect the flounder from other fish?

- A** its tail
- B** its fins
- C** its eyes
- D** its color

Item Information

Item Code: TNS20517

Passage Title:

Standard Code: 0307.5.2

Passage Code:

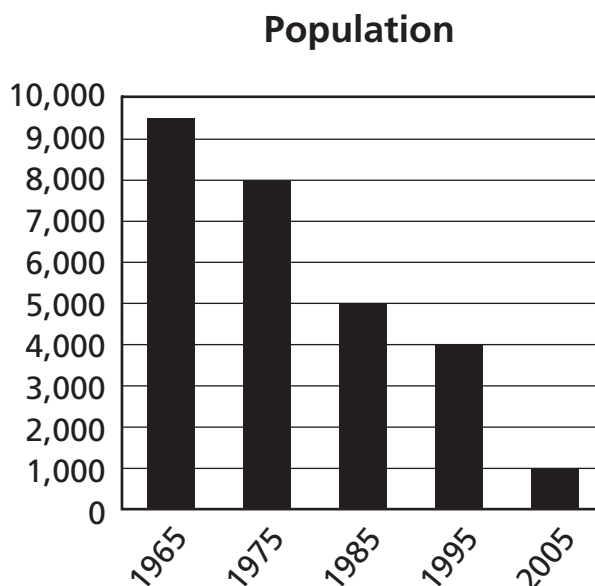
Standard Text: Investigate populations of different organisms and classify them as thriving, threatened, endangered, or extinct.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

An animal population is studied over time, and the changes are shown in the graph.



Based on the graph, the 2005 population is best classified as

- A extinct.
- B thriving.
- C growing.
- D endangered.

Item Information

Item Code:	TNS20939	Passage Title:	
Standard Code:	0307.5.2	Passage Code:	
Standard Text:	Investigate populations of different organisms and classify them as thriving, threatened, endangered, or extinct.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	D	DOK Level:	2

The Florida manatee is an endangered species.



What will most likely happen if the manatee population decreases?

- A** The manatees will thrive.
- B** The manatees will be protected.
- C** The manatees will be threatened.
- D** The manatees will become extinct.

Item Information

Item Code: TNS10298	Passage Title:
Standard Code: 0307.5.3	Passage Code:
Standard Text: Match the organism with evidence of its prior existence	
Reporting Category: Interdependence, Biodiversity & Change	
Correct Answer: A	DOK Level: 1

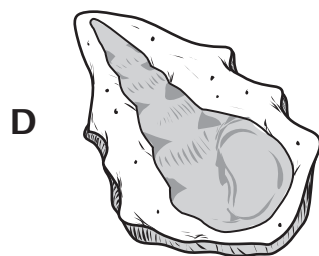
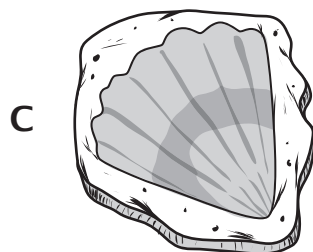
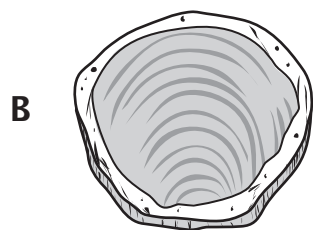
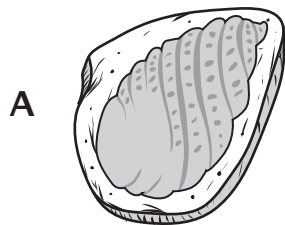
A type of seashell is pictured below.



(This item continues on the next page.)

(Item 22, continued from the previous page)

Which best shows a fossil of this same type of seashell?



Item Information

Item Code:	TNS10109	Passage Title:	
Standard Code:	0307.6.1	Passage Code:	
Standard Text:	Identify the major components of the solar system (i.e., sun, planets and moons).		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	C	DOK Level:	1

Which object in the solar system produces light?

- A** comet
- B** moon
- C** sun
- D** planet

Item Information

Item Code: TNS21084

Passage Title:

Standard Code: 0307.6.1

Passage Code:

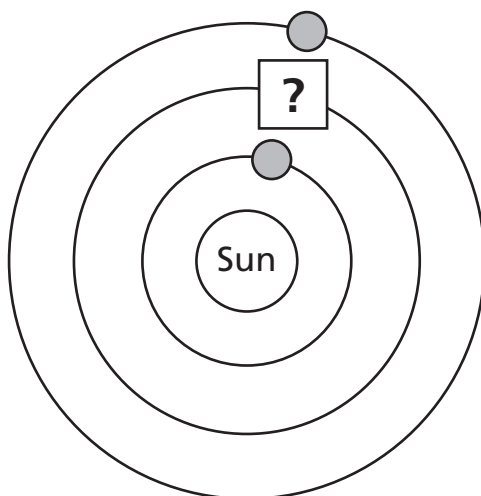
Standard Text: Identify the major components of the solar system (i.e., sun, planets and moons).

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: C

DOK Level: 2

Part of the solar system is shown below.



Which object best completes the diagram?

- A a star
- B a galaxy
- C a planet
- D a moon

Item Information

Item Code: TNS02224

Passage Title:

Standard Code: 0307.7.1

Passage Code:

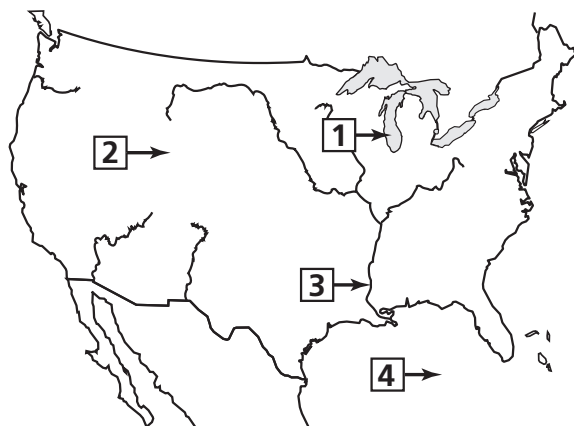
Standard Text: Classify landforms and bodies of water according to their geological features and identify them on a map.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 1

Look at the map below.



Which of these arrows is pointing to a lake?

- A** 1
- B** 2
- C** 3
- D** 4

Item Information

Item Code: TNS21051

Passage Title:

Standard Code: 0307.7.2

Passage Code:

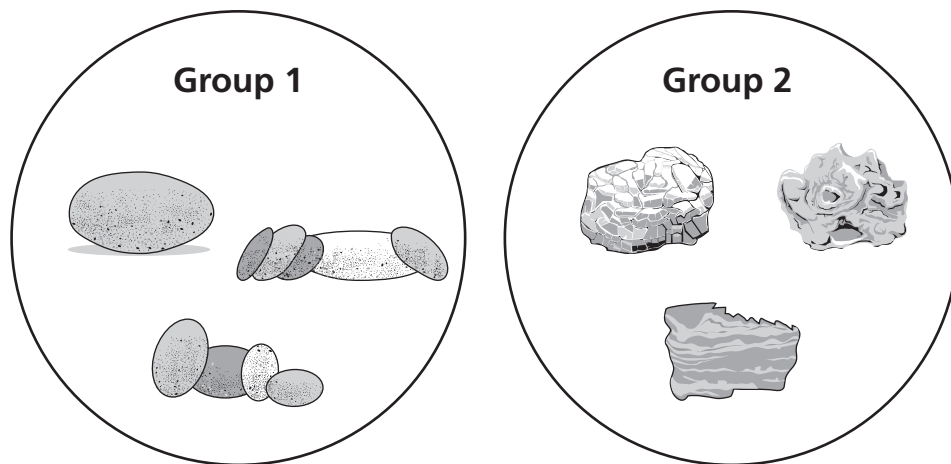
Standard Text: Describe how rocks can be classified according to their physical characteristics.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

Some rocks were put into two groups.



What property was most likely used to sort the rocks into Group 1?

- A** They all are about the same size.
- B** They all have the same color.
- C** They all have layers.
- D** They all are smooth.

Item Information

Item Code: TNS21085

Passage Title:

Standard Code: 0307.7.3

Passage Code:

Standard Text: Identify an object as natural or man-made.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 1

Which of these was made by humans?

A



© iStock.com/Clayton Sharrad #2682081

Cave

C



© iStock.com/Matt Tighman #4599564

River

B



© iStock.com/Wendell Franks #6552124

Tunnel

D



© iStock.com/William Britten #5809565

Waterfall

Item Information

Item Code: TNS21037	Passage Title:
Standard Code: 0307.7.4	Passage Code:
Standard Text: Determine methods for conserving natural resources.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: A	DOK Level: 1

Which is the best example of conserving a natural resource?

- A** recycling aluminum cans
- B** painting a fence
- C** sweeping dust off of a floor
- D** pulling weeds out of grass

Item Information

Item Code: TNS01859

Passage Title:

Standard Code: 0307.8.1

Passage Code:

Standard Text: Choose the correct tool for measuring a particular atmospheric condition.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 1

Cameron is using a rain gauge to collect weather data.

Which type of data is Cameron collecting with the rain gauge?

- A** air pressure
- B** air temperature
- C** direction of the wind
- D** amount of precipitation

Item Information

Item Code: TNS00051

Passage Title:

Standard Code: 0307.8.2

Passage Code:

Standard Text: Match major cloud types with specific atmospheric conditions.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: C

DOK Level: 2

Which of these types of clouds is most often seen just before a thunderstorm?

A



C



B



D



Item Information

Item Code: TNS21043

Passage Title:

Standard Code: 0307.9.1

Passage Code:

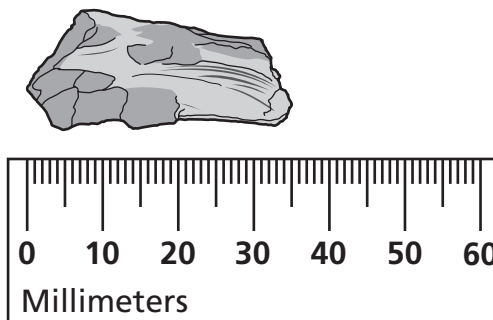
Standard Text: Describe a substance in terms of its physical properties.

Reporting Category: Matter and Energy

Correct Answer: C

DOK Level: 1

A student is measuring a rock sample in science class.



What is the length of this sample?

- A** 25 mm
- B** 30 mm
- C** 35 mm
- D** 40 mm

Item Information

Item Code: TNS10116	Passage Title:
Standard Code: 0307.9.1	Passage Code:
Standard Text: Describe a substance in terms of its physical properties.	
Reporting Category: Matter and Energy	
Correct Answer: C	DOK Level: 2

Apple juice has which of these properties?

- A** It is rough.
- B** It mixes with oil.
- C** It is a liquid.
- D** It is hard to the touch.

Item Information

Item Code: TNS10294	Passage Title:
Standard Code: 0307.9.2	Passage Code:
Standard Text: Identify methods for separating different types of mixtures.	
Reporting Category: Matter and Energy	
Correct Answer: D	DOK Level: 2

Leslie has a mixture of corks and marbles in a cup. Which method will best separate the corks from the marbles?

- A** placing the mixture in the freezer
- B** pulling a magnet through the mixture
- C** placing the mixture in the sun
- D** pouring the mixture into a bucket of water

Item Information

Item Code:	TNS20382	Passage Title:	
Standard Code:	1.0307.TE.2	Passage Code:	
Standard Text:	Recognize the connection between a scientific advance and the development of a new tool or technology.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	A	DOK Level:	2

The invention of the microscope has most helped people to

- A** observe very small parts of plants.
- B** learn how to make new materials.
- C** conserve natural resources.
- D** measure the distance to other planets.

Item Information

Item Code:	TNS21022	Passage Title:	
Standard Code:	3.0307.TE.1	Passage Code:	
Standard Text:	Select a tool, technology, or invention that was used to solve a human problem.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	C	DOK Level:	2

People began to use barometers many years ago. Barometers made it possible for people to know

- A** how fast wind blows.
- B** how much rain has fallen.
- C** when air pressure has changed.
- D** when air temperature has changed.

Item Information

Item Code: TNS21048

Passage Title:

Standard Code: 4.0307.Inq.1

Passage Code:

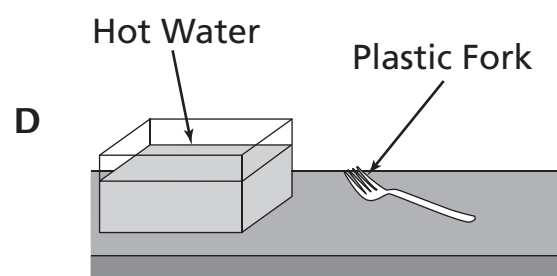
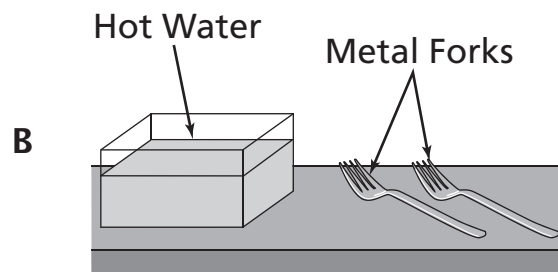
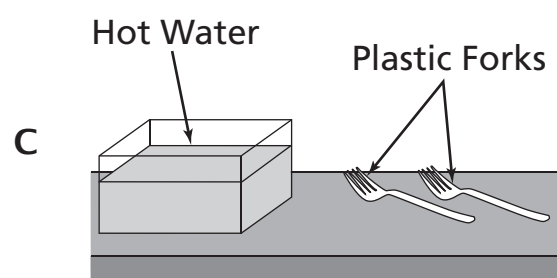
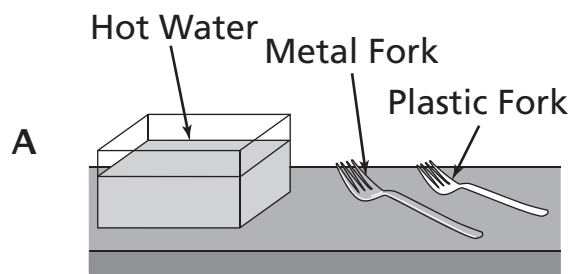
Standard Text: Select an investigation that could be used to answer a specific question.

Reporting Category: Matter and Energy

Correct Answer: A

DOK Level: 2

A student is setting up an investigation for science class. She wants to know which fork will conduct heat the fastest. Which setup should the student use to answer the question?



Item Information

Item Code: TNS20948

Passage Title:

Standard Code: 5.0307.Inq.1

Passage Code:

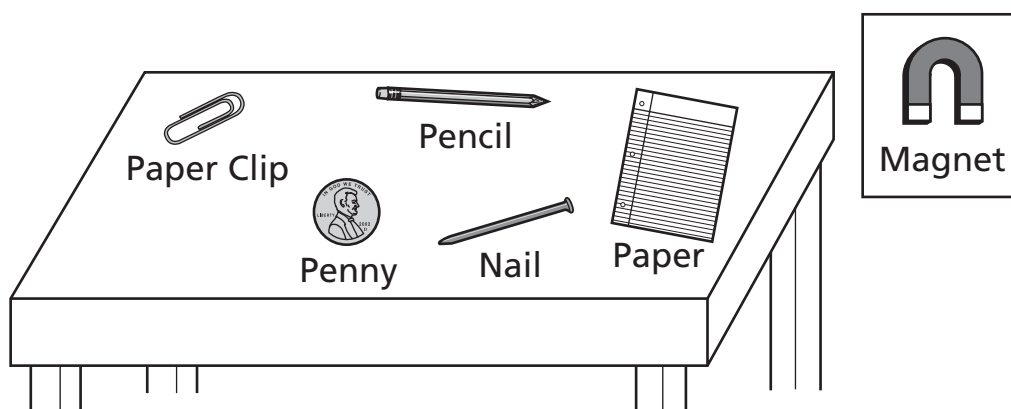
Standard Text: Select an investigation that could be used to answer a specific question.

Reporting Category: Motion, Forces in Nature

Correct Answer: B

DOK Level: 3-4

A student wants to find out which objects are attracted to a small magnet. He places objects on a table, as shown below.



The student could best answer the question by moving the magnet

- A under the table from left to right.
- B 5 centimeters away from each object.
- C 10 centimeters above the pencil.
- D on top of the paper.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 3 Item Release
Spring 2017



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 4 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 4..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Science Grade 4

Item Information

Item Code: TNS10203

Passage Title:

Standard Code: 0407.1.1

Passage Code:

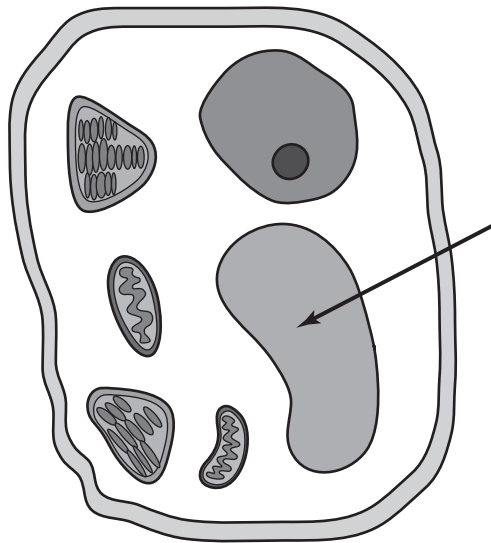
Standard Text: Compare basic structures of plant and animal cells.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: D

DOK Level: 2

A cell is shown in the picture below.



The arrow is pointing to which part found in plant and animal cells?

- A** nucleus
- B** chloroplast
- C** cytoplasm
- D** vacuole

Item Information

Item Code: TNS20433	Passage Title:
Standard Code: 0407.10.1	Passage Code:
Standard Text: Identify different forms of energy, such as heat, light, and chemical.	
Reporting Category: Matter and Energy	
Correct Answer: B	DOK Level: 2

Propane gas is often used to heat homes. The propane gas provides heat through which type of energy?

- A** wind
- B** chemical
- C** nuclear
- D** light

Item Information

Item Code: TNS20604	Passage Title:
Standard Code: 0407.10.2	Passage Code:
Standard Text: Determine which surfaces reflect, refract, or absorb light.	
Reporting Category: Matter and Energy	
Correct Answer: C	DOK Level: 2

Which object best refracts light?

- A** a wooden block
- B** a black trash bag
- C** a glass of water
- D** a rubber tire

Item Information

Item Code: TNS00206	Passage Title:
Standard Code: 0407.10.2	Passage Code:
Standard Text: Determine which surfaces reflect, refract, or absorb light.	
Reporting Category: Matter and Energy	
Correct Answer: A	DOK Level: 1

When light hits a black cloth, most of the light is

- A** absorbed
- B** increased
- C** reflected
- D** refracted

Item Information

Item Code: TNS10090

Passage Title:

Standard Code: 0407.10.3

Passage Code:

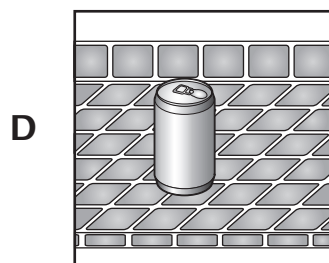
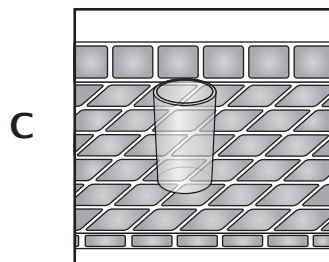
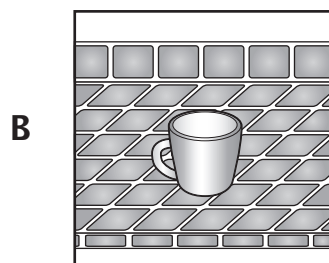
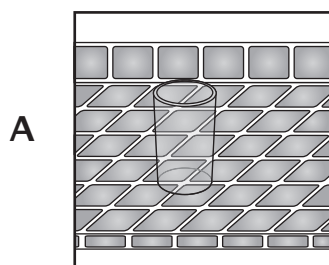
Standard Text: Determine whether a material is transparent, translucent, or opaque.

Reporting Category: Matter and Energy

Correct Answer: A

DOK Level: 1

Which object is transparent?



Item Information

Item Code: TNS10254

Passage Title:

Standard Code: 0407.11.1

Passage Code:

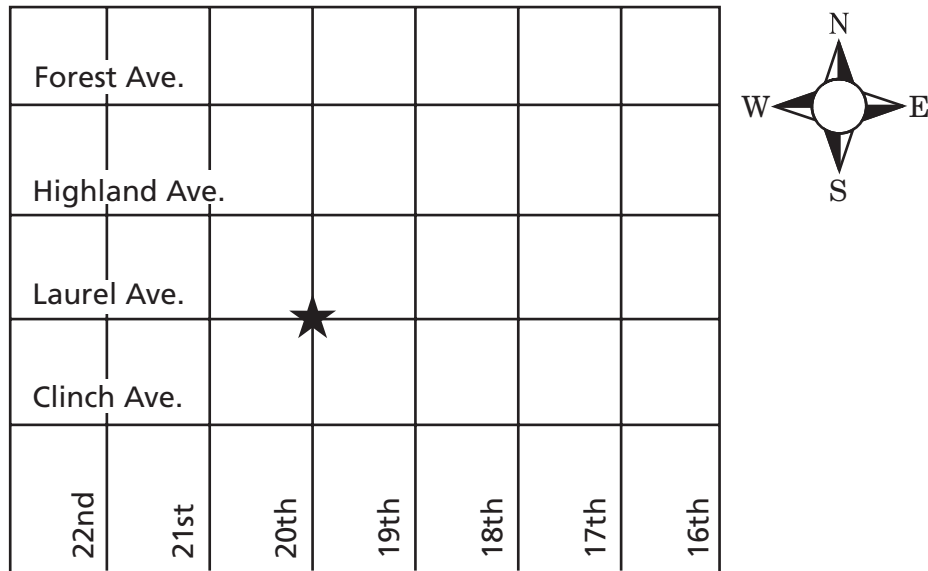
Standard Text: Describe the position of an object relative to fixed reference points.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

Pictured below is a section of a map.



If a person is standing at 20th and Laurel Ave., which intersection is two blocks east and one block north?

- A** 18th and Forest Ave.
- B** 22nd and Forest Ave.
- C** 18th and Highland Ave.
- D** 22nd and Highland Ave.

Item Information

Item Code: TNS20609

Passage Title:

Standard Code: 0407.11.2

Passage Code:

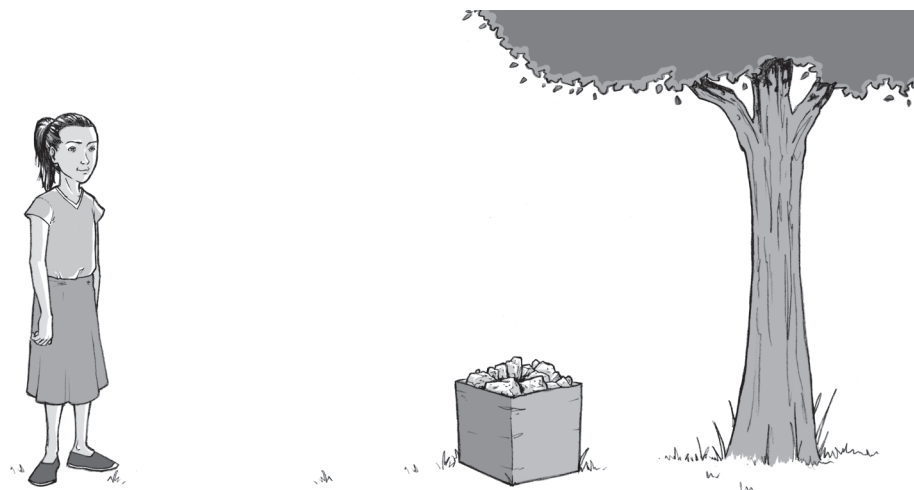
Standard Text: Identify factors that influence the motion of an object.

Reporting Category: Motion, Forces in Nature

Correct Answer: D

DOK Level: 2

The picture shows a student with a box of rocks next to a tree.



Which factor will most likely make it easier to move the box closer to the tree?

- A adding rocks to the box
- B squeezing the sides of the box together
- C using a heavier box
- D removing rocks from the box

Item Information

Item Code: TNS02291	Passage Title:
Standard Code: 0407.11.3	Passage Code:
Standard Text: Determine the relationship between speed and distance traveled over time.	
Reporting Category: Motion, Forces in Nature	
Correct Answer: C	DOK Level: 2

Tran rode his bike to the park in 10 minutes. It took him 20 minutes to ride his bike home using the same route.

Which statement about Tran's speed is correct?

- A** Tran pedaled faster while riding home.
- B** Tran pedaled slower while riding to the park.
- C** His bike moved twice as fast going to the park as it did returning home.
- D** His bike moved at the same speed going to the park and returning home.

Item Information

Item Code: TNS01917

Passage Title:

Standard Code: 0407.11.3

Passage Code:

Standard Text: Determine the relationship between speed and distance traveled over time.

Reporting Category: Motion, Forces in Nature

Correct Answer: A

DOK Level: 2

Four people traveled from Memphis, Tennessee, to Jackson, Mississippi.**Who traveled at the greatest speed?**

- A** Frank, who took the bus from Memphis to Jackson in 4 hours
- B** Pam, who drove a truck from Memphis to Jackson in 5 hours
- C** Scott, who drove his sports car from Memphis to Jackson in $5\frac{1}{2}$ hours
- D** Linda, who rode her motorcycle from Memphis to Jackson in $4\frac{1}{2}$ hours

Item Information

Item Code: TNS10257

Passage Title:

Standard Code: 0407.12.1

Passage Code:

Standard Text: Identify how magnets attract or repel one another.

Reporting Category: Motion, Forces in Nature

Correct Answer: D

DOK Level: 2

The toy carts below have a magnet on each end. Which toy carts will attract each other?



Item Information

Item Code: TNS20439

Passage Title:

Standard Code: 0407.12.2

Passage Code:

Standard Text: Determine how an electrically charged material interacts with other objects.

Reporting Category: Motion, Forces in Nature

Correct Answer: C

DOK Level: 2

A student rubbed a foam cup briskly against a piece of wool. The student then held the cup over some pieces of paper.



What will most likely happen to the pieces of paper?

- A** They will stick to the table.
- B** They will stick to her shirt.
- C** They will be attracted to the cup.
- D** They will move away from the cup.

Item Information

Item Code: TNS20372

Passage Title:

Standard Code: 0407.2.1

Passage Code:

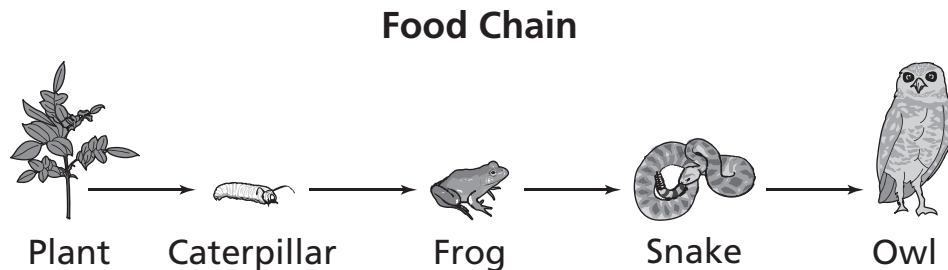
Standard Text: Recognize the impact of predation and competition on an ecosystem.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

A food chain is shown below.



If another predator of the frog was living in this ecosystem, which population would most likely increase first?

- A Plant
- B Caterpillar
- C Snake
- D Owl

Item Information

Item Code: TNS10157

Passage Title:

Standard Code: 0407.3.1

Passage Code:

Standard Text: Determine how different organisms function within an environment in terms of their location on an energy pyramid.

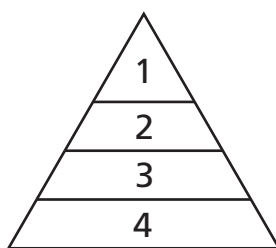
Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: D

DOK Level: 2

The diagram shows an energy pyramid.

Energy Pyramid



An oak tree provides food for many animals. The oak tree is found at which level of the energy pyramid?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code:	TNS01944	Passage Title:	
Standard Code:	0407.4.1	Passage Code:	
Standard Text:	Draw conclusions about the relationship between reproduction and the survival of a species.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	A	DOK Level:	1

For the survival of all species, they must

- A** reproduce
- B** build shelter
- C** be able to swim
- D** make their own food

Item Information

Item Code: TNS20591	Passage Title:
Standard Code: 0407.4.1	Passage Code:
Standard Text: Draw conclusions about the relationship between reproduction and the survival of a species.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

What will most likely happen if frog eggs are not fertilized?

- A The frog population will increase.
- B The frog population will decrease.
- C The frog population will lay more eggs.
- D The frog population will find another habitat.

Item Information

Item Code: TNS00168

Passage Title:

Standard Code: 0407.4.2

Passage Code:

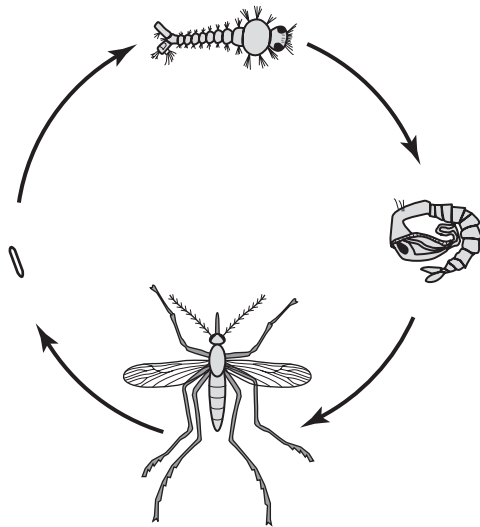
Standard Text: Distinguish between complete and incomplete metamorphosis.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: B

DOK Level: 1

Look at the picture of the mosquito's life cycle.



Which is true about the mosquito life cycle?

- A** The mosquito has five stages of growth.
- B** The mosquito goes through complete metamorphosis.
- C** The mosquito goes through incomplete metamorphosis.
- D** The young mosquitoes look similar to adult mosquitoes.

Item Information

Item Code: TNS10234

Passage Title:

Standard Code: 0407.4.2

Passage Code:

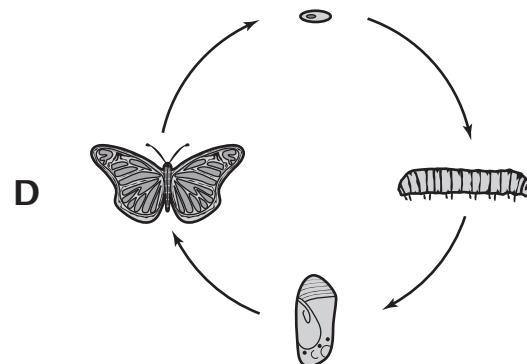
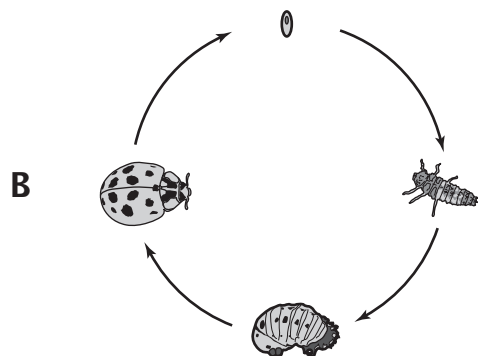
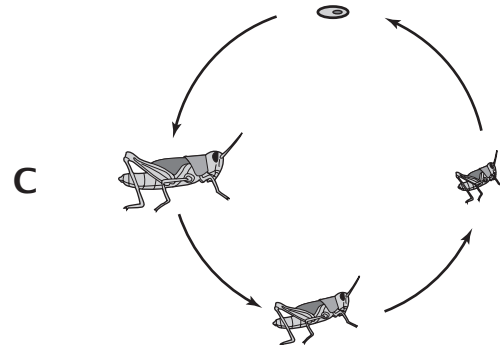
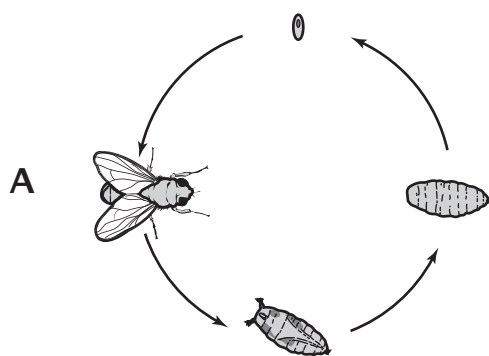
Standard Text: Distinguish between complete and incomplete metamorphosis.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: C

DOK Level: 2

Incomplete metamorphosis can best be shown using which diagram?



Item Information

Item Code: TNS10163

Passage Title:

Standard Code: 0407.5.1

Passage Code:

Standard Text: Determine how a physical or behavioral adaptation can enhance the chances of survival.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

A tortoise has a hard outer shell. The shell gives the tortoise a better chance to survive by

- A** helping the tortoise to swim.
- B** protecting the tortoise from predators.
- C** helping the tortoise to find more food.
- D** keeping the tortoise from getting too hot.

Item Information

Item Code: TNS10319

Passage Title:

Standard Code: 0407.5.1

Passage Code:

Standard Text: Determine how a physical or behavioral adaptation can enhance the chances of survival.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: A

DOK Level: 2

Some snakes that live in the desert spend time underground during the day. How does this behavior most likely help these snakes survive?

- A** They will stay cool.
- B** They will find food faster.
- C** They will breathe more oxygen.
- D** They will have more space to live.

Item Information

Item Code: TNS01934	Passage Title:
Standard Code: 0407.5.2	Passage Code:
Standard Text: Infer the possible reasons why a species became endangered or extinct.	
Reporting Category: Interdependence, Biodiversity & Change	
Correct Answer: A	DOK Level: 2

Sheep and goats were brought to an island by human settlers. Some years later, a certain species of plant that grew only on that island became extinct.

Which of these explains how the sheep and goats most likely made the plant extinct?

- A** They ate too many of the plants.
- B** They introduced disease to the plants.
- C** They spread the seeds of the plants across the island.
- D** They competed with the plants for water and sunlight.

Item Information

Item Code: TNS10167

Passage Title:

Standard Code: 0407.6.1

Passage Code:

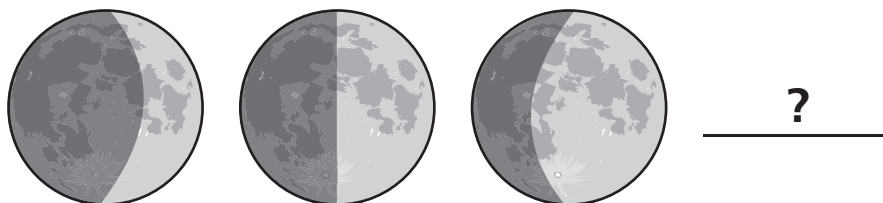
Standard Text: Organize the phases of the moon in the correct sequence.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: C

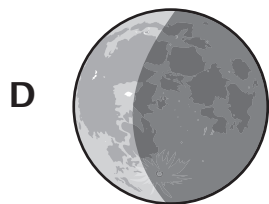
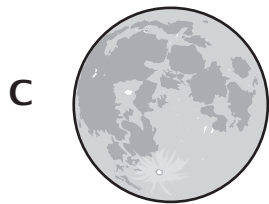
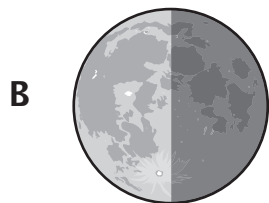
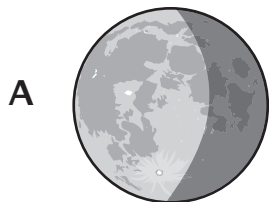
DOK Level: 2

The diagram below shows a sequence of moon phases.



(Item 21, continued from the previous page)

Which picture correctly completes the sequence?



Item Information

Item Code: TNS02654

Passage Title:

Standard Code: 0407.6.1

Passage Code:

Standard Text: Organize the phases of the moon in the correct sequence.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: A

DOK Level: 2

Which of these shows the phases of the moon as it changes from full moon to new moon?

A



B



C



D



Item Information

Item Code: TNS20209

Passage Title:

Standard Code: 0407.6.2

Passage Code:

Standard Text: Infer that the moon's phases are caused by the revolution of the moon and earth around the sun.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: C

DOK Level: 2

Why does the moon change phases when viewed from Earth?

- A** The sun revolves around Earth.
- B** The moon rotates on its axis.
- C** The moon revolves around Earth.
- D** The sun blocks the view of the moon.

Item Information

Item Code:	TNS20211	Passage Title:	
Standard Code:	0407.7.2	Passage Code:	
Standard Text:	Analyze how different earth materials are utilized to solve human problems or improve the quality of life.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	B	DOK Level:	2

Penicillin, which is made from mold, is used to treat many types of infections. Why is penicillin important to humans?

- A** Penicillin makes oxygen.
- B** Penicillin helps treat illness.
- C** Penicillin is a food source.
- D** Penicillin is used to make clothing.

Item Information

Item Code:	TNS10879	Passage Title:	
Standard Code:	0407.7.2	Passage Code:	
Standard Text:	Analyze how different earth materials are utilized to solve human problems or improve the quality of life.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	D	DOK Level:	2

Why is calcium an earth material that is important to humans?

- A** It gives humans energy.
- B** It gives humans oxygen.
- C** It helps keep humans warm.
- D** It helps build strong bones and teeth.

Item Information

Item Code: TNS00186

Passage Title:

Standard Code: 0407.7.2

Passage Code:

Standard Text: Analyze how different earth materials are utilized to solve human problems or improve the quality of life.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 2

Which best explains how copper is used?

- A** Copper can be cut into paper.
- B** Copper can be stretched into wires.
- C** Copper can be used to fuel automobiles.
- D** Copper can be burned to produce energy.

Item Information

Item Code:	TNS10874	Passage Title:	
Standard Code:	0407.8.1	Passage Code:	
Standard Text:	Identify the basic features of the water cycle and describe their importance to life on earth.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	D	DOK Level:	1

A glass of ice water left on a table will form small beads of water on the outside of the glass. Which part of the water cycle does this most likely represent?

- A** collection
- B** evaporation
- C** precipitation
- D** condensation

Item Information

Item Code: TNS10246
Standard Code: 0407.8.2
Standard Text: Distinguish between weather and climate.
Reporting Category: The Universe, The Earth, The Atmosphere
Correct Answer: C

Passage Title:
Passage Code:
DOK Level: 2

Students recorded observations about the environment in the data table below.

Data Table

Observation	Tuesday 10 A.M.	Wednesday 10 A.M.	Thursday 10 A.M.
Temperature (°F)	68	72	75
Sky	Mostly Cloudy	Partly Cloudy	Clear
Wind Speed (mph)	8–12	3–7	0
Rainfall Collected (inches)	0	0.1	0

The data in the table best describes the environment's

- A season.
- B climate.
- C weather.
- D moon phase.

Item Information

Item Code: TNS10247

Passage Title:

Standard Code: 0407.9.1

Passage Code:

Standard Text: Choose an appropriate tool for measuring a specific physical property of matter.

Reporting Category: Matter and Energy

Correct Answer: D

DOK Level: 2

Students wanted to find out how much liquid soap was in a container.



Which tool would best help the students measure the volume of liquid soap in milliliters?

- A** ruler
- B** pan balance
- C** thermometer
- D** graduated cylinder

Item Information

Item Code:	TNS10328	Passage Title:	
Standard Code:	0407.9.2	Passage Code:	
Standard Text:	Determine the mass, volume, and temperature of a substance or object using proper units of measurement.		
Reporting Category:	Matter and Energy		
Correct Answer:	C	DOK Level:	2

Students were making observations of a pond. Which units should the students use to record the temperature of the pond water?

- A** miles per hour
- B** grams
- C** degrees Celsius
- D** liters

Item Information

Item Code: TNS20432	Passage Title:
Standard Code: 0407.9.3	Passage Code:
Standard Text: Interpret the causes and effects of a physical change in matter.	
Reporting Category: Matter and Energy	
Correct Answer: C	DOK Level: 2

Which best describes the change that happens when water is frozen?





- A** A liquid changes to a gas.
- B** A gas changes to a solid.
- C** A liquid changes to a solid.
- D** A solid changes to a liquid.

Item Information





Item Code:	TNS20140	Passage Title:	
Standard Code:	2.0407.INQ.1	Passage Code:	
Standard Text:	Select an investigation that could be used to answer a specific question.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

Some students are studying the birds in their area. They want to find out if the birds prefer one type of seed better than others. The students put up bird feeders with different seeds. Which set of seeds in their feeders is likely to get the best results?





A

Feeder 1	Feeder 2	Feeder 3	Feeder 4
			
Safflower Seeds	Safflower Seeds	Corn Seeds	Corn Seeds





B

Feeder 1	Feeder 2	Feeder 3	Feeder 4
			
Corn Seeds	Corn Seeds	Sunflower Seeds	Sunflower Seeds

C

Feeder 1	Feeder 2	Feeder 3	Feeder 4
			
Sunflower Seeds	Safflower Seeds	Corn Seeds	Mixed Seeds

D

Feeder 1	Feeder 2	Feeder 3	Feeder 4
			
Safflower Seeds	Mixed Seeds	Safflower Seeds	Mixed Seeds

Item Information

Item Code:	TNS10909	Passage Title:	
Standard Code:	3.0407.TE.2	Passage Code:	
Standard Text:	Recognize the connection between a scientific advance and the development of a new tool or technology.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	D	DOK Level:	2

Years ago a scientist was working with different types of energy. The scientist discovered a form of energy that could travel through solid objects. This energy could be used to make images of the solid objects. This discovery led to which tool?

- A** a scale
- B** a microscope
- C** a thermometer
- D** an x-ray machine

Item Information

Item Code: TNS10881

Passage Title:

Standard Code: 4.0407.INQ.1

Passage Code:

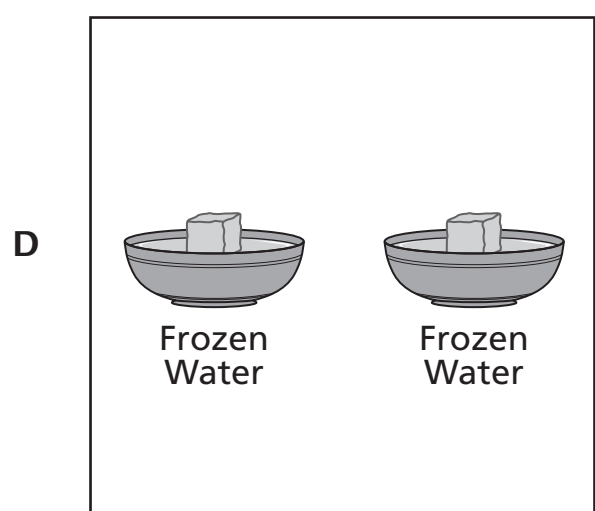
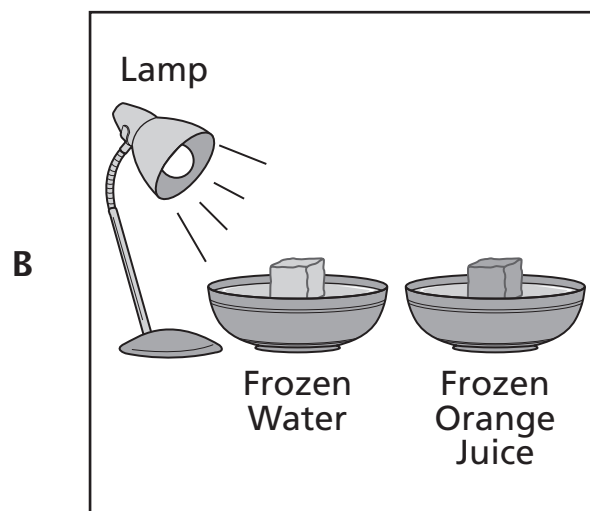
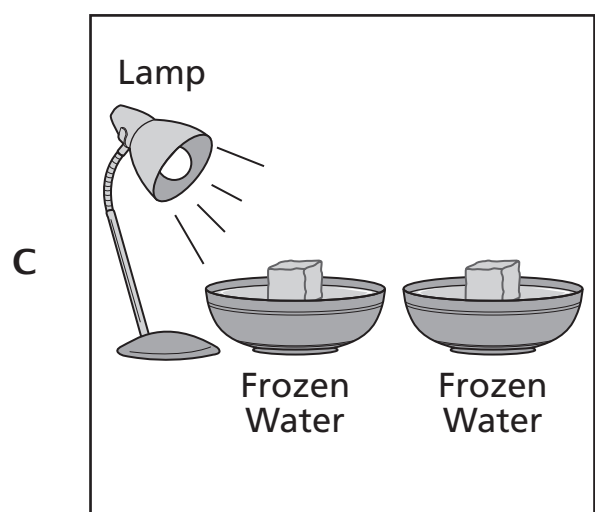
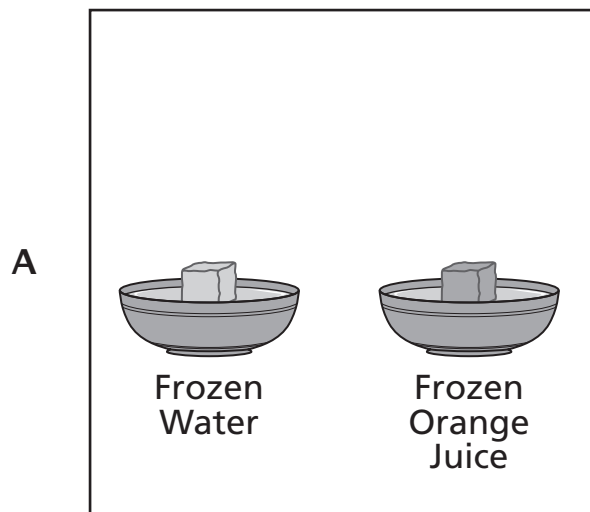
Standard Text: Select an investigation that could be used to answer a specific question.

Reporting Category: Matter and Energy

Correct Answer: A

DOK Level: 2

A group of students wants to know if two different frozen substances will melt at the same rate. What is the best way to set up the investigation?



This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 4 Item Release
Spring 2017



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 5 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 5..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS02699

Passage Title:

Standard Code: 0507.1.1

Passage Code:

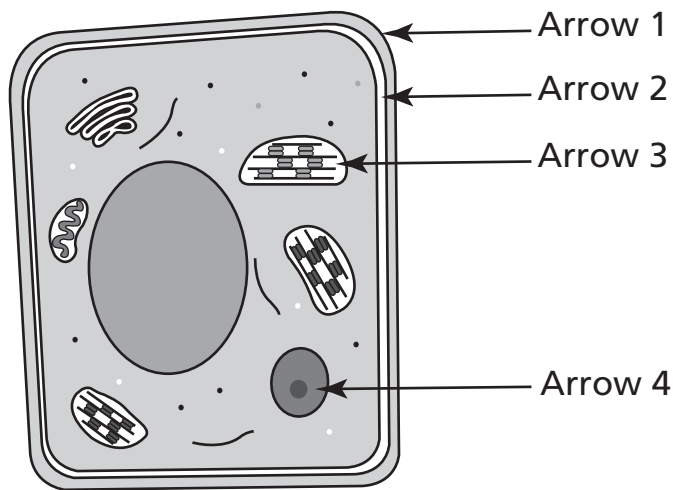
Standard Text: Identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: A

DOK Level: 1

Study the diagram of a plant cell.



Which arrow is pointing to a structure that provides protection and rigid support for plant cells?

- A** Arrow 1
- B** Arrow 2
- C** Arrow 3
- D** Arrow 4

Item Information

Item Code: TNS02709

Passage Title:

Standard Code: 0507.1.1

Passage Code:

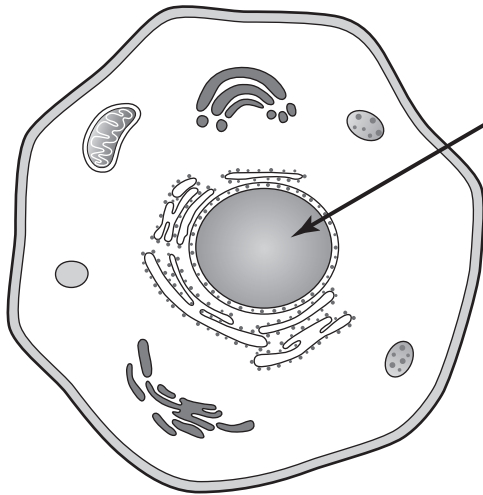
Standard Text: Identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.

Reporting Category: Cells, Flow of Matter & Energy, Heredity

Correct Answer: A

DOK Level: 1

The diagram below shows an animal cell.



Which of these structures does the arrow point to in the diagram?

- A** nucleus
- B** cell wall
- C** chloroplast
- D** cell membrane

Item Information

Item Code:	TNS20031	Passage Title:	
Standard Code:	0507.1.2	Passage Code:	
Standard Text:	Compare and contrast basic structures and functions of plant and animal cells.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	D	DOK Level:	1

Which cell structure allows materials to move in and out of both plant and animal cells?

- A** cytoplasm
- B** nucleus
- C** vacuole
- D** cell membrane

Item Information

Item Code: TNS10772

Passage Title:

Standard Code: 0507.10.1

Passage Code:

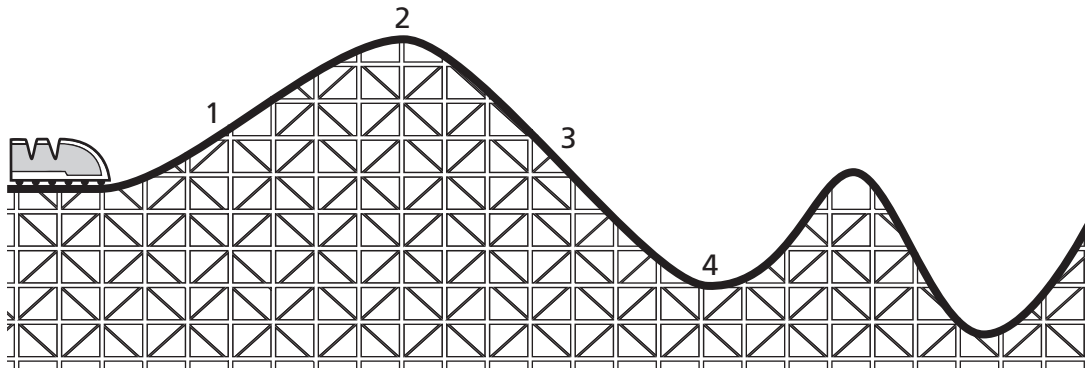
Standard Text: Differentiate between potential and kinetic energy.

Reporting Category: Matter and Energy

Correct Answer: B

DOK Level: 1

The picture shows the path of a roller-coaster ride.



At which position will the roller coaster have the most potential energy?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS20024	Passage Title:
Standard Code: 0507.10.2	Passage Code:
Standard Text: Use data from an investigation to determine the method by which heat energy is transferred from one object or material to another.	
Reporting Category: Matter and Energy	
Correct Answer: D	DOK Level: 2

Which of these is the best model to show radiation?

- A** a pot of water boiling on the stove
- B** a metal spoon warming in a cup of hot tea
- C** a hamburger frying in a pan
- D** a sidewalk being warmed by the sun

Item Information

Item Code: TNS10614

Passage Title:

Standard Code: 0507.11.1

Passage Code:

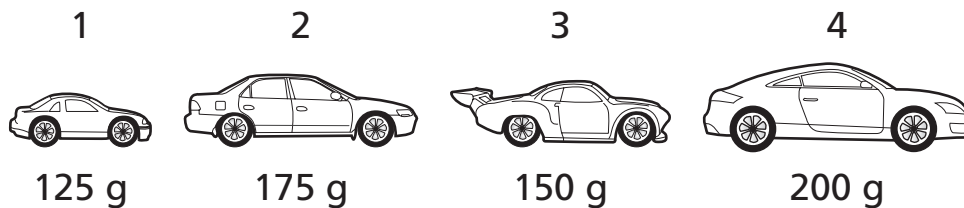
Standard Text: Explain the relationships that exist among mass, force, and distance traveled.

Reporting Category: Motion and Forces in Nature

Correct Answer: A

DOK Level: 2

Some toy cars are shown.



When a student pushes each toy car with an equal amount of force on the same level surface, which car will travel the greatest distance?

- A** 1
- B** 2
- C** 3
- D** 4

Item Information

Item Code: TNS20255

Passage Title:

Standard Code: 0507.2.1

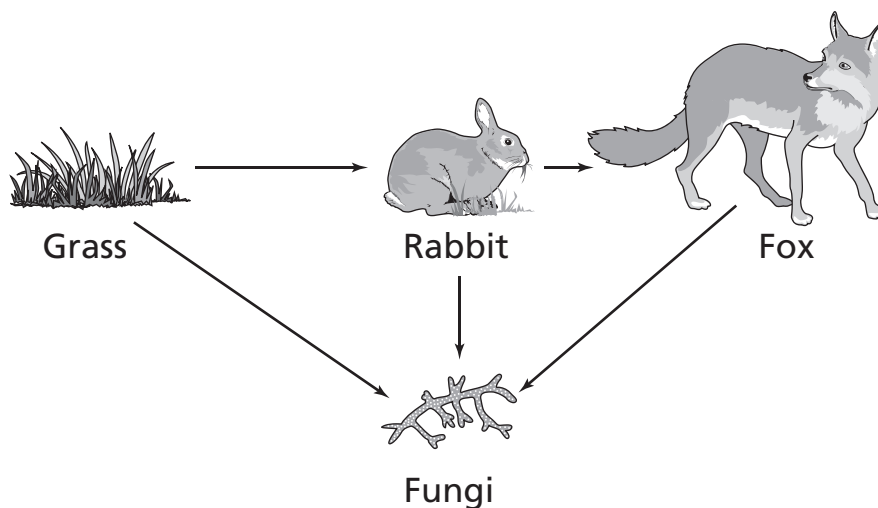
Passage Code:

Standard Text: Describe the different types of nutritional relationships that exist among organisms.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: D

DOK Level: 2

A food chain is shown below.**Which organism is a decomposer in this food chain?**

- A** Grass
- B** Rabbit
- C** Fox
- D** Fungi

Item Information

Item Code: TNS10771

Passage Title:

Standard Code: 0507.2.2

Passage Code:

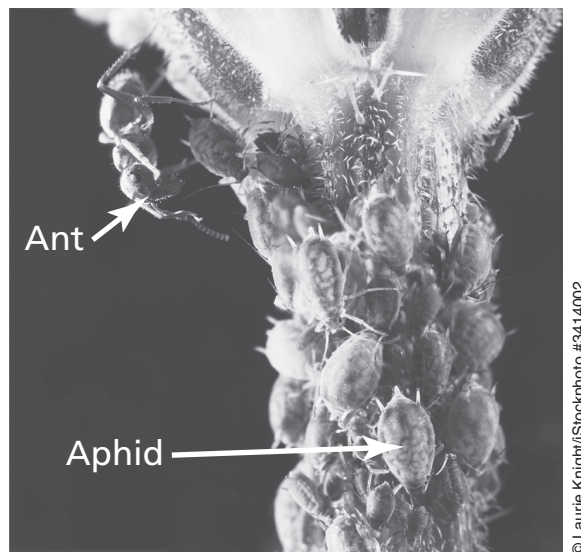
Standard Text: Distinguish among symbiotic, commensal, and parasitic relationships.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: C

DOK Level: 2

The picture shows an ant and aphids on a plant.



The ants eat sugar that is released by the aphids. The aphids gain some protection from the ants. Which best describes this relationship?

- A** parasitic
- B** commensal
- C** mutualistic
- D** competitive

Item Information

Item Code:	TNS10420	Passage Title:	
Standard Code:	0507.2.3	Passage Code:	
Standard Text:	Use information about the impact of human actions or natural disasters on the environment to support a simple hypothesis, make a prediction, or draw a conclusion.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	D	DOK Level:	2

When a volcano erupts, a lot of ash can enter the air. The ash in the air may block sunlight for a long time. Which organisms would most likely be affected first when this happens?

- A** parasites
- B** decomposers
- C** carnivores
- D** producers

Item Information

Item Code:	TNS10791	Passage Title:	
Standard Code:	0507.2.3	Passage Code:	
Standard Text:	Use information about the impact of human actions or natural disasters on the environment to support a simple hypothesis, make a prediction, or draw a conclusion.		
Reporting Category:	Interdependence, Biodiversity & Change		
Correct Answer:	C	DOK Level:	2

A developer plans to drain a wetland to build houses and a shopping center. What is the most likely effect on the environment?

- A** decrease in flooding
- B** decrease in air pollution
- C** decrease in native plants
- D** decrease in noise pollution

Item Information

Item Code: TNS01977	Passage Title:
Standard Code: 0507.3.1	Passage Code:
Standard Text: Identify photosynthesis as the food manufacturing process in plants.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: A	DOK Level: 1

Photosynthesis is the process that plants use to

- A** make food
- B** absorb water
- C** release wastes
- D** produce new plants

Item Information

Item Code: TNS10604	Passage Title:
Standard Code: 0507.3.2	Passage Code:
Standard Text: Compare how plants and animals obtain energy.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: D	DOK Level: 2

A fifth-grade classroom has a hamster and some bean plants.

Hamster



Bean Plants



Why does the hamster need to be fed every day, but the bean plants do not?

- A** because bean plants get their food from insects
- B** because bean plants do not move around
- C** because bean plants live longer than the hamster
- D** because bean plants use sunlight to make their own food

Item Information

Item Code:	TNS20184	Passage Title:	
Standard Code:	0507.4.2	Passage Code:	
Standard Text:	Distinguish between inherited traits and those that can be attributed to the environment.		
Reporting Category:	Cells, Flow of Matter & Energy, Heredity		
Correct Answer:	B	DOK Level:	1

Which trait could a mouse inherit from its parents?

- A** where it lives
- B** color of its fur
- C** places it finds food
- D** materials it uses for its nest

Item Information

Item Code: TNS20010

Passage Title:

Standard Code: 0507.5.1

Passage Code:

Standard Text: Identify physical and behavioral adaptations that enable animals such as, amphibians, reptiles, birds, fish, and mammals to survive in a particular environment.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

The pictures show a snowshoe hare during the summer and the winter. In the summer, the hare has a brown coat, and in the winter, the hare has a white coat.



Summer



Winter

Which is the most likely reason the coat of the snowshoe hare changes color?

- A** to attract a mate
- B** to hide from predators
- C** to help it find food
- D** to look like another animal

Item Information

Item Code: TNS20059

Passage Title:

Standard Code: 0507.5.2

Passage Code:

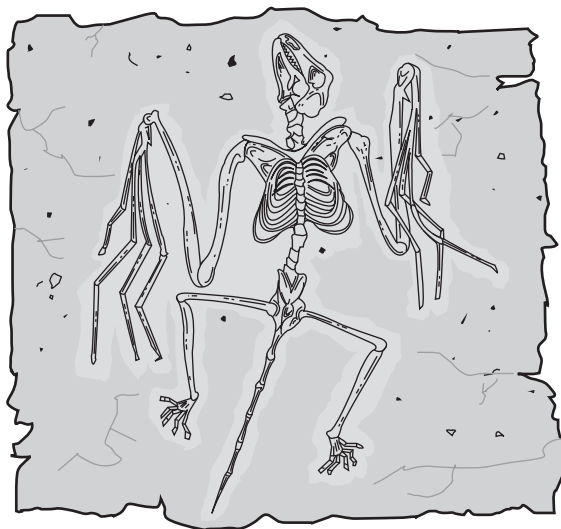
Standard Text: Explain how fossils provide information about the past.

Reporting Category: Interdependence, Biodiversity & Change

Correct Answer: B

DOK Level: 2

A scientist finds the fossil shown.



Based on its structure, this fossil is most likely related to which modern animal?

- A** monkey
- B** bat
- C** dog
- D** frog

Item Information

Item Code: TNS10535

Passage Title:

Standard Code: 0507.6.1

Passage Code:

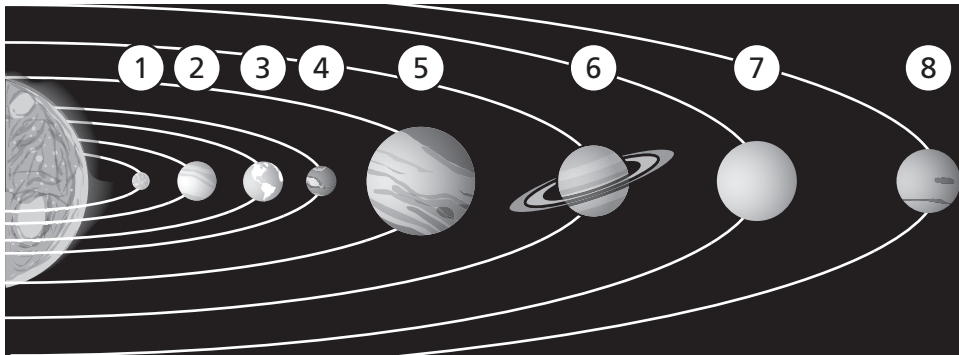
Standard Text: Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

A diagram of our solar system is shown.



Which planet represents Uranus?

- A** Planet 1
- B** Planet 3
- C** Planet 5
- D** Planet 7

Item Information

Item Code: TNS00346

Passage Title:

Standard Code: 0507.6.1

Passage Code:

Standard Text: Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: B

DOK Level: 1

Which planet is blue and has rings?

- A** Jupiter
- B** Neptune
- C** Saturn
- D** Venus

Item Information

Item Code:	TNS10339	Passage Title:	
Standard Code:	0507.6.1	Passage Code:	
Standard Text:	Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.		
Reporting Category:	The Universe, The Earth, The Atmosphere		
Correct Answer:	D	DOK Level:	1

What is the third planet from the sun?

- A** Venus
- B** Uranus
- C** Neptune
- D** Earth

Item Information

Item Code: TNS10797

Passage Title:

Standard Code: 0507.7.1

Passage Code:

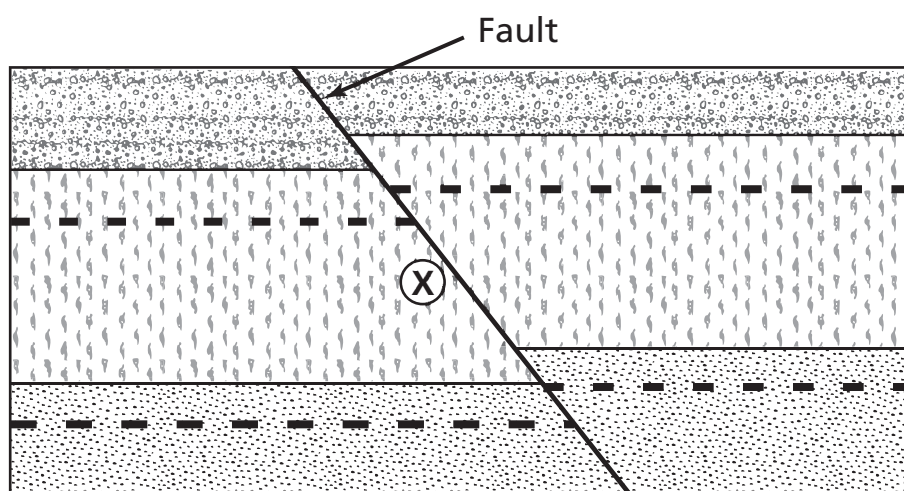
Standard Text: Describe internal forces such as volcanoes, earthquakes, faulting, and plate movements that are responsible for the earth's major geological features such as mountains, valleys, etc.

Reporting Category: The Universe, The Earth, The Atmosphere

Correct Answer: D

DOK Level: 2

A fault is shown.



When there is movement at the fault, which of these most likely happens at point X?

- A** severe weather
- B** glaciers flow
- C** a drought
- D** an earthquake

Item Information

Item Code: TNS20314	Passage Title:
Standard Code: 0507.8.1	Passage Code:
Standard Text: Describe the effects of the oceans on weather and climate.	
Reporting Category: The Universe, The Earth, The Atmosphere	
Correct Answer: D	DOK Level: 3-4

Which best explains why temperatures along the coast change less than temperatures 200 kilometers away from the coast?

- A** Waves keep air temperatures more constant at the coast than farther away.
- B** Winds are weaker near the coast than farther away.
- C** Sand dunes help keep the land warmer than the water.
- D** Temperature of water changes more slowly than the temperature of land.

Item Information

Item Code: TNS10547	Passage Title:
Standard Code: 0507.9.1	Passage Code:
Standard Text: Distinguish between physical and chemical properties.	
Reporting Category: Matter and Energy	
Correct Answer: B	DOK Level: 1

Which describes a physical property of a substance?

- A** Iron rusts.
- B** Gold melts.
- C** Paper burns.
- D** Silver tarnishes.

Item Information

Item Code: TNS10743

Passage Title:

Standard Code: 0507.9.2

Passage Code:

Standard Text: Describe the differences among freezing, melting, and evaporation.

Reporting Category: Matter and Energy

Correct Answer: A

DOK Level: 2

The picture shows an ice cube on a table.



Heat is being

- A** added to cause a solid to melt.
- B** removed to cause a liquid to freeze.
- C** removed to cause a liquid to evaporate.
- D** added to cause a gas to condense.

Item Information

Item Code: TNS10429

Passage Title:

Standard Code: 0507.9.2

Passage Code:

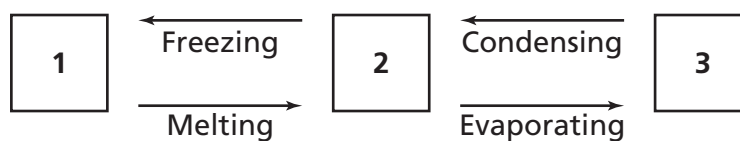
Standard Text: Describe the differences among freezing, melting, and evaporation.

Reporting Category: Matter and Energy

Correct Answer: C

DOK Level: 2

The diagram shows some of the processes that happen when matter changes state.



Which would be the change of water from a liquid to a solid?

- A 1 to 3
- B 1 to 2
- C 2 to 1
- D 3 to 2

Item Information

Item Code: TNS10343

Passage Title:

Standard Code: 0507.9.3

Passage Code:

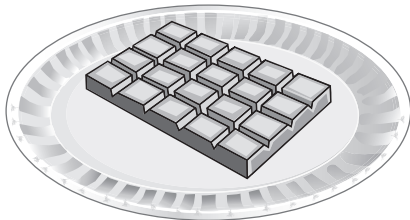
Standard Text: Describe factors that influence the rate at which different types of material freeze, melt, or evaporate.

Reporting Category: Matter and Energy

Correct Answer: B

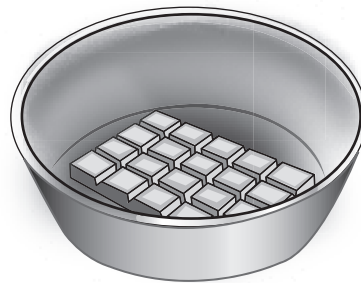
DOK Level: 2

The pictures below show the setup for a heating investigation. Four pieces of chocolate were placed in different conditions.



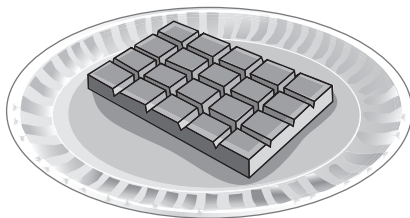
1

On a paper plate in the sun



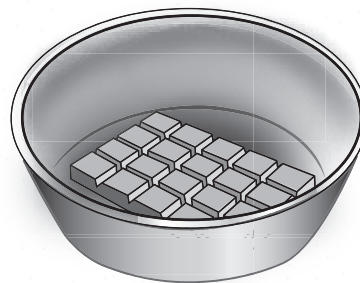
2

In an aluminum pan in the sun



3

On a paper plate in the shade



4

In an aluminum pan in the shade

Which piece of chocolate will most likely melt the fastest?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code:	TNS20003	Passage Title:	
Standard Code:	5.0507.TE.2	Passage Code:	
Standard Text:	Recognize the connection between a scientific advance and the development of a new tool or technology.		
Reporting Category:	Motion and Forces in Nature		
Correct Answer:	B	DOK Level:	2

Scientists are now able to convert light energy from the sun directly into electricity. Which technology was developed as a result of this scientific advance?

- A** battery-powered flashlights
- B** solar-powered traffic signals
- C** light bulbs
- D** telephones

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 5 Item Release
Spring 2017



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 6 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 6..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code:	TNS10632	Passage Title:	
Standard Code:	0607.10.1	Passage Code:	
Standard Text:	Distinguish among gravitational potential energy, elastic potential energy, and chemical potential energy.		
Reporting Category:	Energy, Forces in Nature		
Correct Answer:	D	DOK Level:	2

Which best describes the change in energy that takes place as a log of wood burns?

- A** The mechanical potential energy of the log of wood increases.
- B** The gravitational potential energy in the log of wood increases.
- C** The elastic potential energy of the log of wood decreases.
- D** The chemical potential energy in the log of wood decreases.

Item Information

Item Code: TNS10719

Passage Title:

Standard Code: 0607.10.3

Passage Code:

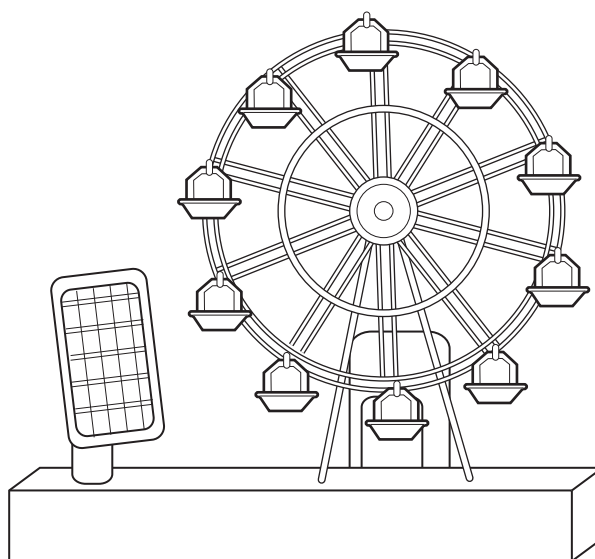
Standard Text: Recognize that energy can be transformed from one type to another.

Reporting Category: Energy, Forces in Nature

Correct Answer: A

DOK Level: 3-4

A student has a toy Ferris wheel that moves when placed in sunlight.



Which best describes the energy transformation that moves the Ferris wheel?

- A** Solar → Electrical → Mechanical
- B** Mechanical → Electrical → Potential
- C** Solar → Mechanical → Chemical
- D** Potential → Electrical → Chemical

Item Information

Item Code: TNS21204	Passage Title:
Standard Code: 0607.10.3	Passage Code:
Standard Text: Recognize that energy can be transformed from one type to another.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: D	DOK Level: 2

A raccoon eats berries for energy. What type of energy do the berries provide to the raccoon?

- A** solar energy
- B** electrical energy
- C** nuclear energy
- D** chemical energy

Item Information

Item Code: TNS21311

Passage Title:

Standard Code: 0607.10.4

Passage Code:

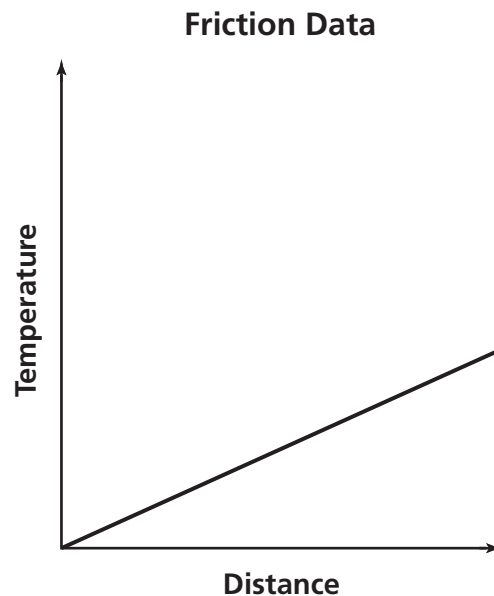
Standard Text: Explain the Law of Conservation of Energy using data from a variety of energy transformations.

Reporting Category: Energy, Forces in Nature

Correct Answer: C

DOK Level: 3-4

The graph shows data from a brick being pushed along a concrete surface.



What happened to the kinetic energy of the moving brick?

- A** Some of the energy was destroyed.
- B** The energy was used up so it no longer exists.
- C** The energy transformed into thermal energy.
- D** The brick had no energy once the force had been removed.

Item Information

Item Code: TNS21313

Passage Title:

Standard Code: 0607.12.1

Passage Code:

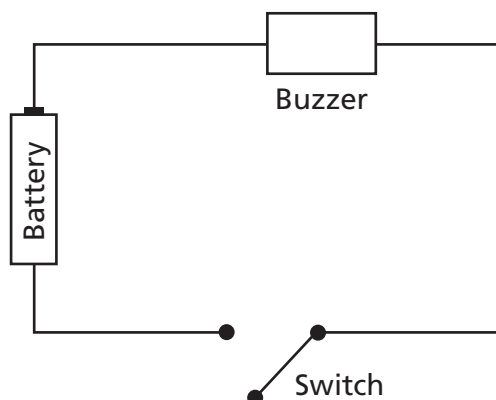
Standard Text: Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.

Reporting Category: Energy, Forces in Nature

Correct Answer: D

DOK Level: 2

When the switch is closed in the circuit below, the buzzer makes a sound.



What causes the buzzer to produce sound?

- A the movement of air through the wires
- B the transfer of chemicals through the wires
- C the vibration of molecules in the wires
- D the motion of electrons in the wires

Item Information

Item Code: TNS21314	Passage Title:
Standard Code: 0607.12.2	Passage Code:
Standard Text: Identify materials that can conduct electricity.	
Reporting Category: Energy, Forces in Nature	
Correct Answer: B	DOK Level: 1

Which material best conducts an electric current?

- A** glass
- B** silver
- C** rubber
- D** cork

Item Information

Item Code:	TNS10622	Passage Title:	
Standard Code:	0607.2.1	Passage Code:	
Standard Text:	Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.		
Reporting Category:	Interdependence		
Correct Answer:	D	DOK Level:	2

Mushrooms are considered decomposers because they obtain nutrients from

- A** water.
- B** oxygen.
- C** living animals.
- D** decaying plants.

Item Information

Item Code:	TNS02034	Passage Title:	
Standard Code:	0607.2.1	Passage Code:	
Standard Text:	Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.		
Reporting Category:	Interdependence		
Correct Answer:	B	DOK Level:	2

Gazelles living in the grasslands of Africa eat grass and tree leaves. Gazelles are eaten by lions.

Which of these terms describes the role of gazelles in this ecosystem?

- A** producer
- B** herbivore
- C** carnivore
- D** decomposer

Item Information

Item Code: TNS21297

Passage Title:

Standard Code: 0607.2.2

Passage Code:

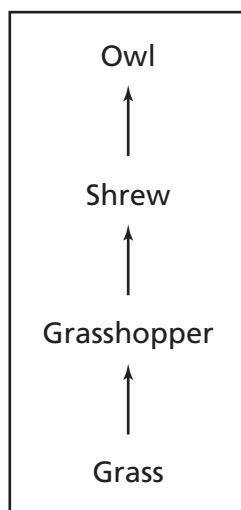
Standard Text: Interpret how materials and energy are transferred through an ecosystem.

Reporting Category: Interdependence

Correct Answer: A

DOK Level: 1

The food chain below shows one part of a complex food chain.



How is energy transferred in this food chain?

- A** Organisms consume other organisms.
- B** Chemicals are absorbed through the skin.
- C** Organisms breathe in carbon dioxide.
- D** Producers consume other producers.

Item Information

Item Code: TNS00412	Passage Title:
Standard Code: 0607.2.3	Passage Code:
Standard Text: Identify the biotic and abiotic elements of the major biomes.	
Reporting Category: Interdependence	
Correct Answer: D	DOK Level: 2

Which of these best describes a coniferous forest in the winter?

- A** a few small trees separated by mosses and lichens
- B** a few trees without leaves separated by tall grasses
- C** many trees covered by vines with large green leaves
- D** many trees with green needles and few other plants

Item Information

Item Code:	TNS21300	Passage Title:	
Standard Code:	0607.2.4	Passage Code:	
Standard Text:	Identify the environmental conditions and interdependencies among organisms found in the major biomes.		
Reporting Category:	Interdependence		
Correct Answer:	A	DOK Level:	2

An organism lives in a region that has long winters with cool summer temperatures and high precipitation amounts. In which biome does this organism most likely live?

- A** coniferous forest
- B** temperate grassland
- C** tropical rain forest
- D** coastal desert

Item Information

Item Code:	TNS21207	Passage Title:	
Standard Code:	0607.2.4	Passage Code:	
Standard Text:	Identify the environmental conditions and interdependencies among organisms found in the major biomes.		
Reporting Category:	Interdependence		
Correct Answer:	A	DOK Level:	2

A grassland biome contains herbivores, carnivores, grasses, trees, and decomposers. The carnivores obtain energy directly from

- A** herbivores.
- B** decomposers.
- C** grasses.
- D** trees.

Item Information

Item Code: TNS20991 Passage Title:
Standard Code: 0607.6.1 Passage Code:
Standard Text: Use data to draw conclusions about the major components of the universe.
Reporting Category: The Universe
Correct Answer: C DOK Level: 2

A table listing parts of the universe is shown below.

Major Parts of the Universe

Part	Description
K	Less than 1 km in diameter
L	Gigantic and contains trillions of stars
M	Larger than asteroids and comets

According to the data, which part is described by letter K?

- A constellation
- B galaxy
- C meteoroid
- D planet

Item Information

Item Code: TNS10443

Passage Title:

Standard Code: 0607.6.3

Passage Code:

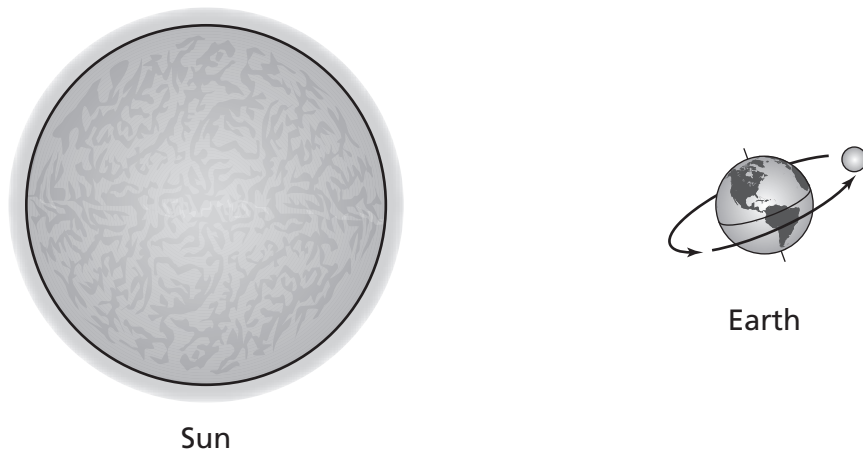
Standard Text: Distinguish among a day, lunar cycle, and year based on the movements of the earth, sun, and moon.

Reporting Category: The Universe

Correct Answer: B

DOK Level: 2

The diagram shows the position of the sun, Earth, and the moon.



As Earth rotates, the moon revolves around Earth. This revolving of the moon is also known as a

- A year.
- B lunar cycle.
- C day.
- D solar cycle.

Item Information

Item Code: TNS10444

Passage Title:

Standard Code: 0607.6.4

Passage Code:

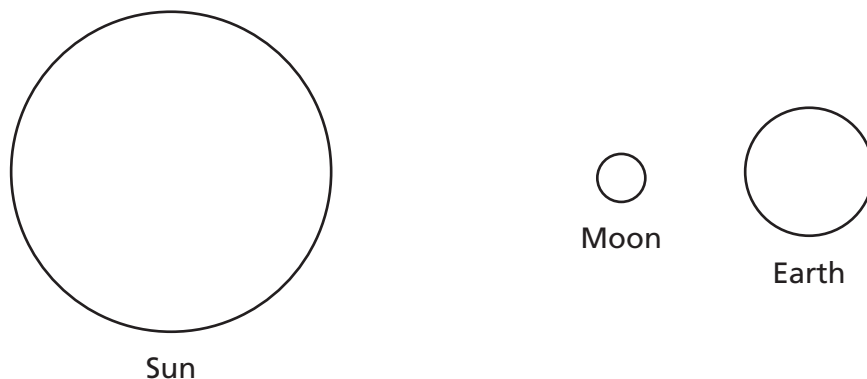
Standard Text: Explain the different phases of the moon using a model of the earth, moon, and sun.

Reporting Category: The Universe

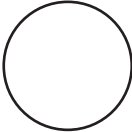

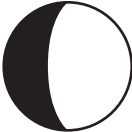

Correct Answer: D

DOK Level: 2

A student arranges a model of the sun, the moon, and Earth as shown.



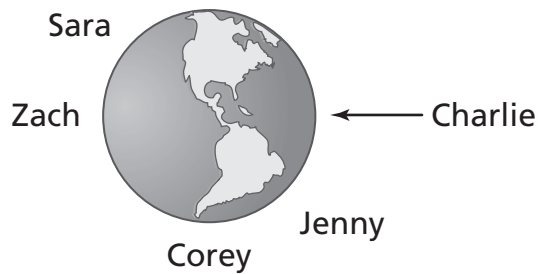
How would the moon appear to an observer on Earth?

- A 
- B 
- C 
- D 

Item Information

Item Code: TNS01533	Passage Title:
Standard Code: 0607.6.5	Passage Code:
Standard Text: Predict the types of tides that occur when the earth and moon occupy various positions.	
Reporting Category: The Universe	
Correct Answer: D	DOK Level: 2

Look at this diagram.



Charlie observes a low tide at his location.

Which other person would also observe a low tide at the same time as Charlie?

- A** Corey
- B** Jenny
- C** Sara
- D** Zach

Item Information

Item Code: TNS10448

Passage Title:

Standard Code: 0607.6.6

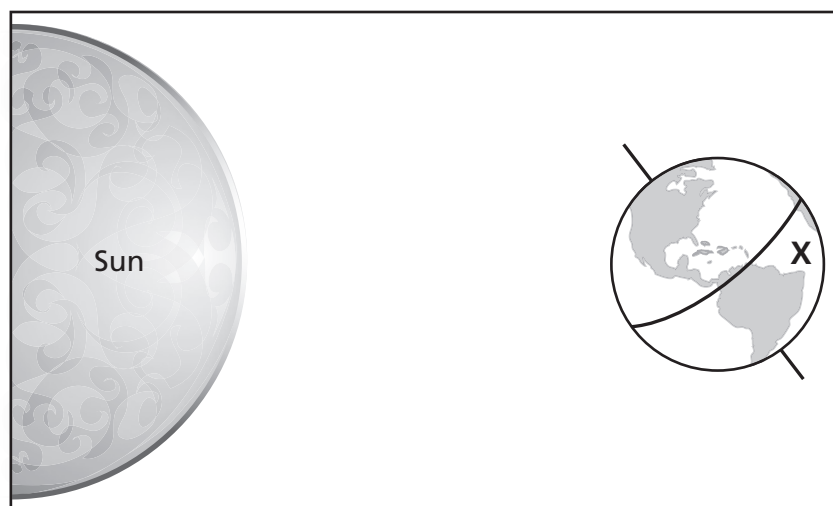
Passage Code:

Standard Text: Use a diagram that shows the positions of the earth and sun to explain the four seasons.

Reporting Category: The Universe

Correct Answer: C

DOK Level: 2

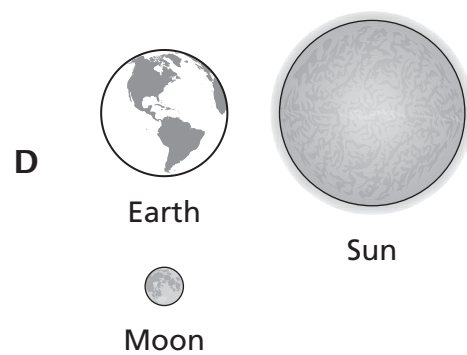
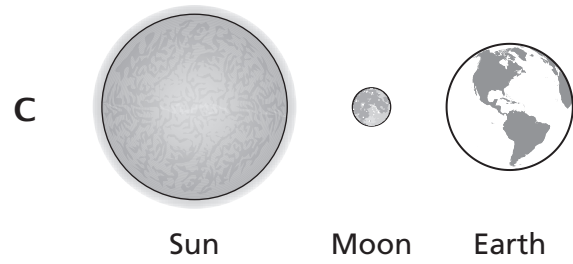
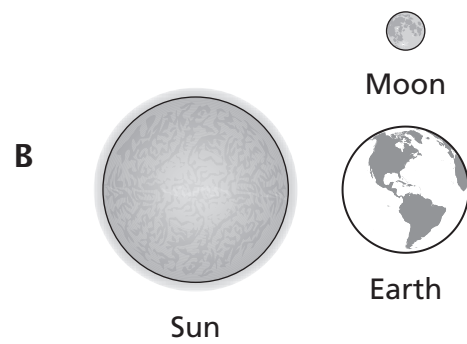
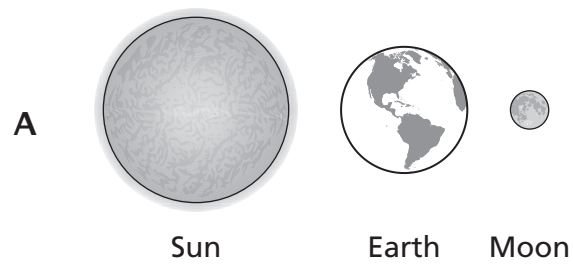
A diagram of the sun and Earth is shown.**What season is occurring at point X?**

- A fall
- B spring
- C winter
- D summer

Item Information

Item Code:	TNS20997	Passage Title:	
Standard Code:	0607.6.7	Passage Code:	
Standard Text:	Explain the difference between a solar and a lunar eclipse.		
Reporting Category:	The Universe		
Correct Answer:	C	DOK Level:	2

Which diagram shows the positions of the sun, Earth, and the moon during a solar eclipse?



Item Information

Item Code:	TNS10662	Passage Title:	
Standard Code:	0607.8.1	Passage Code:	
Standard Text:	Analyze data to identify events associated with heat convection in the atmosphere.		
Reporting Category:	The Atmosphere		
Correct Answer:	C	DOK Level:	3-4

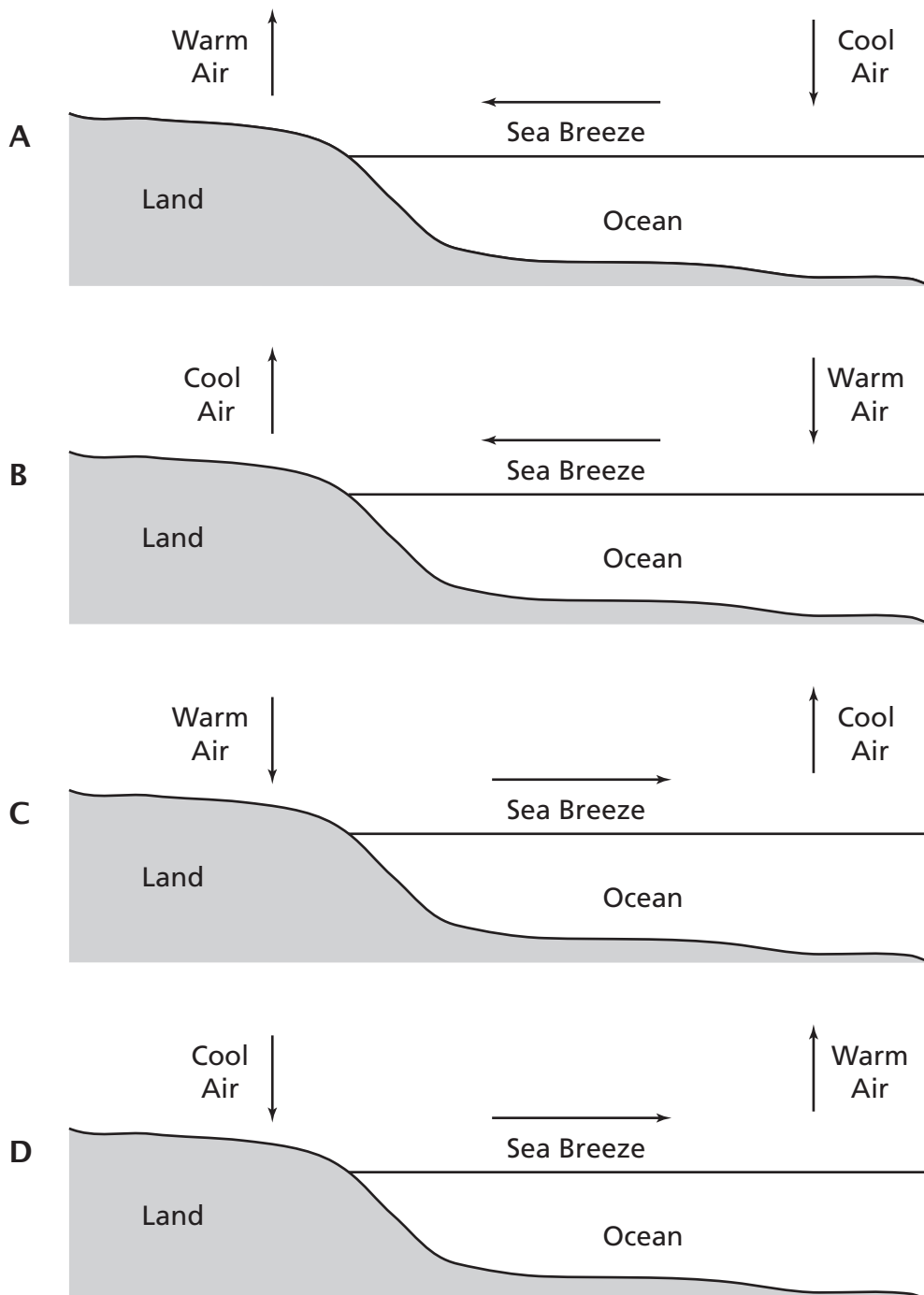
Which could be caused by convection in the atmosphere?

- A** land absorbing solar energy
- B** rising of ocean tides
- C** formation of a hurricane
- D** clouds reflecting sunlight

Item Information

Item Code:	TNS20986	Passage Title:	
Standard Code:	0607.8.2	Passage Code:	
Standard Text:	Recognize the connection between the sun's energy and the wind.		
Reporting Category:	The Atmosphere		
Correct Answer:	A	DOK Level:	2

The diagrams show the land, ocean, and heat from the sun interacting during the daytime. Which diagram correctly shows how air currents are created during daylight hours?



Item Information

Item Code: TNS10666
Standard Code: 0607.8.4
Standard Text: Interpret meteorological data to make predictions about the weather.
Reporting Category: The Atmosphere
Correct Answer: C

Passage Title:

Passage Code:

DOK Level: 2

A student recorded a barometer reading for four days.

Day of Week	Barometric Pressure (in. Hg)
Monday	31.13
Tuesday	30.25
Wednesday	29.91
Thursday	30.05

Based on the barometric pressure, which day had the highest chance of rain?

- A Monday
- B Tuesday
- C Wednesday
- D Thursday

Item Information

Item Code: TNS10529	Passage Title:
Standard Code: 0607.8.4	Passage Code:
Standard Text: Interpret meteorological data to make predictions about the weather.	
Reporting Category: The Atmosphere	
Correct Answer: A	DOK Level: 2

Students in Franklin, Tennessee, recorded some weather conditions.

Weather Conditions

Clouds	Increasing
Wind Direction	From the south
Barometric Pressure	29.95 in. Hg and falling quickly
Humidity	75% and increasing
Temperature	30°C

Based on the data, which type of weather will be expected?

- A** It will rain.
- B** It will become warmer.
- C** The skies will clear.
- D** There will be light snowfall.

Item Information

Item Code: TNS20968

Passage Title:

Standard Code: 0607.Inq.1

Passage Code:

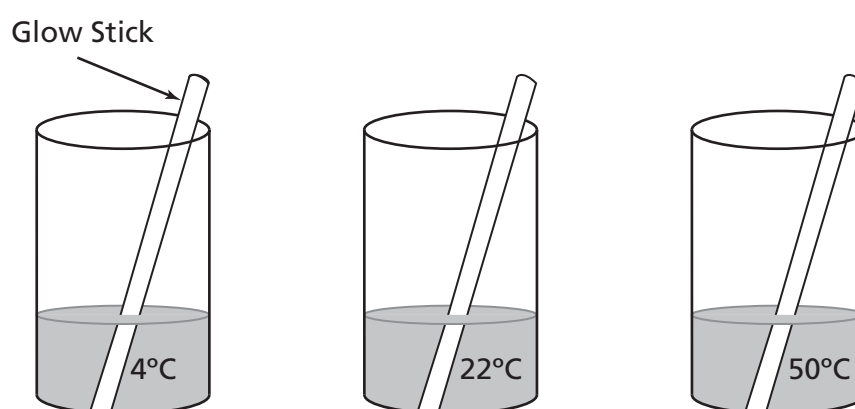
Standard Text: Design a simple experimental procedure with an identified control and appropriate variables.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: B

DOK Level: 2

A student conducts an investigation using the same kind of green glow sticks as shown in the setup below.



The student then records the light intensity of each stick and how long each stick glows.

Which is the independent variable in this investigation?

- A color of the glow sticks
- B temperature of the water
- C length of time each stick glowed
- D intensity of light from each glow stick

Item Information

Item Code: TNS20645	Passage Title:
Standard Code: 0607.Inq.2	Passage Code:
Standard Text: Select tools and procedures needed to conduct a moderately complex experiment.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: D	DOK Level: 2

Students were asked to record and compare the wind speeds observed every 10 minutes over a one-hour period. Which tool will best help conduct this investigation?

- A telescope
- B thermometer
- C binoculars
- D anemometer

Item Information

Item Code: TNS00400

Passage Title:

Standard Code: 0607.TE.2

Passage Code:

Standard Text: Evaluate a protocol to determine if the engineering design process was successfully applied.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: C

DOK Level: 2

For a science project, a group of students want to create a representation of how organisms depend on one another in a freshwater biome.

Which procedure most likely needs to occur first in their project?

- A** build a model of the biome
- B** use a computer program to create the representation
- C** look for information that already exists about the biome
- D** introduce new species of animals into the biome and observe what happens

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 6 Item Release
Spring 2017



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 7 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 7..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Science Grade 7

Item Information

Item Code:	TNS02097	Passage Title:	
Standard Code:	0707.1.1	Passage Code:	
Standard Text:	Identify and describe the function of the major plant and animal cell organelles.		
Reporting Category:	Cells, Flow of Matter & Energy		
Correct Answer:	D	DOK Level:	1

What cell organelle produces energy in animal cells?

- A** vacuole
- B** lysosome
- C** ribosome
- D** mitochondrion

Item Information

Item Code: TNS10466

Passage Title:

Standard Code: 0707.1.3

Passage Code:

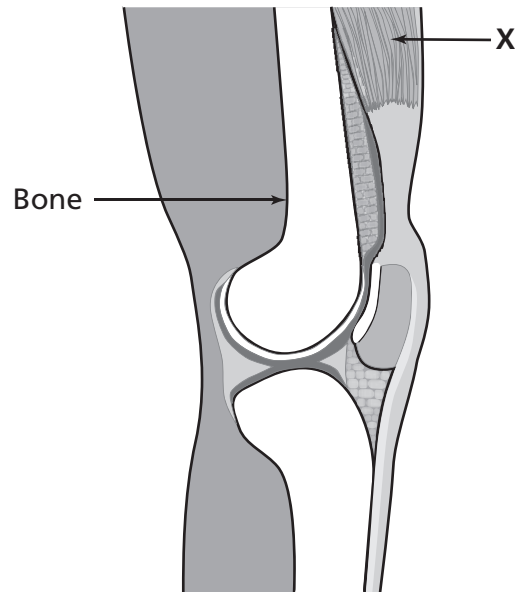
Standard Text: Explain the basic functions of a major organ system.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: A

DOK Level: 2

The illustration shows structures from certain body systems.



What is the main function of the structure labeled X?

- A moving the body
- B forming blood cells
- C supporting the body
- D transmitting nerve impulses

Item Information

Item Code: TNS20854

Passage Title:

Standard Code: 0707.1.3

Passage Code:

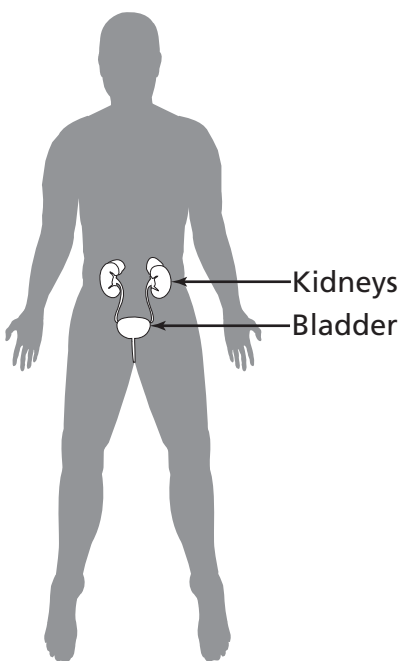
Standard Text: Explain the basic functions of a major organ system.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: C

DOK Level: 2

A system from the human body is shown in the diagram.



What is a main function of this organ system?

- A providing nutrients to cells
- B transporting oxygen to cells
- C removing wastes
- D producing offspring

Item Information

Item Code: TNS20755

Passage Title:

Standard Code: 0707.1.4

Passage Code:

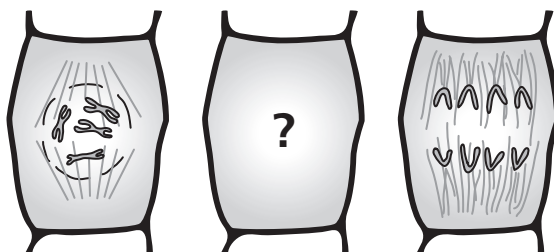
Standard Text: Sequence a series of diagrams that depict chromosome movement during plant cell division.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: C

DOK Level: 2

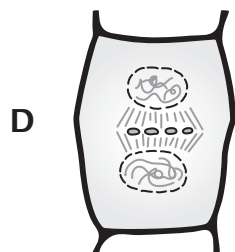
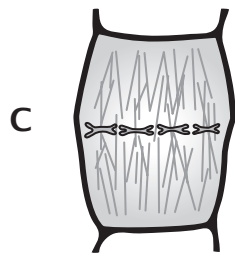
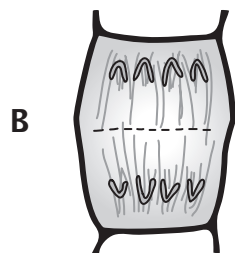
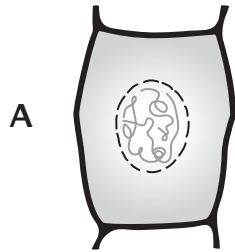
The diagram shows two phases in plant cell division.



(This item continues on the next page.)

(Item 4, continued from the previous page)

Which phase occurs between the two phases shown above?



Item Information

Item Code: TNS20764	Passage Title:
Standard Code: 0707.11.1	Passage Code:
Standard Text: Differentiate between the six simple machines.	
Reporting Category: Motion	
Correct Answer: B	DOK Level: 2

Workers need to move some heavy tools to a roof several meters above the ground. Which simple machine would best help the workers lift the tools?

- A** a wedge
- B** a pulley
- C** a lever
- D** a screw

Item Information

Item Code: TNS00286	Passage Title:
Standard Code: 0707.11.1	Passage Code:
Standard Text: Differentiate between the six simple machines.	
Reporting Category: Motion	
Correct Answer: C	DOK Level: 1

Jonas uses a pair of scissors to cut a piece of paper in half.

What simple machine is used to cut the paper?

- A** pulley
- B** screw
- C** wedge
- D** wheel and axle

Item Information

Item Code: TNS10044	Passage Title:
Standard Code: 0707.11.2	Passage Code:
Standard Text: Determine the amount of force needed to do work using different simple machines.	
Reporting Category: Motion	
Correct Answer: A	DOK Level: 2

A person performed 100 newton-meters of work by moving an object into a truck with a ramp 5 meters long.

$\text{Force } (f) = \text{Work } (w) \div \text{Distance } (d)$
--

How much force was needed to move the object into the truck?

- A** 20 newtons
- B** 95 newtons
- C** 105 newtons
- D** 500 newtons

Item Information

Item Code: TNS10485

Passage Title:

Standard Code: 0707.11.4

Passage Code:

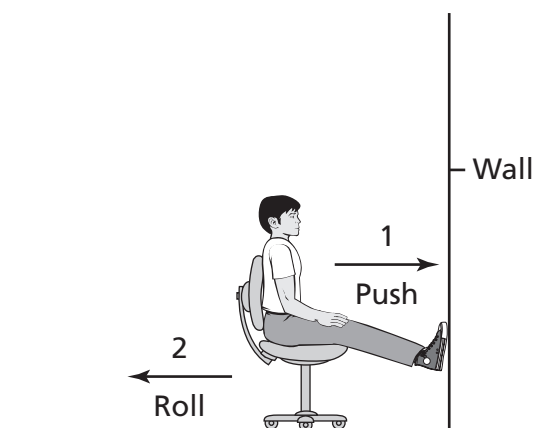
Standard Text: Identify and explain how Newton's laws of motion relate to the movement of objects.

Reporting Category: Motion

Correct Answer: D

DOK Level: 2

A person sits in a chair with wheels. He pushes on a wall with his legs and applies a force directly to the wall. The push force causes an applied force in the opposite direction, as shown in the picture below.



Which scientific principle best identifies why the person moves away from the wall?

- A the law of gravity
- B the principle of inertia
- C Newton's second law of motion
- D Newton's third law of motion

Item Information

Item Code: TNS20539

Passage Title:

Standard Code: 0707.11.5

Passage Code:

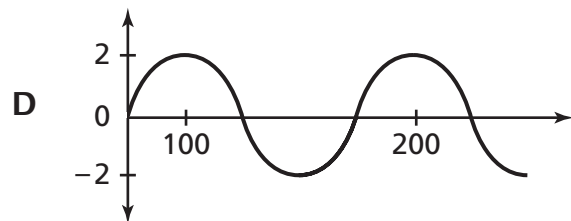
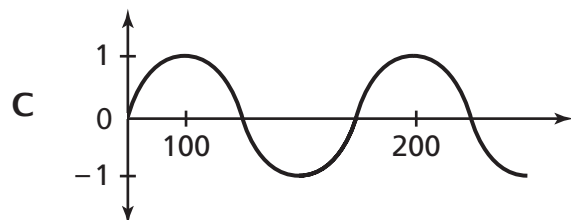
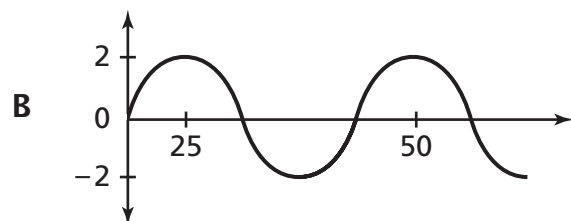
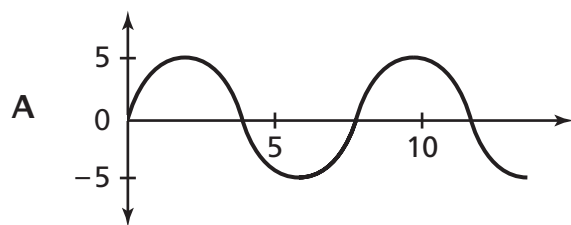
Standard Text: Compare and contrast the different parts of a wave.

Reporting Category: Motion

Correct Answer: A

DOK Level: 2

Which wave has the greatest amplitude?



Item Information

Item Code: TNS10576

Passage Title:

Standard Code: 0707.11.6

Passage Code:

Standard Text: Differentiate between transverse and longitudinal waves in terms of how they are produced and transmitted.

Reporting Category: Motion

Correct Answer: B

DOK Level: 2

A book falls off a desk and makes a sound when it hits the floor. The sound wave that travels through the air

- A** is a transverse wave.
- B** is a longitudinal wave.
- C** moves in one direction from the source.
- D** moves faster than the speed of light.

Item Information

Item Code:	TNS10031	Passage Title:	
Standard Code:	0707.3.1	Passage Code:	
Standard Text:	Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.		
Reporting Category:	Cells, Flow of Matter & Energy		
Correct Answer:	C	DOK Level:	2

Which statement accurately describes the relationship between photosynthesis and respiration?

- A** Both processes produce water (H_2O).
- B** Both processes produce oxygen (O_2).
- C** Carbon dioxide (CO_2) produced by respiration is needed for photosynthesis.
- D** Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) is a reactant for photosynthesis and a product of respiration.

Item Information

Item Code: TNS20562

Passage Title:

Standard Code: 0707.3.2

Passage Code:

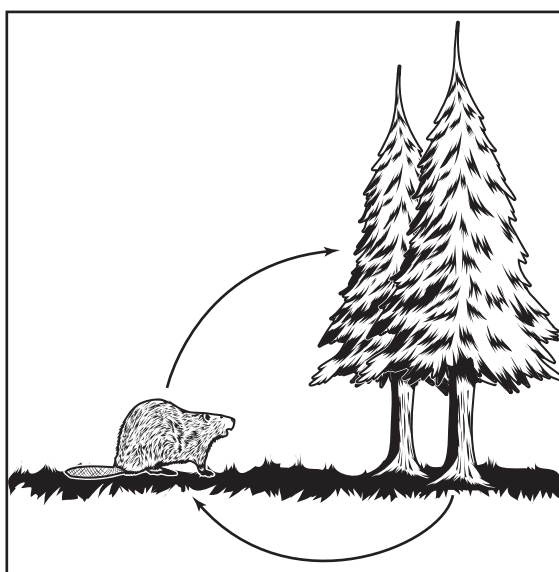
Standard Text: Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

Reporting Category: Cells, Flow of Matter & Energy

Correct Answer: B

DOK Level: 2

The arrows in the diagram represent gases exchanged between plants and animals.

Gas Exchange

Which statement best explains this gas exchange?

- A Animals produce oxygen that plants release.
- B Animals release carbon dioxide that plants use in photosynthesis.
- C Plants produce carbon dioxide that animals use to produce oxygen.
- D Plants release oxygen that animals use to produce chlorophyll.

Item Information

Item Code: TNS20563	Passage Title:
Standard Code: 0707.4.1	Passage Code:
Standard Text: Classify methods of reproduction as sexual or asexual.	
Reporting Category: Heredity	
Correct Answer: A	DOK Level: 1

The union of a sperm and an egg during the life cycle of a jellyfish is best described as

- A** sexual reproduction.
- B** genetic inheritance.
- C** asexual reproduction.
- D** genetic engineering.

Item Information

Item Code: TNS10035	Passage Title:
Standard Code: 0707.4.1	Passage Code:
Standard Text: Classify methods of reproduction as sexual or asexual.	
Reporting Category: Heredity	
Correct Answer: B	DOK Level: 2

Which is the best example of sexual reproduction?

- A** A new plant cell results from mitosis.
- B** Offspring receive genetic material from two parents.
- C** A bacterium divides into offspring identical to the parent.
- D** Daughter cells receive all the genetic material of a parent cell.

Item Information

Item Code: TNS10270

Passage Title:

Standard Code: 0707.4.2

Passage Code:

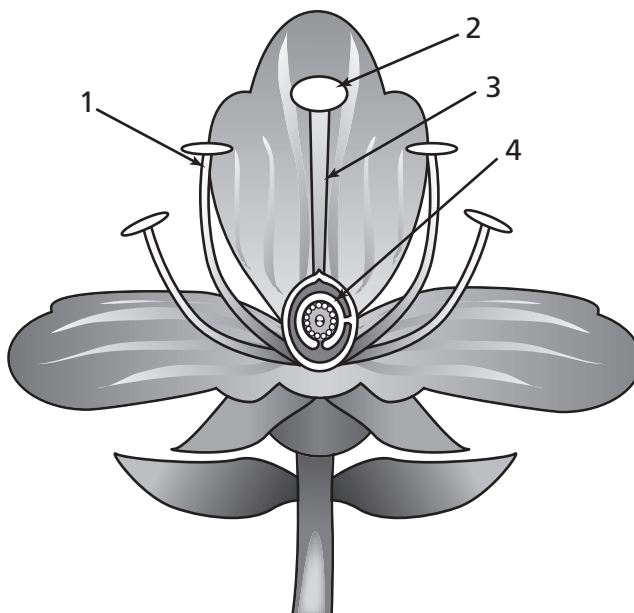
Standard Text: Match flower parts with their reproductive functions.

Reporting Category: Heredity

Correct Answer: D

DOK Level: 2

The diagram shows a flower.



Which arrow points to the part of the flower where the seeds develop?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS10563

Passage Title:

Standard Code: 0707.7.1

Passage Code:

Standard Text: Use a table of physical properties to classify minerals.

Reporting Category: The Earth

Correct Answer: A

DOK Level: 2

Students examine a soft, white mineral with a distinct odor. The students compare their observations with the properties in the table below.

Physical Characteristics of Minerals

Name	Hardness	Color	Odor
Talc	1	White	Earthy
Sulfur	2	Yellow	Rotten Eggs
Gypsum	2	Colorless	None
Calcite	3	White	None
Amethyst	7	Purple	None
Quartz	7	Colorless	None
Emerald	8	Green	None
Diamond	10	Colorless	None

Based on the table, which mineral did the students observe?

- A Talc
- B Sulfur
- C Calcite
- D Quartz

Item Information

Item Code: TNS10479	Passage Title:
Standard Code: 0707.7.3	Passage Code:
Standard Text: Identify the major processes that drive the rock cycle.	
Reporting Category: The Earth	
Correct Answer: C	DOK Level: 1

Which process can transform a sedimentary rock into a metamorphic rock?

- A** melting and cooling
- B** deposition and cementation
- C** heat and pressure
- D** evaporation and condensation

Item Information

Item Code: TNS20490

Passage Title:

Standard Code: 0707.7.3

Passage Code:

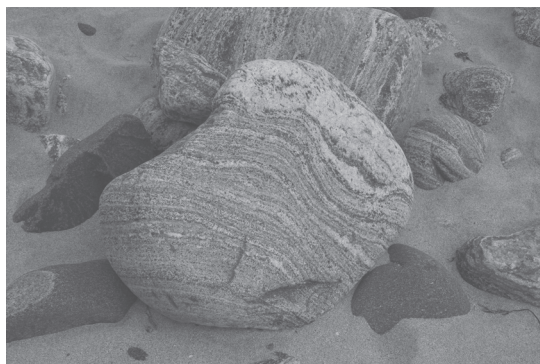
Standard Text: Identify the major processes that drive the rock cycle.

Reporting Category: The Earth

Correct Answer: C

DOK Level: 1

Gneiss is a metamorphic rock that can form from granite.



What must occur in order for granite to form gneiss?

- A** weathering and erosion
- B** melting and cooling
- C** high temperature and pressure
- D** transportation and deposition

Item Information

Item Code: TNS10565	Passage Title:
Standard Code: 0707.7.3	Passage Code:
Standard Text: Identify the major processes that drive the rock cycle.	
Reporting Category: The Earth	
Correct Answer: B	DOK Level: 1

Which of these can transform metamorphic rock into igneous rock?

- A** heat and pressure
- B** melting and cooling
- C** pressure and melting
- D** deposition and cementation

Item Information

Item Code: TNS10349	Passage Title:
Standard Code: 0707.7.4	Passage Code:
Standard Text: Differentiate among the characteristics of the earth's three layers.	
Reporting Category: The Earth	
Correct Answer: D	DOK Level: 1

Which layer of Earth has the least density?

- A** inner core
- B** outer core
- C** mantle
- D** crust

Item Information

Item Code: TNS10276	Passage Title:
Standard Code: 0707.7.4	Passage Code:
Standard Text: Differentiate among the characteristics of the earth's three layers.	
Reporting Category: The Earth	
Correct Answer: C	DOK Level: 1

In which layer of Earth are the temperature and pressure the highest?

- A** crust
- B** mantle
- C** inner core
- D** outer core

Item Information

Item Code: TNS20446

Passage Title:

Standard Code: 0707.7.5

Passage Code:

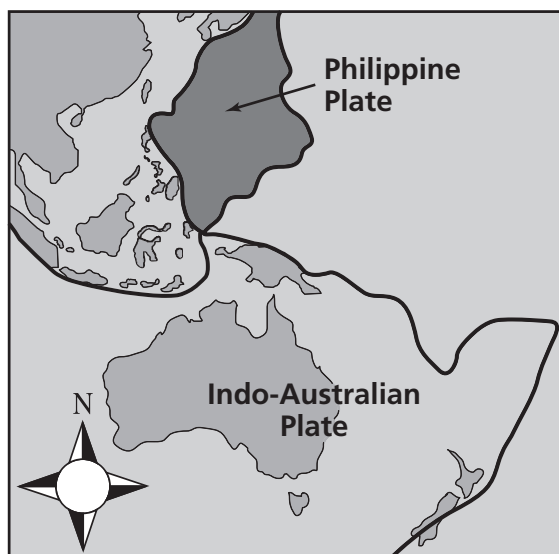
Standard Text: Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.

Reporting Category: The Earth

Correct Answer: A

DOK Level: 2

As the Indo-Australian Plate moves toward the northeast, it collides with the Philippine Plate.



Which best describes the annual rate of movement of the Indo-Australian Plate?

- A 6.7 centimeters
- B 67 meters
- C 6.7 millimeters
- D 67 kilometers

Item Information

Item Code: TNS10355	Passage Title:
Standard Code: 0707.7.7	Passage Code:
Standard Text: Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.	
Reporting Category: The Earth	
Correct Answer: D	DOK Level: 2

Which human activity greatly increases the amount of carbon dioxide that is released into the atmosphere?

- A** planting trees
- B** composting leaves
- C** draining wetlands
- D** burning coal

Item Information

Item Code:	TNS00228	Passage Title:	
Standard Code:	0707.Inq.1	Passage Code:	
Standard Text:	Design a simple experimental procedure with an identified control and appropriate variables.		
Reporting Category:	Inquiry and Technology & Engineering		
Correct Answer:	D	DOK Level:	2

A scientist wants to know if female guppies prefer to mate with male guppies when the males are more colorful. She divides a fish tank in half using a glass divider. She then places a female guppy in one side of the tank and takes turns placing differently-colored male guppies in the other side. She observes the response the female has to each male guppy.

What is the dependent variable in this investigation?

- A** size of the male guppies
- B** color of the male guppies
- C** amount of time each male is in the tank
- D** female response to each male in the tank

Item Information

Item Code: TNS10893	Passage Title:
Standard Code: 0707.TE.2	Passage Code:
Standard Text: Evaluate a protocol to determine if the engineering design process was successfully applied.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: A	DOK Level: 3-4

A company is manufacturing a platform to help painters reach high places. The platform is supposed to support up to 3,000 N. Which is the best way for the company to test the platform to make sure it supports the weight for which it was designed?

- A** place objects on the platform that are slightly greater than 3,000 N
- B** place objects on the platform that are slightly less than 3,000 N
- C** release the platform holding 3,000 N from a given height
- D** drop 3,000-N objects from a given height onto the platform

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 7 Item Release
Spring 2017



Tennessee Comprehensive Assessment Program

TCAP

TNReady—Science
Grade 8 Item Release





Developed by ETS (Educational Testing Service). Published under contract with the Tennessee Department of Education by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. Copyright © 2017 by Tennessee Department of Education. No part of this publication may be copied, reproduced, or distributed in any form or by any means, or stored in a database or retrieval system, without the prior express written consent of the Tennessee Department of Education and Questar Assessment Inc. Nextera® is a registered trademark of Questar Assessment Inc. All trademarks, product names, and logos are the property of their respective owners. All rights reserved.

Table of Contents

Metadata Interpretation Guide – Science 4

Science Grade 8..... 5

Metadata Interpretation Guide – Science

Item Information

Item Code: TNS10220	Passage Title:
Standard Code: 0307.1.1	Passage Code:
Standard Text: Identify specific parts of a plant and describe their function.	
Reporting Category: Cells, Flow of Matter & Energy, Heredity	
Correct Answer: B	DOK Level: 2

Item Code: Unique letter/number code used to identify the item.	Passage Title: (if listed): Title of the passage(s) associated with this item.
Standard Code: Primary educational standard assessed.	Passage Code: (if listed): Unique letter/number code used to identify the passage(s) that go with this item.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Correct Answer: Correct answer. This may be blank for constructed response items where students write or type their responses.	DOK Level (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1= Recall; 2= Skill/Concepts; 3= Strategic Thinking; 3-4 = Strategic/Extended Thinking

Item Information

Item Code: TNS00131

Passage Title:

Standard Code: 0807.12.1

Passage Code:

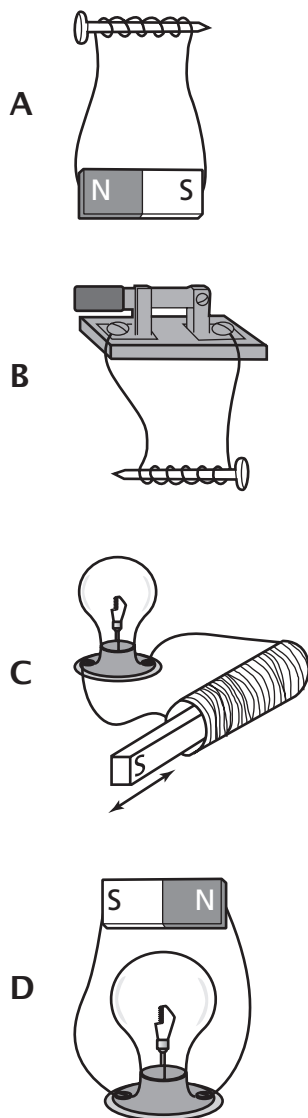
Standard Text: Recognize that electricity can be produced using a magnet and wire coil.

Reporting Category: Forces of Nature

Correct Answer: C

DOK Level: 2

Which diagram shows an example of how to produce electricity?



Item Information

Item Code: TNS20867	Passage Title:
Standard Code: 0807.12.2	Passage Code:
Standard Text: Describe the basic principles of an electromagnet.	
Reporting Category: Forces of Nature	
Correct Answer: C	DOK Level: 2

A student wants to make an electromagnet. Which items are needed?

- A** battery, heat source, copper wire
- B** magnet, copper wire, metal nail
- C** copper wire, metal nail, battery
- D** magnet, battery, heat source

Item Information

Item Code: TNS02153

Passage Title:

Standard Code: 0807.12.5

Passage Code:

Standard Text: Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.

Reporting Category: Forces of Nature

Correct Answer: B

DOK Level: 2

The force of gravity pulls down on Carol's house with a total force of 300,000 newtons.

The force of gravity on Carol's house would be exactly twice as much if the house

- A** were twice as tall
- B** had twice as much mass
- C** had twice as much volume
- D** covered twice as much area

Item Information

Item Code:	TNS02890	Passage Title:	
Standard Code:	0807.12.5	Passage Code:	
Standard Text:	Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.		
Reporting Category:	Forces of Nature		
Correct Answer:	B	DOK Level:	2

The sun’s mass is about 30 million times greater than the moon.

Why does the gravitational pull between Earth and the moon affect Earth’s tides more than the gravitational pull between Earth and the sun?

- A** The moon is more dense than the sun.
- B** The moon is closer to Earth than the sun.
- C** The moon has phases, but the sun does not.
- D** The moon orbits Earth, but the sun does not.

Item Information

Item Code: TNS20808

Passage Title:

Standard Code: 0807.5.1

Passage Code:

Standard Text: Use a simple classification key to identify an unknown organism.

Reporting Category: Biodiversity & Change

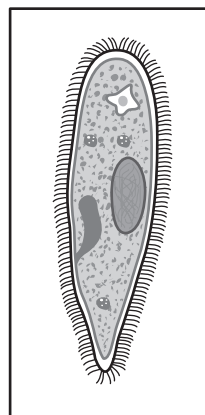
Correct Answer: B

DOK Level: 2

A classification key and a diagram of an organism are shown below.

Classification Key

- 1A. Only 1 cell go to 2
1B. More than 1 cell go to 3
2A. No nucleus Eubacteria
2B. Has a nucleus Protista
3A. Autotrophic Plantae
3B. Heterotrophic go to 4
4A. Mobile Animalia
4B. Immobile Fungi



The organism shown on the right belongs to what kingdom?

- A Eubacteria
- B Protista
- C Plantae
- D Animalia

Item Information

Item Code: TNS20894	Passage Title:
Standard Code: 0807.5.1	Passage Code:
Standard Text: Use a simple classification key to identify an unknown organism.	
Reporting Category: Biodiversity & Change	
Correct Answer: D	DOK Level: 2

A picture of an organism and a classification key are shown below.

Classification Key



© Davthy/Dreamstime #5400198

- 1a. The organism has feathers Class Aves
- 1b. The organism has no feathers..... Go to 2
- 2a. The organism has scales..... Go to 3
- 2b. The organism has no scales Go to 4
- 3a. The organism has gills....Class Chondrichthyes
- 3b. The organism has lungs..... Class Reptilia
- 4a. The organism has fur Class Mammalia
- 4b. The organism has no fur..... Class Insecta

Using the classification key above, identify the class of the organism.

- A** Class Aves
- B** Class Reptilia
- C** Class Chondrichthyes
- D** Class Mammalia

Item Information

Item Code: TNS10495

Passage Title:

Standard Code: 0807.5.2

Passage Code:

Standard Text: Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.

Reporting Category: Biodiversity & Change

Correct Answer: C

DOK Level: 2

The most available food source for birds on an island is hard-shelled nuts. Which birds have beaks designed to best survive on a diet of hard-shelled nuts?



Item Information

Item Code: TNS10676	Passage Title:
Standard Code: 0807.5.3	Passage Code:
Standard Text: Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions.	
Reporting Category: Biodiversity & Change	
Correct Answer: A	DOK Level: 2

The table below shows four different populations of bacteria and the percentage of each that is resistant to different antibiotics.

Percent of Bacterial Population Resistant to Antibiotic

Population	Antibiotic Q	Antibiotic R	Antibiotic S	Antibiotic T
1	9.3%	17.1%	19.0%	30.1%
2	18.1%	46.9%	18.4%	0%
3	0%	95.1%	1.6%	82.0%
4	0%	3.3%	6.6%	4.1%

Which population of bacteria would have the greatest number of survivors if treated with Antibiotic S?

- A 1
- B 2
- C 3
- D 4

Item Information

Item Code: TNS00103

Passage Title:

Standard Code: 0807.5.5

Passage Code:

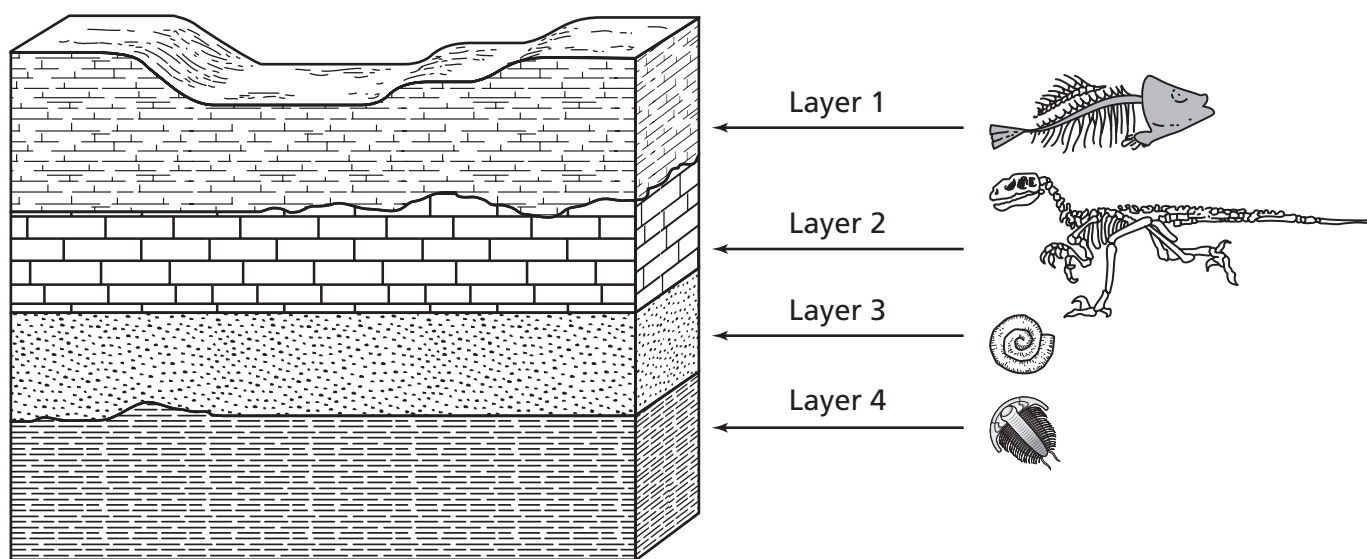
Standard Text: Compare fossils found in sedimentary rock to determine their relative age.

Reporting Category: Biodiversity & Change

Correct Answer: D

DOK Level: 2

The diagram below shows layers of sedimentary rock and the types of fossils found in each layer.



What layer contains the oldest fossil?

- A Layer 1
- B Layer 2
- C Layer 3
- D Layer 4

Item Information

Item Code: TNS20907	Passage Title:
Standard Code: 0807.9.1	Passage Code:
Standard Text: Recognize that all matter consists of atoms.	
Reporting Category: Properties of Matter	
Correct Answer: B	DOK Level: 1

Which represents the smallest part of an element that retains all the properties of that element?

- A molecule
- B atom
- C nucleus
- D proton

Item Information

Item Code: TNS20782

Passage Title:

Standard Code: 0807.9.10

Passage Code:

Standard Text: Identify the reactants and products of a chemical reaction.

Reporting Category: Chemical Reactions

Correct Answer: D

DOK Level: 2

A table of chemical equations is shown below.

Equations Table

$\text{NaOH} + \text{KNO}_3 \rightarrow \text{NaNO}_3 + \text{KOH}$
$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
$2\text{Fe} + 6\text{NaBr} \rightarrow 2\text{FeBr}_3 + 6\text{Na}$
$\text{Pb} + \text{O}_2 \rightarrow \text{PbO}_2$

Which is a reactant in one of the equations?

- A NaNO_3
- B CO_2
- C PbO_2
- D NaBr

Item Information

Item Code: TNS20924

Passage Title:

Standard Code: 0807.9.11

Passage Code:

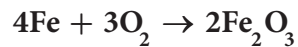
Standard Text: Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

Reporting Category: Chemical Reactions

Correct Answer: A

DOK Level: 2

A chemical equation is shown below.



The mass of $2\text{Fe}_2\text{O}_3$ produced must be equal to

- A the total mass of 4Fe and 3O_2 .
- B twice the total mass of 4Fe and 3O_2 .
- C one-half the mass of 4Fe and 3O_2 .
- D the mass of 4Fe less the mass of 3O_2 .

Item Information

Item Code: TNS20865
Standard Code: 0807.9.12
Standard Text: Identify the basic properties of acids and bases.
Reporting Category: Chemical Reactions
Correct Answer: C

Passage Title:
Passage Code:
DOK Level: 2

The table below shows the pH values of some different foods.

pH of Foods

Substance	Approximate pH
Egg whites	7.96
Graham crackers	7.92
Cranberry juice	2.30
Conch snails	8.40

Based on its pH level, which kind of food is most likely to have a sour taste?

- A Egg whites
- B Graham crackers
- C Cranberry juice
- D Conch snails

Item Information

Item Code: TNS20925	Passage Title:
Standard Code: 0807.9.12	Passage Code:
Standard Text: Identify the basic properties of acids and bases.	
Reporting Category: Chemical Reactions	
Correct Answer: D	DOK Level: 1

A strip of litmus paper turns blue when placed in a liquid. This observation indicates that the liquid has the properties of

- A** citrus juice.
- B** pure water.
- C** an acid.
- D** a base.

Item Information

Item Code: TNS20811	Passage Title:
Standard Code: 0807.9.2	Passage Code:
Standard Text: Identify the common outcome of all chemical changes.	
Reporting Category: Chemical Reactions	
Correct Answer: C	DOK Level: 2

After time, a copper penny will turn a green color and have a higher mass due to a chemical process. Which is the most likely reason for the changes to the copper penny?

- A** Dirt is clinging to the copper penny.
- B** The copper penny was painted.
- C** Metal in the copper penny oxidizes.
- D** The copper penny absorbed water.

Item Information

Item Code:	TNS20832	Passage Title:	
Standard Code:	0807.9.3	Passage Code:	
Standard Text:	Classify common substances as elements or compounds based on their symbols or formulas.		
Reporting Category:	Chemical Reactions		
Correct Answer:	C	DOK Level:	1

Which is a compound?

- A** lead (Pb)
- B** sulfur (S)
- C** hydrogen peroxide (H₂O₂)
- D** oxygen gas (O₂)

Item Information

Item Code: TNS10500	Passage Title:
Standard Code: 0807.9.4	Passage Code:
Standard Text: Differentiate between a mixture and a compound.	
Reporting Category: Chemical Reactions	
Correct Answer: B	DOK Level: 2

A student examines a powder. He notices most of the powder is made of white grains, but black grains are also present. The powder should be classified as

- A** an atom.
- B** a mixture.
- C** an element.
- D** a compound.

Item Information

Item Code: TNS20835

Passage Title:

Standard Code: 0807.9.6

Passage Code:

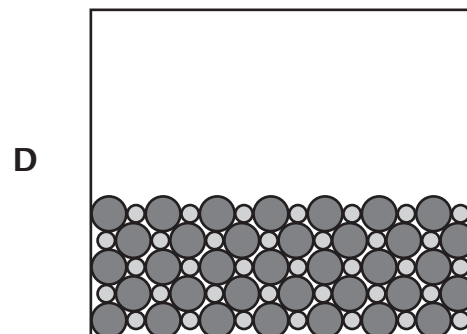
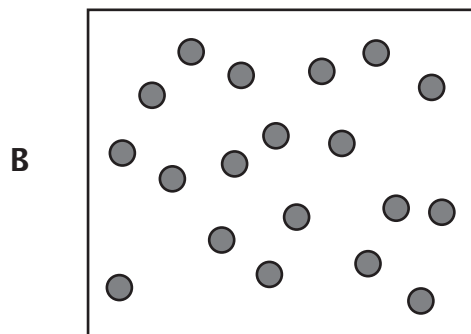
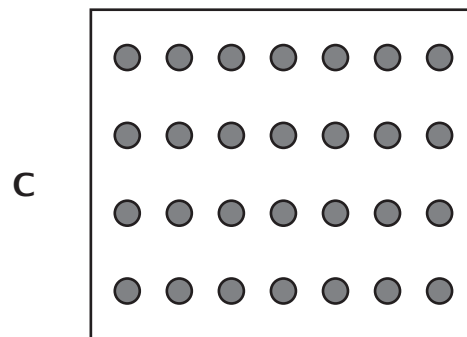
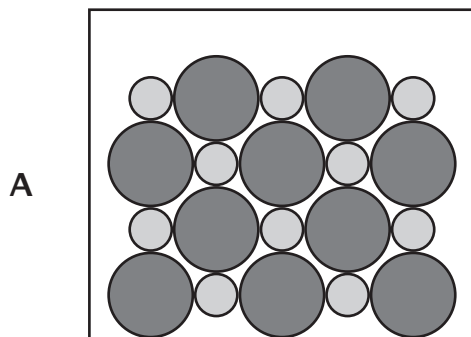
Standard Text: Compare the particle arrangement and type of particle motion associated with different states of matter.

Reporting Category: Properties of Matter

Correct Answer: B

DOK Level: 2

Which of these particle arrangements best represents a gas?



Item Information

Item Code: TNS20860

Passage Title:

Standard Code: 0807.9.7

Passage Code:

Standard Text: Apply an equation to determine the density of an object based on its mass and volume.

Reporting Category: Properties of Matter

Correct Answer: B

DOK Level: 2

The formula for density is shown below.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{v}$$

A substance has a mass of 12 grams and a volume of 6.0 cubic centimeters. What is the density of the substance?

- A 0.5 gram/cubic centimeter
- B 2.0 grams/cubic centimeter
- C 18 grams/cubic centimeter
- D 72 grams/cubic centimeter

Item Information

Item Code: TNS20837

Passage Title:

Standard Code: 0807.9.8

Passage Code:

Standard Text: Interpret the results of an investigation to determine whether a physical or chemical change has occurred.

Reporting Category: Chemical Reactions

Correct Answer: C

DOK Level: 3-4

A teacher put five grams of each of the four different substances into individual test tubes and then heated each test tube over a flame. The teacher asked the students to note the appearance of each substance after heating. The results were as follows:

Reaction of Substances Table

Substance	Appearance Before Heating	Observations While Heating	Appearance After Cooling
Potassium permanganate	Purple crystalline solid	Crackling, black smoke	Black powder
Copper carbonate	Blue-green powder	Begins to turn black	Black solid
Zinc oxide	White powder	Turns yellow	White powder
Sulfur	Yellow crystalline solid	Yellow-brown liquid, smells like rotten eggs	Yellow-brown liquid with large, fiber-like crystals

According to the data, which substance underwent a physical change?

- A Potassium permanganate
- B Copper carbonate
- C Zinc oxide
- D Sulfur

Item Information

Item Code: TNS20716

Passage Title:

Standard Code: 0807.9.9

Passage Code:

Standard Text: Use the periodic table to determine the properties of an element.

Reporting Category: Properties of Matter

Correct Answer: A

DOK Level: 2

The diagram below shows the periodic table.

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt									

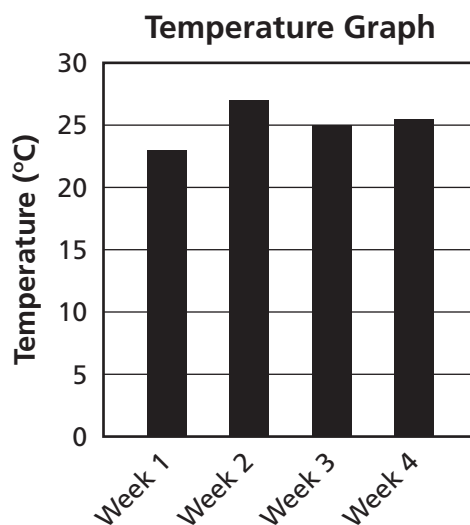
Which shaded element will chemically combine most easily with hydrogen (H)?

- A fluorine (F)
- B sulfur (S)
- C krypton (Kr)
- D tin (Sn)

Item Information

Item Code: TNS20701	Passage Title:
Standard Code: 0807.Inq.1	Passage Code:
Standard Text: Design a simple experimental procedure with an identified control and appropriate variables.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: A	DOK Level: 2

The graph below was created as part of a classroom investigation to show how the average weekly temperature changed during a one-month period.



Which variable, if not controlled, will make this graph most unreliable?

- A The temperatures were measured at different times of the day.
- B A digital thermometer was used to collect data.
- C The temperatures are an average.
- D A cold front changed the weather.

Item Information

Item Code: TNS21018

Passage Title:

Standard Code: 0807.Inq.3

Passage Code:

Standard Text: Interpret and translate data into a table, graph, or diagram.

Reporting Category: Inquiry and Technology & Engineering

Correct Answer: D

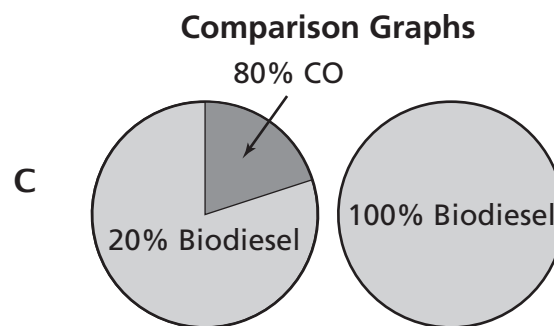
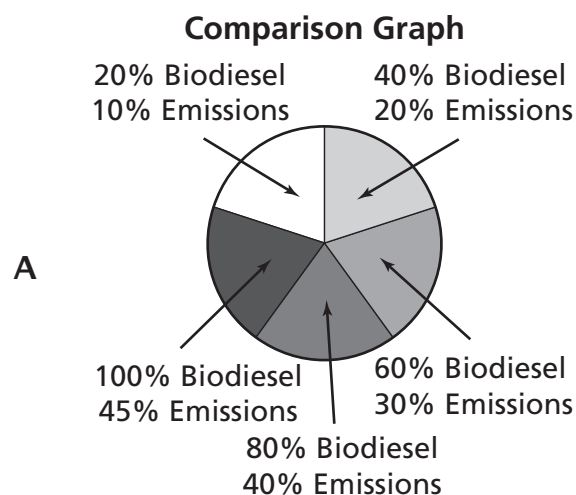
DOK Level: 2

The table shows the relationship between the percent of biodiesel used to operate machines and the reduction in carbon monoxide (CO) emissions.

Reduction in Carbon Monoxide Emissions

Percent of Biodiesel	Percent Reduction of CO Emissions
20	10
40	20
60	30
80	40
100	45

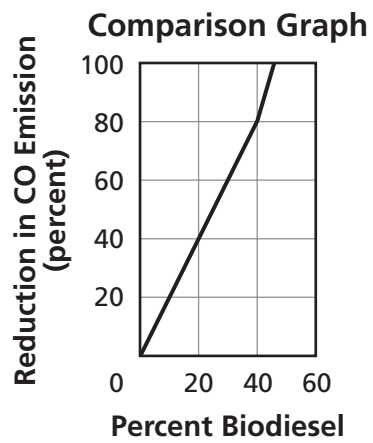
Which graph best shows the information from the table?



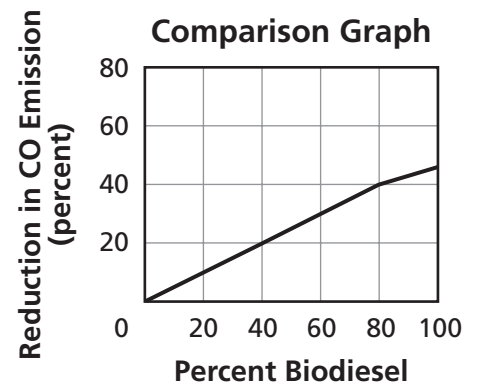
(This item continues on the next page.)

(Item 23, continued from the previous page)

B



D



Item Information

Item Code: TNS20795 Passage Title:
Standard Code: 0807.Inq.4 Passage Code:
Standard Text: Draw a conclusion that establishes a cause and effect relationship supported by evidence.
Reporting Category: Inquiry and Technology & Engineering
Correct Answer: A DOK Level: 2

A small plant was added to a closed jar where a cricket was kept. The table shows the oxygen (O₂) and carbon dioxide (CO₂) levels in the jar.

Comparison of Gas Levels

Time (minutes)	CO ₂	O ₂
0	0.04%	21.00%
2	0.02%	21.05%
4	0.03%	21.03%
6	0.04%	21.00%

Which statement is best supported by data in the table?

- A The plant was added between the times of 2 and 4 minutes.
- B The plant was added between the times of 4 and 6 minutes.
- C The plant absorbed O₂ in the jar faster than the cricket breathed.
- D The cricket used CO₂ at the same rate that the plant released it.

Item Information

Item Code: TNS00086	Passage Title:
Standard Code: 0807.TE.1	Passage Code:
Standard Text: Identify the tools and procedures needed to test the design features of a prototype.	
Reporting Category: Inquiry and Technology & Engineering	
Correct Answer: D	DOK Level: 2

A train that is powered by magnetism and electricity is currently being tested in Japan. A student wants to build a model of this train.

Which test will best determine if the model train works?

- A** attach the model train to an electric fan
- B** connect the model train to a solar panel
- C** attach the model train to a bottle rocket
- D** connect the model train to an electromagnet

This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grade 8 Item Release
Spring 2017



This page intentionally left blank.

Tennessee Comprehensive
Assessment Program TCAP
TNReady—Science
Grades 3–8 Item Release

