



Mississippi Academic Assessment Program (MAAP)

Science
Grade 5

PRACTICE TEST

The Science Grade 5 Practice Test is a useful tool for Mississippi educators to use in preparing students for the format of the Mississippi Academic Assessment Program for Science. The items were written and aligned to the 2018 Mississippi College- and Career-Readiness Standards for Science. **This document contains 25 Science grade 5 items.**

1. The data table shows information about four stars. A light-year is the distance that light travels in one year.

Star Data

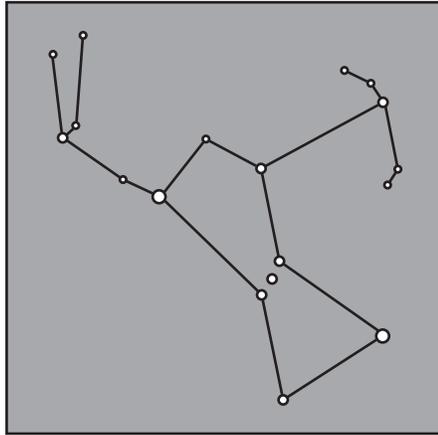
Star Name	Star Color	Temperature of Star (°C)	Distance from Earth (light-years)
Sun	yellow	6,000	<1
Vega	white	11,000	25.1
Antares	red	3,000	619.7
Rigel	blue-white	12,000	864.3

Based on these data, why does the Sun appear to be the brightest star from Earth?

- A. The Sun is a yellow star.
- B. The Sun is the hottest star.
- C. The Sun is the closest star to Earth.
- D. The Sun is the farthest star from Earth.

2. In the winter night sky above Mississippi, the constellation Orion, the hunter, can be observed. The three stars of Orion's belt are easy to identify.

Orion



Orion can be seen until May. Which statement **best** explains why Orion cannot be seen during the summer in Mississippi?

- A. The orbit of Earth on its axis shifts Orion to the daytime sky.
- B. The rotation of Earth on its axis shifts Orion to the daytime sky.
- C. The orbit of Earth around the Sun places the Sun between Earth and Orion.
- D. The rotation of Earth around the Sun places the Sun between Earth and Orion.

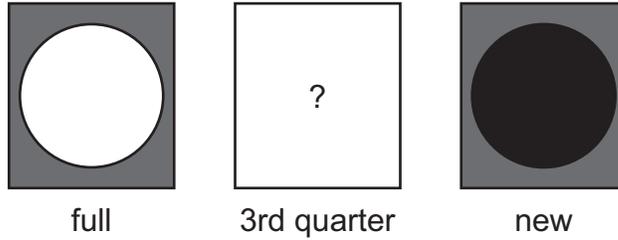
3. In the 17th century, Galileo invented a telescope that could magnify distant objects ten times. Galileo used the telescope to observe the Moon's surface. He noticed that it was covered in bumps and craters. As technology advanced, others made improvements on the telescope.

Which statement **best** supports the claim that the telescope can be used to observe objects in the sky?

- A. Galileo pointed the telescope toward the sky.
- B. Galileo invented the telescope in the 17th century.
- C. Galileo invented a telescope that could magnify distant objects.
- D. Galileo noticed that the Moon was covered in bumps and craters.

4. A student is studying three phases of the Moon.

Appearance of the Moon over Time

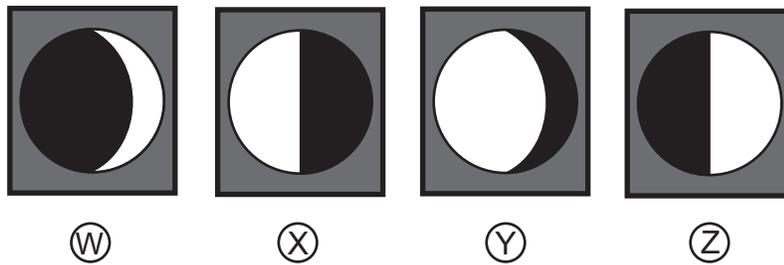
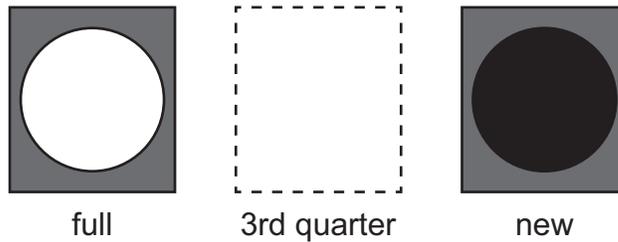


Part A: Circle a word or phrase in each set of options to explain why the Moon appears to change.

The lit portion of the Moon is becoming (larger / smaller) because the Moon is (orbiting Earth / moving closer to Earth / orbiting the Sun / moving closer to the Sun).

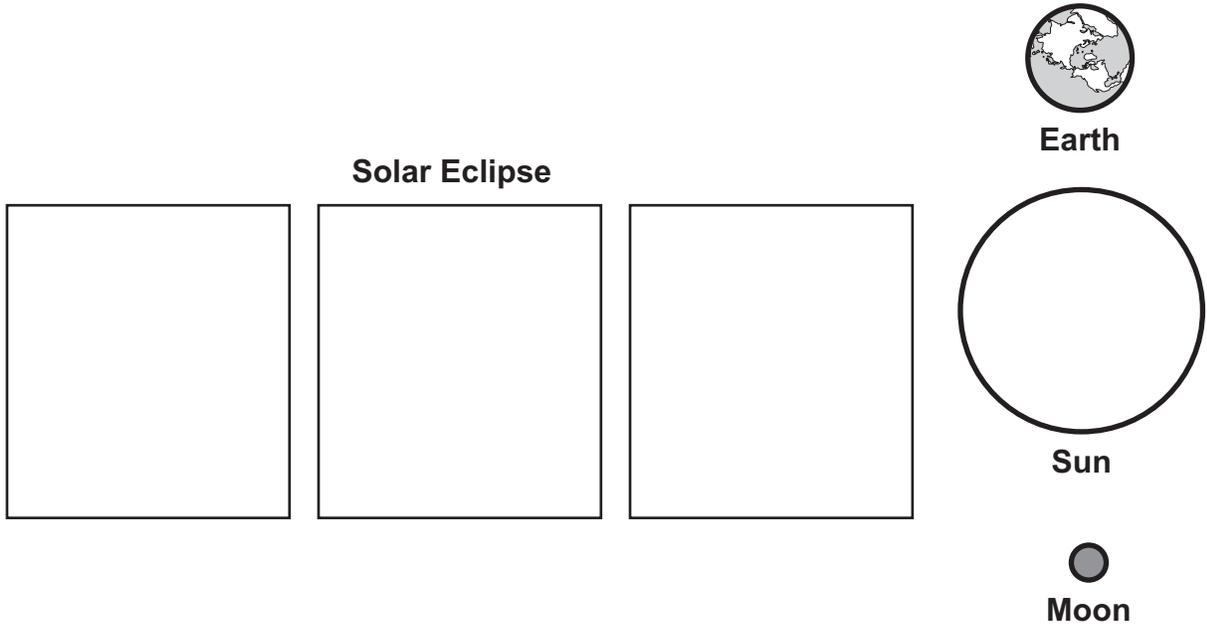
Part B: Record the letter of the Moon phase in the box that correctly completes the model.

Appearance of the Moon over Time



5. A student is developing a model to represent a solar eclipse.

Record a label in each box to show the arrangement of objects during a solar eclipse.



6. A student made a list of ideas that scientists have had over time about the solar system. Record the letter of each sentence in the correct position in the list to show the order in which the ideas were accepted by the scientific community.

1st: _____

2nd: _____

3rd: _____

Ideas

Ⓜ Earth is just one planet orbiting one star in a vast universe.

ⓧ Earth is the center of the universe.

Ⓨ The Sun is the center of the solar system.

7. A student is making a chart to show the inputs and outputs of photosynthesis in a plant.
Record the number of each label in the correct column to **best** complete the student's chart.

Photosynthesis in a Plant

Inputs	Outputs

- ① oxygen
- ② carbon dioxide
- ③ water
- ④ sugar
- ⑤ sunlight

8. A student was researching an area in a U.S. national park. The student reported the following characteristics about this ecosystem.

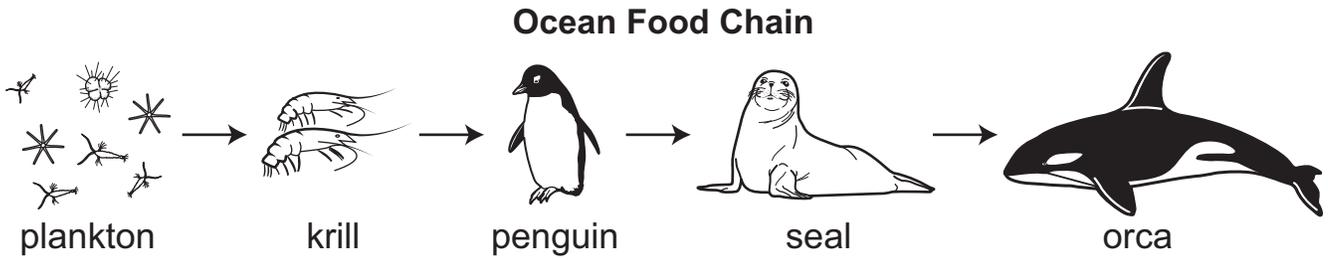
Ecosystem Characteristics

- located at a high elevation above sea level
- rocky soil with few nutrients
- long winters and short summers
- low amount of precipitation
- few plants or grasses and no trees
- animals include elk, coyotes, mountain lions, and bighorn sheep

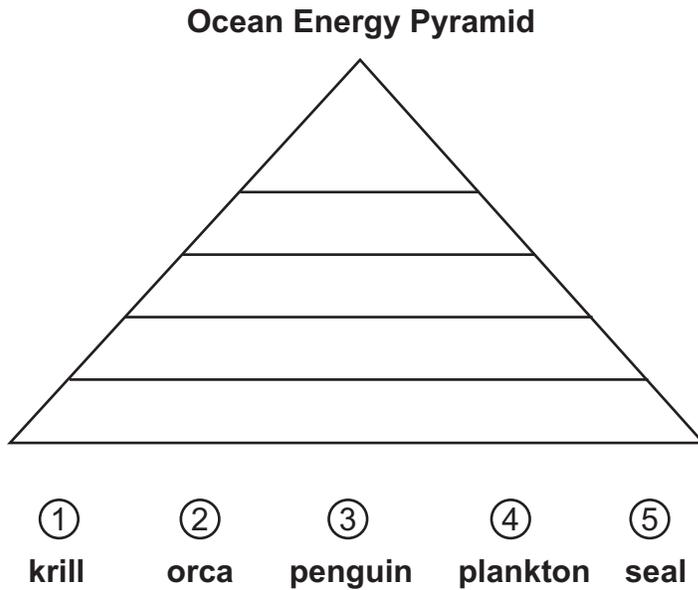
Which type of ecosystem was the student **most likely** researching?

- A. forest
- B. desert
- C. tundra
- D. grassland

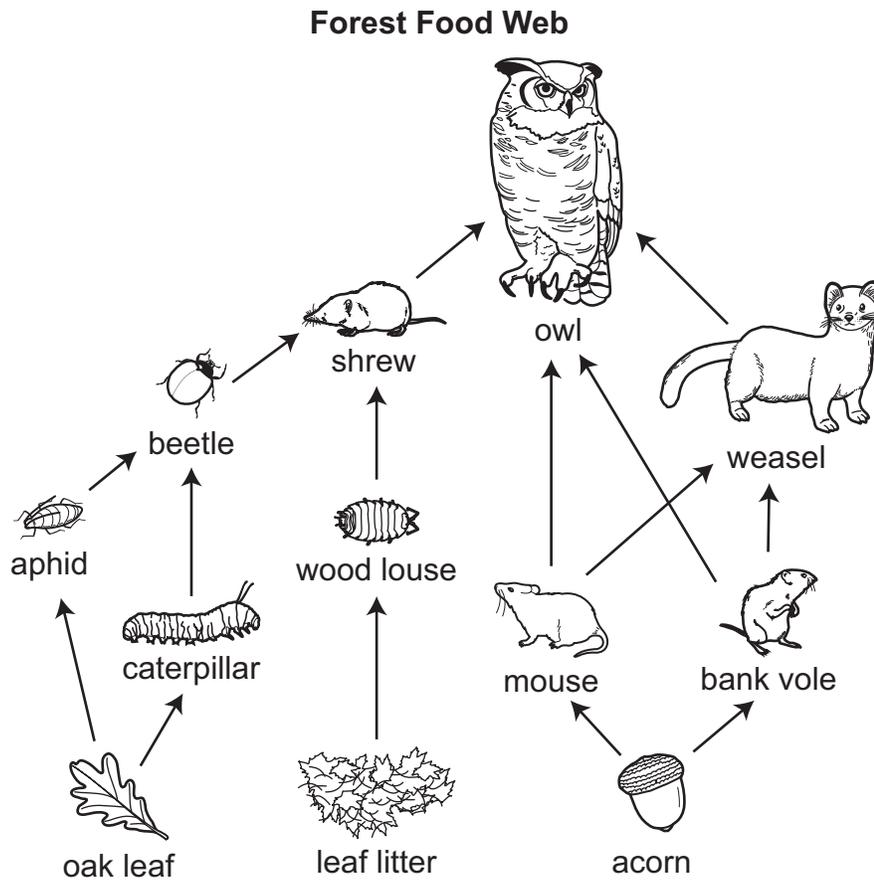
9. A student made the ocean food chain shown.



Record the number of each organism in the ocean energy pyramid to **best** represent the amount of energy available at each level.



10. The diagram shows a forest food web.



Which **two** organisms would **most likely** increase in population size if the shrew population were eliminated by disease?

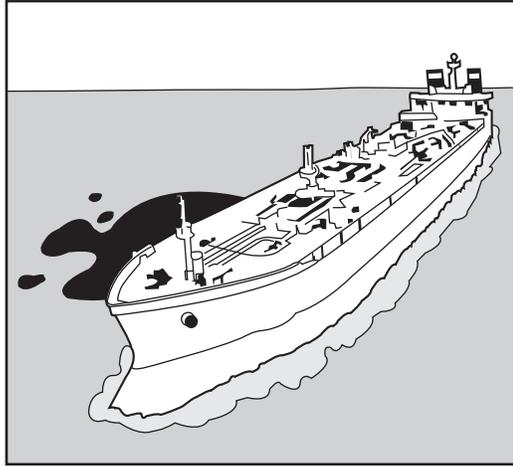
- A. owl
- B. aphid
- C. beetle
- D. caterpillar
- E. wood louse

Use the scenario to answer the next two questions.

Oil Spills

An oil spill is an example of a human-caused disaster. Effects from an oil spill can be very damaging to the environment. People on land and on the water work to contain the rust-colored oil, that endangers plant and animal wildlife.

Oil Spill in the Ocean



11. Which process is the **least** harmful way to remove oil from the water?
- A. Leave the oil alone so it can spread out naturally.
 - B. Use floating devices to enclose and collect the oil.
 - C. Light the oil on fire so it burns off the water rapidly.
 - D. Add chemicals to the water to break down the oil.

12. After an oil spill, a large number of seabirds and aquatic mammals may die.

Some Aquatic Food Web Organisms

Organism	Facts
phytoplankton	producer eaten by krill
krill	organism consumed by blue whales and fish
fish	consumer that eats krill
seagull	bird that eats fish
seal	mammal that eats fish and seagulls

Which statement describes the **most likely** effect of an oil spill on organisms in the chart?

- A. The fish population will decrease due to aquatic plants being healthier with the addition of oil.
- B. There will be an increase in the fish population because there will be fewer predators in the food web.
- C. The populations of seabirds and mammals will increase because they will have more prey to consume.
- D. There will be a decrease in the phytoplankton population because more sunlight will be able to enter the water.

13. A student researches the properties of a substance.

Substance Properties

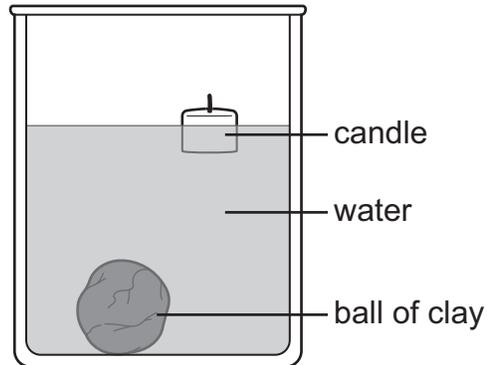
- It is transparent.
- Its temperature is 20°C.
- It fills its container.
- The filled container feels light.

Based on these properties, which statement **best** describes the substance?

- A. The substance is a liquid because it feels light.
- B. The substance is a gas because it fills its container.
- C. The substance is a gas because it is solid at 20°C.
- D. The substance is a liquid because it is transparent.

14. Students performed an investigation using a candle, a container of water, and a ball of clay. The students predicted that the ball of clay would sink.

Investigation Results



Which statement **best** explains the reason the students' prediction was correct?

- A. The ball of clay sank because it has a lower mass than the water.
- B. The ball of clay sank because it has a greater mass than the candle.
- C. The ball of clay sank because it has a lower density than the candle.
- D. The ball of clay sank because it has a greater density than the water.

15. A student mixed a tablespoon of orange-colored drink powder into a glass of water. After stirring for a few minutes, the student observed the mixture.

Which observation would **best** provide evidence that the mixture is a solution?

- A. The water became orange with nothing on the bottom of the glass.
- B. The water remained colorless with nothing on the bottom of the glass.
- C. The water became orange with some powder on the bottom of the glass.
- D. The water remained colorless with some powder on the bottom of the glass.

16. A student mixes four solutions by dissolving different amounts of a solid into water.

Making Four Solutions

Solution	Mass of Solid (grams)	Volume of Water (liters)
S	1	10
T	2	10
W	2	20
X	3	30

Using the data in the table, record the letter of the solution with the **greatest** concentration of the solid in the water.

17. A student plans to add a solid to a container of water. The student wants the solid to dissolve quickly.

Part A: Which **two** actions would help the solid dissolve the **most** quickly into the water?

- A. stirring the water after adding the solid
- B. placing a lid on the container after adding the solid
- C. placing the container with the solid and water in a dark area
- D. placing the container in a bowl of ice before adding the solid
- E. crushing the solid into smaller pieces before adding it to the water

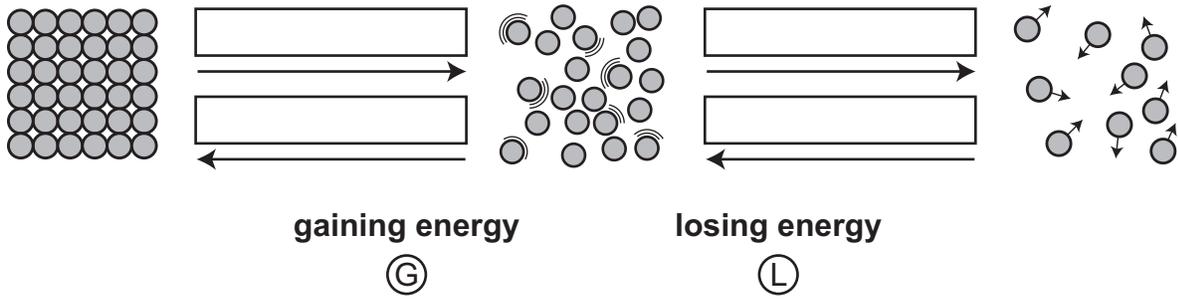
Part B: What is the dependent variable in this investigation?

- A. size of solid
- B. time to dissolve
- C. amount of water
- D. temperature of water

18. Which action is an example of a chemical change?

- A. melting ice
- B. tearing paper
- C. mowing grass
- D. baking brownies

19. Record a label in each box of the diagram to correctly identify the interactions of matter. Each label will be used **twice**.



20. A student is given four containers, each with a different material.

Making a Mixture

Container	Material	Mass of Material (grams)
1	peanuts	10
2	pretzels	5
3	crackers	12
4	popcorn	7

The student claims that these materials can be used to demonstrate the law of conservation of mass. Which statement supports the claim?

- A. The mass of the pretzels is more than the mass of the popcorn.
- B. The mass of the crackers is the same as the mass of the peanuts.
- C. The mass of the peanuts plus the mass of the crackers is the same before and after they are mixed.
- D. The mass of the peanuts minus the mass of the pretzels is less than the mass of all the ingredients combined.

21. A student studies the following data table.

Number of Moons of Two Planets

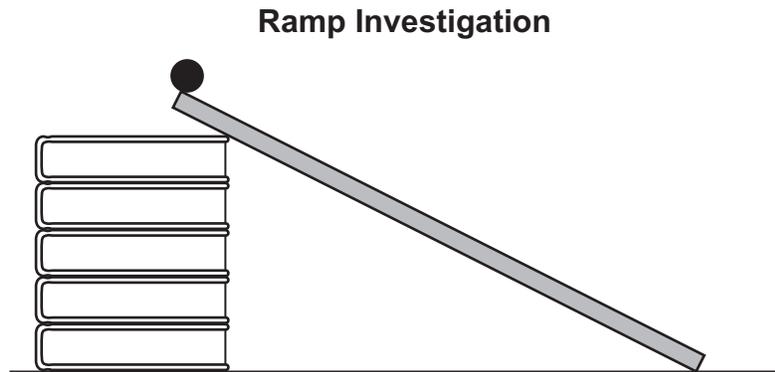
Planet	Number of Moons Orbiting Planet
1	2
2	27

Circle one word or phrase in each set of options to explain how gravity causes moons to orbit planets.

Gravity (pushes / pulls) each moon (away from / toward) the center of the planet.

Planet 1 is less massive than planet 2 and therefore has (less / more) gravity than planet 2.

22. A student conducts the first trial of an investigation using a ramp and 5 books. The student places a ball at the top of the ramp and records how long it takes the ball to roll down the ramp.

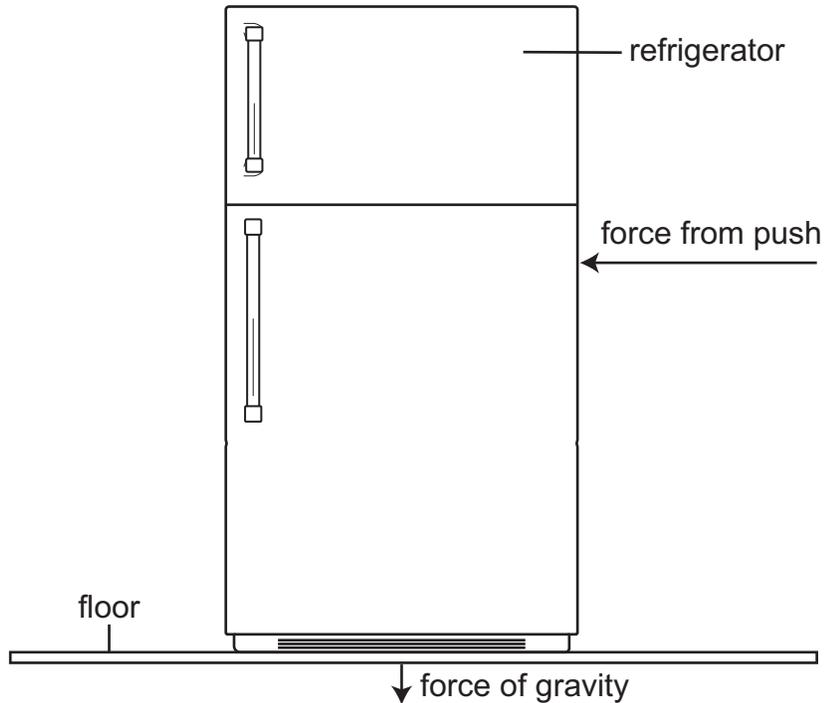


For the second trial, the student removes two books. How will removing two books **most likely** affect the motion of the ball for the second trial?

- A. The ball will travel at a slower speed.
- B. The ball will travel at a faster speed.
- C. The ball will travel at various speeds.
- D. The ball will travel at a constant speed.

23. A person is trying to move a refrigerator. The refrigerator does not move when the person uses a force to push on it. The diagram shows the forces acting on the refrigerator.

Forces Acting on a Refrigerator



Which statement explains the **most likely** reason the refrigerator does not move when pushed?

- A. A noncontact force is pulling the refrigerator toward the person.
- B. A noncontact force is acting on the person pushing the refrigerator.
- C. A contact force is pushing the refrigerator up and away from the floor.
- D. A contact force is acting in the opposite direction of the person's push.

24. Four investigations and their results are shown.

Ball Force Investigation Results

	Action	Result
Investigation 1	One student places the ball on a flat surface.	Ball does not move.
Investigation 2	One student gently pushes the ball.	Ball rolls across surface at 5 centimeters per second.
Investigation 3	Two students gently push the ball in opposite directions.	Ball does not move.
Investigation 4	Two students push the ball in opposite directions; one pushes gently, one pushes hard.	Ball moves across surface in the direction of stronger push at 2 centimeters per second.

Identify whether each investigation produced balanced or unbalanced forces by recording an "X" in each row of the table.

	Balanced Forces	Unbalanced Forces
Investigation 1		
Investigation 2		
Investigation 3		
Investigation 4		

25. The drawing shows a student stretching a rubber band.

Stretching a Rubber Band



Circle a word in each set of options to explain the energy in a rubber band.

Stretching a rubber band increases the (kinetic / potential) energy stored by that rubber band.

Once released, this energy is converted to (kinetic / potential) energy.

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Practice Test**

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

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

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	(E.5.8A.2) Use evidence to argue why the sun appears brighter than other stars.	2	Multiple Choice	C
2	(E.5.8A.3) Describe how constellations appear to move from Earth's perspective throughout the seasons (e.g., Ursa Major, Ursa Minor, and Orion).	2	Multiple Choice	C
3	(E.5.8A.4) Construct scientific arguments to support claims about the importance of astronomy in navigation and exploration, including the use of telescopes, compasses, and star charts.	2	Multiple Choice	D
4	(E.5.8B.1) Analyze and interpret data from observations and research (e.g., from NASA, NOAA, or the USGS) to explain patterns in the location, movement, and appearance of the moon throughout a month and over the course of a year.	2	Technology Enhanced	See Answer Key
5	(E.5.8B.2) Develop and use a model of the Earth-Sun-Moon system to analyze the cyclic patterns of lunar phases, solar and lunar eclipses, and seasons.	1	Technology Enhanced	See Answer Key
6	(P.5.8B.4) Obtain information and analyze how our understanding of the solar system has evolved over time (e.g., Earth-centered model of Aristotle and Ptolemy compared to the Sun-centered model of Copernicus and Galileo).	2	Technology Enhanced	See Answer Key
7	(L.5.3A.1) Research and communicate the basic process of photosynthesis that is used by plants to convert light energy into chemical energy that can be stored and released to fuel an organism's activities.	2	Technology Enhanced	See Answer Key
8	(L.5.3B.1) Obtain and evaluate scientific information regarding the characteristics of different ecosystems and the organisms they support (e.g., salt and fresh water, deserts, grasslands, forests, rain forests, or polar tundra lands).	2	Multiple Choice	C
9	(L.5.3B.2) Develop and use a food chain model to classify organisms as producers, consumers, or decomposers. Trace the energy flow to explain how each group of organisms obtains energy.	2	Technology Enhanced	See Answer Key
10	(L.5.3B.3) Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	3	Technology Enhanced	See Answer Key
11	(E.5.10.2) Design a process for better preparing communities to withstand manmade or natural disasters (e.g., removing oil from water or soil, systems that reduce the impact of floods, structures that resist hurricane forces). Use an engineering design process to define the problem, design, construct, evaluate, and improve the disaster plan.*	2	Multiple Choice	B
12	(L.5.3B.4) Communicate scientific or technical information that explains human positions in food webs and our potential impacts on these systems.	2	Multiple Choice	B
13	(P.5.5A.2) Collect, analyze, and interpret data from measurements of the physical properties of solids, liquids, and gases (e.g., volume, shape, movement, and spacing of particles).	2	Multiple Choice	B
14	(P.5.5A.4) Make and test predictions about how the density of an object affects whether the object sinks or floats when placed in a liquid.	2	Multiple Choice	D
15	(P.5.5B.1) Obtain and evaluate scientific information to describe what happens to the properties of substances in mixtures and solutions.	2	Multiple Choice	A

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Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
16	(P.5.5B.2) Analyze and interpret data to communicate that the concentration of a solution is determined by the relative amount of solute versus solvent in various mixtures.	2	Technology Enhanced	See Answer Key
17	(P.5.5B.3) Investigate how different variables (e.g., temperature change, stirring, particle size, or surface area) affect the rate at which a solute will dissolve.	2	Technology Enhanced	See Answer Key
18	(P.5.5C.1) Analyze and communicate the results of chemical changes that result in the formation of new materials (e.g., decaying, burning, rusting, or cooking).	1	Multiple Choice	D
19	(P.5.5C.2) Analyze and communicate the results of physical changes to a substance that results in a reversible change (e.g., changes in states of matter with the addition or removal of energy, changes in size or shape, or combining/separating mixtures or solutions).	2	Technology Enhanced	See Answer Key
20	(P.5.5C.3) Analyze and interpret data to support claims that when two substances are mixed, the total weight of matter is conserved.	2	Multiple Choice	C
21	(P.5.6.1) Obtain and communicate information describing gravity's effect on an object.	2	Technology Enhanced	See Answer Key
22	(P.5.6.2) Predict the future motion of various objects based on past observation and measurement of position, direction, and speed.	2	Multiple Choice	A
23	(P.5.6.3) Develop and use models to explain how the amount or type of force, both contact and non-contact, affects the motion of an object.	2	Multiple Choice	D
24	(P.5.6.4) Plan and conduct scientific investigations to test the effects of balanced and unbalanced forces on the speed and/or direction of objects in motion.	2	Technology Enhanced	See Answer Key
25	(P.5.6.5) Predict how a change of force, mass, and/or friction affects the motion of an object to convert potential energy into kinetic energy.	2	Technology Enhanced	See Answer Key

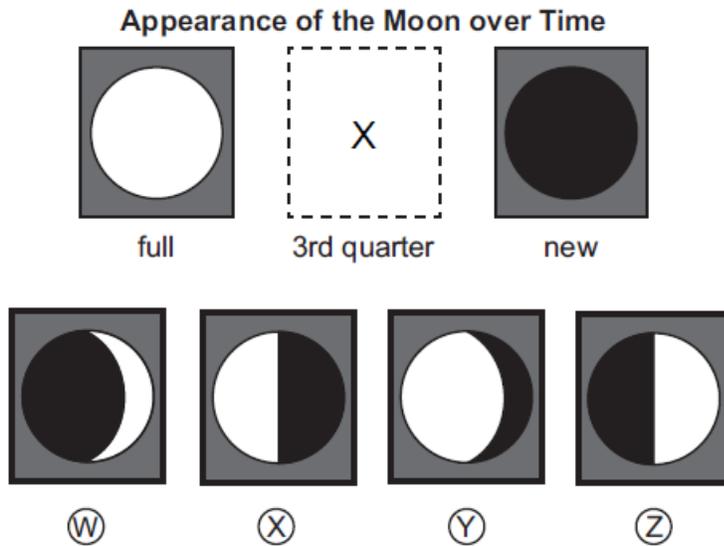
Mississippi Academic Assessment Program
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 Practice Test
 Technology Enhanced Items
 Answer Key

Item #4

Part A: Circle a word or phrase in each set of options to explain why the Moon appears to change.

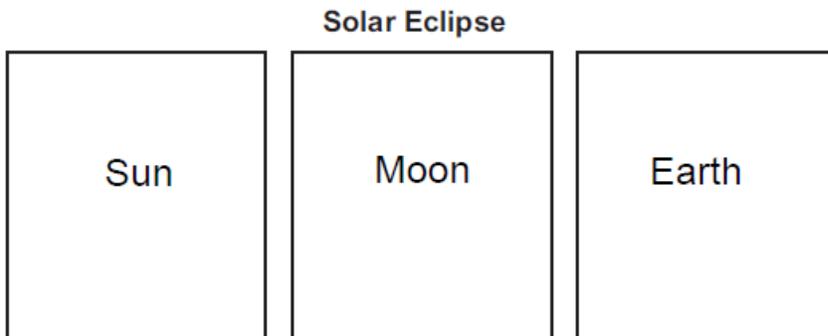
The lit portion of the Moon is becoming (larger / smaller) because the Moon is (orbiting Earth / moving closer to Earth / orbiting the Sun / moving closer to the Sun).

Part B: Record the letter of the Moon phase in the box that correctly completes the model.



Item #5

Left to Right



or Earth, Moon, Sun

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Technology Enhanced Items
Answer Key**

Item #6

1st: X _____

2nd: Y _____

3rd: W _____

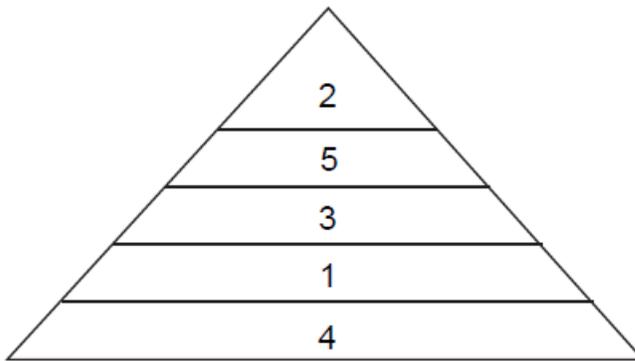
Item #7

Photosynthesis in a Plant

Inputs	Outputs
2, 3, 5	1, 4

Item #9

Ocean Energy Pyramid



- ① krill ② orca ③ penguin ④ plankton ⑤ seal

Item #10

C, E

**Mississippi Academic Assessment Program
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Technology Enhanced Items
Answer Key**

Item #24

	Balanced Forces	Unbalanced Forces
Investigation 1	X	
Investigation 2		X
Investigation 3	X	
Investigation 4		X

Item #25

Stretching a rubber band increases the (kinetic / potential) energy stored by that rubber band.
Once released, this energy is converted to (kinetic / potential) energy.