



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.

Use the scenario to answer the next two questions.

Moon Phases

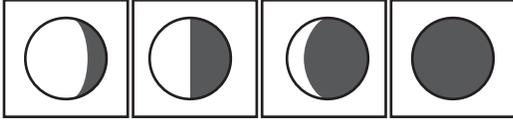
Look into the sky on a clear night and you may be able to observe the Moon, or part of it, lit up by the Sun. People can keep track of the Moon's appearance from Earth in lunar calendars. This makes it easy to see how the appearance of the Moon changes over time. A student made the following lunar calendar for 16 days, but it was cloudy on several nights.

Partial Lunar Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 	2 	3 	4 	5	6 
7	8 	9 	10 	11	12 	13 
14 	15 	16				

1. A student is studying the partial lunar calendar. Which sequence of moon phases correctly represents the pattern in the appearance of the moon and completes the calendar?

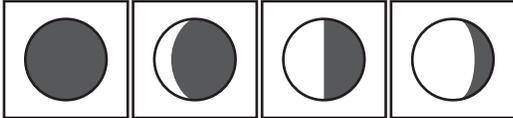
A. day 5 day 7 day 11 day 16



B. day 5 day 7 day 11 day 16



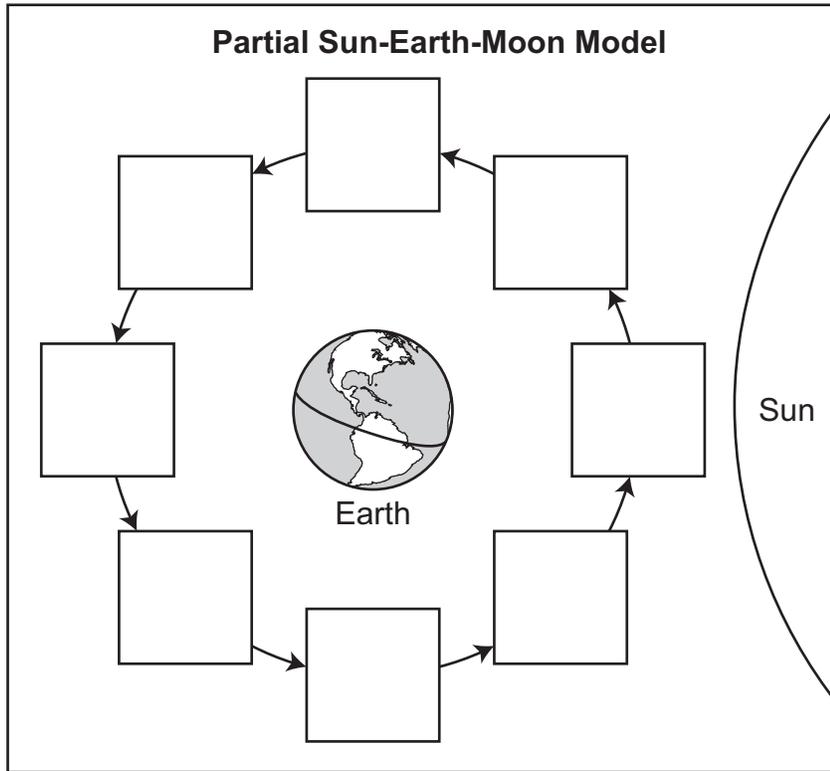
C. day 5 day 7 day 11 day 16



D. day 5 day 7 day 11 day 16



2. The diagram shows a partial Sun-Earth-Moon system. The boxes represent the position of the moon at different times. Select the position on the model that represents the day 1 moon phase.



3. A student is identifying properties of chemical particles by using the chart below. Complete the chart by selecting boxes to identify each property as a description of an atom, a molecule, or both.

Properties of Particles

	Atom	Molecule
particles held together by bonding		
smallest particle of an element with properties of that element		
composed of more than one particle		

4. A student is making a data table to represent the outer planets of the solar system.

Part A: Write the information into the correct position in the data table.

Outer Planet Information

Planet	Distance from Sun (millions of km)
Jupiter	
	1,427.0

Uranus	Neptune	Saturn
2,871.0	778.3	4,497.1

Part B: Circle two words that correctly identify properties of these planets.

rocky

gaseous

large

small

5. The table shows data about different stars.

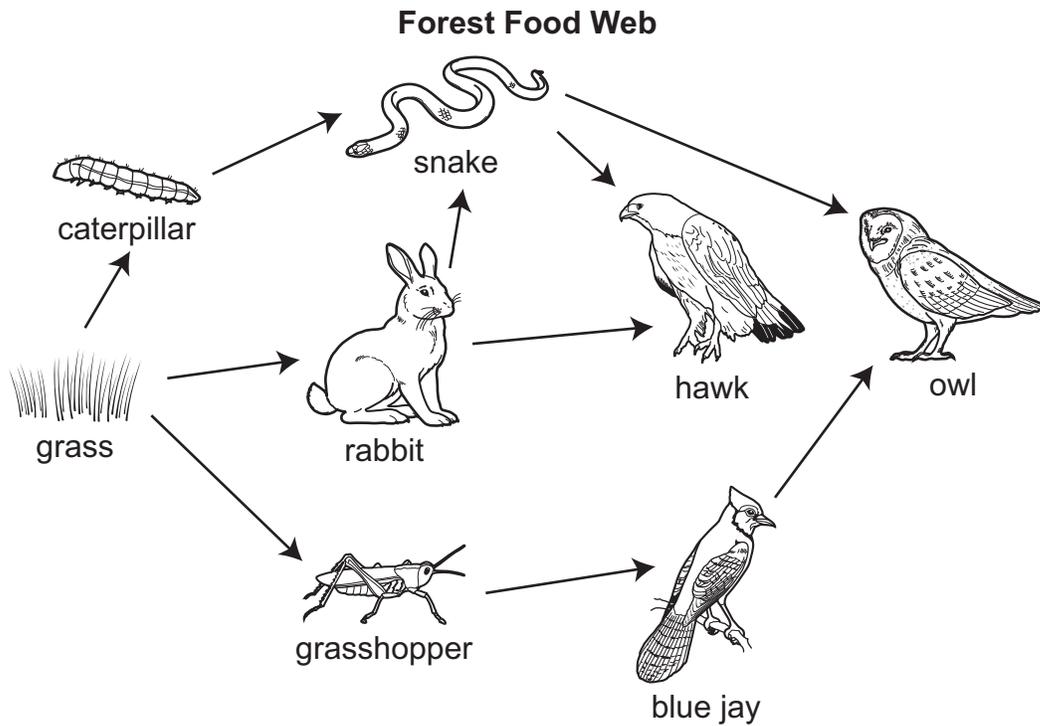
Star Data

Star Name	Distance from Earth (light-years)	Distance across Star (million km)	Apparent Brightness Rank (1 = brightest)
Vega	25	4	3
Polaris	434	70	4
Arcturus	37	36	2
Sun	<1	1.4	1

Circle one word or phrase in each set of parentheses to explain a reason for the brightness data shown.

The Sun appears (dimmer / brighter) than the other stars because it is (closer to Earth / farther from Earth / larger / smaller) than the other stars.

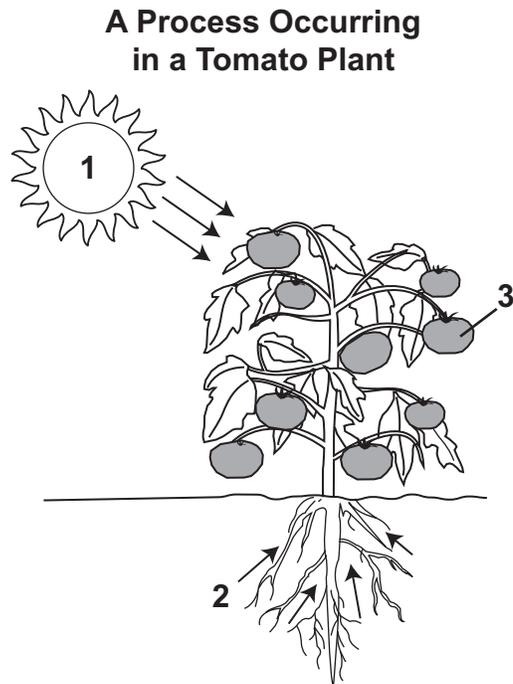
6. A forest food web is shown.



Which statement identifies the **most likely** outcome if the rabbit population suddenly reduced?

- A. Owls would become extinct because they have no food.
- B. Snakes would have less food available so their population would decrease.
- C. Grasshoppers would have less food available so their population would decrease.
- D. Grasses in the area would die and all of the animals would have to move to another area to survive.

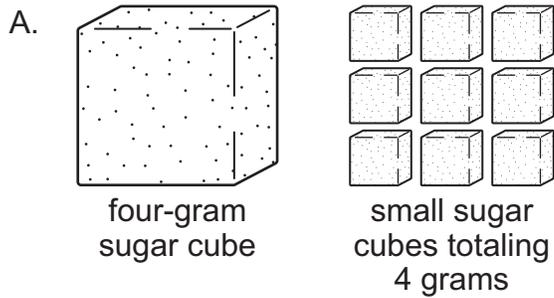
7. The model shows a process that occurs in a tomato plant.



Which labels correctly complete the model to help describe this process?

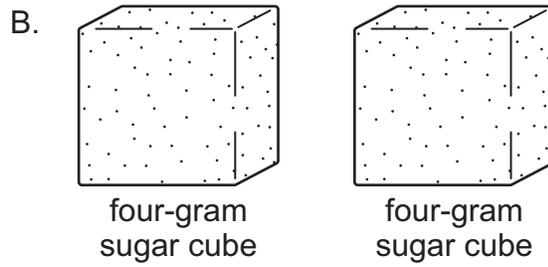
- A.** 1. water
2. sunlight
3. stored energy
- B.** 1. sunlight
2. stored energy
3. water
- C.** 1. sunlight
2. water
3. stored energy
- D.** 1. stored energy
2. water
3. sunlight

8. A student wants to investigate how surface area affects the time it takes sugar to dissolve. Which setup allows for a fair test of this variable?



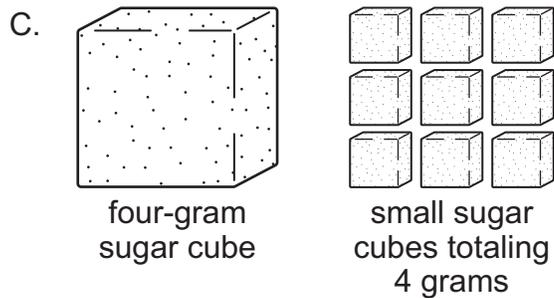
Plan

Place each sugar cube setup in beakers of the same size, with the same amount of water at 20°C.



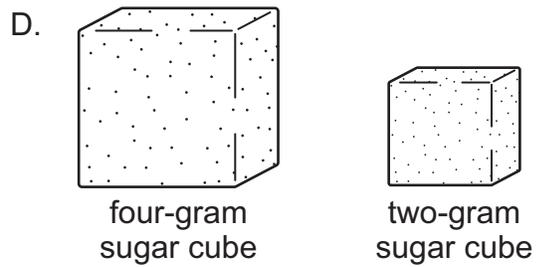
Plan

Place each sugar cube setup in beakers of the same size, with different amounts of water at 20°C.



Plan

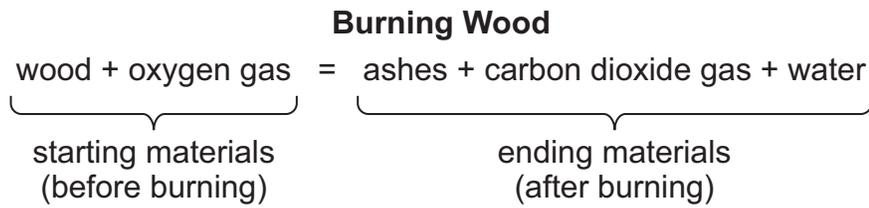
Place each sugar cube setup in beakers of the same size, with the same amount of water, one at 20°C and the other at 5°C.



Plan

Place each sugar cube setup in beakers of same size, with the same amount of water at 20°C.

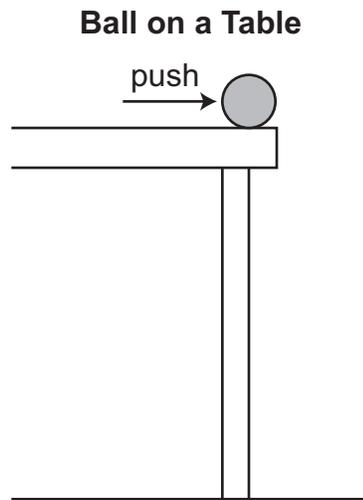
9. The diagram shows what happens when wood is burned.



Which statement **best** explains the change that occurs when wood is burned?

- A. This is a physical change because the products can be changed back into wood.
- B. This is a physical change because the products are different from the starting materials.
- C. This is a chemical change because the products can be changed back into wood.
- D. This is a chemical change because the products are different from the starting materials.

10. A student is going to push a ball off a table.



Which statement **best** predicts how the energy of the ball will change immediately after the push?

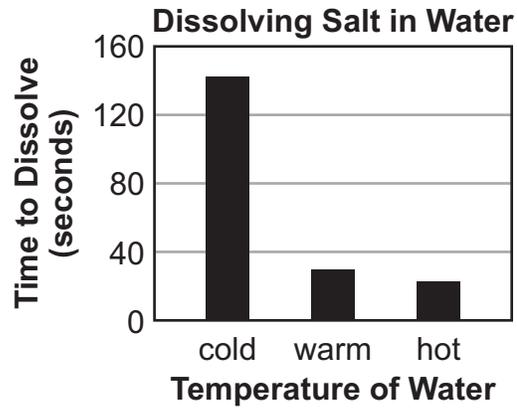
- A. Both potential energy and kinetic energy will increase.
- B. Both potential energy and kinetic energy will decrease.
- C. Potential energy will decrease, and kinetic energy will increase.
- D. Potential energy will increase, and kinetic energy will decrease.

Use the scenario to answer the next two questions.

Making Solutions

Solutions are mixtures that are very common in our daily lives. A solution is composed of a solute and a solvent.

A student conducted an investigation using 50 milliliters of distilled water and 5 grams of table salt. The water for each test was brought to a certain temperature before the salt was added. The data from the investigation are shown in the graph.



11. Which conclusion **best** describes the data in the graph?

- A. Increasing the amount of solvent increases the temperature of a solution.
- B. Increasing the temperature of the solute increases the amount of the solution.
- C. The amount of solute in a solution determines the time needed for the solute to dissolve in the solvent.
- D. A decrease in the temperature of a solvent increases the time needed for a solute to dissolve in a solvent.

12. The diagram below represents the saltwater solution made by the student. When salt (NaCl) molecules are added to water (H_2O), they break into one sodium (Na) particle and one chlorine (Cl) particle.

Write the name of the water molecule (H_2O) or the salt molecule (NaCl) into each of the three empty boxes to identify their roles in the solution.

Saltwater Solution

Key

	H_2O
	NaCl

solvent solute adding this substance decreases the concentration of the solution

13. Students list ways people at their school can reduce landfill waste.

Ways to Reduce Landfill Waste at Our School

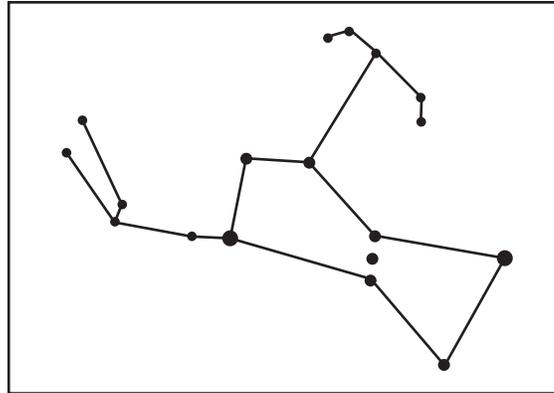
- serve lunches on reusable plates
- turn in some homework using email
- copy worksheets on both sides of paper
- replace paper towels with hand dryers

Which other idea would **most likely** be included on this list?

- A. remove trash cans from hallways
- B. turn off lights when leaving a room
- C. replace old textbooks with newer ones
- D. add recycle bins for paper in classrooms

14. From November to February, the constellation Orion is clearly visible in the night sky from Mississippi. Orion appears to rise from the east and set in the west. The stars do not actually move through the sky. They appear to change positions due to the Earth's movement.

Orion in November

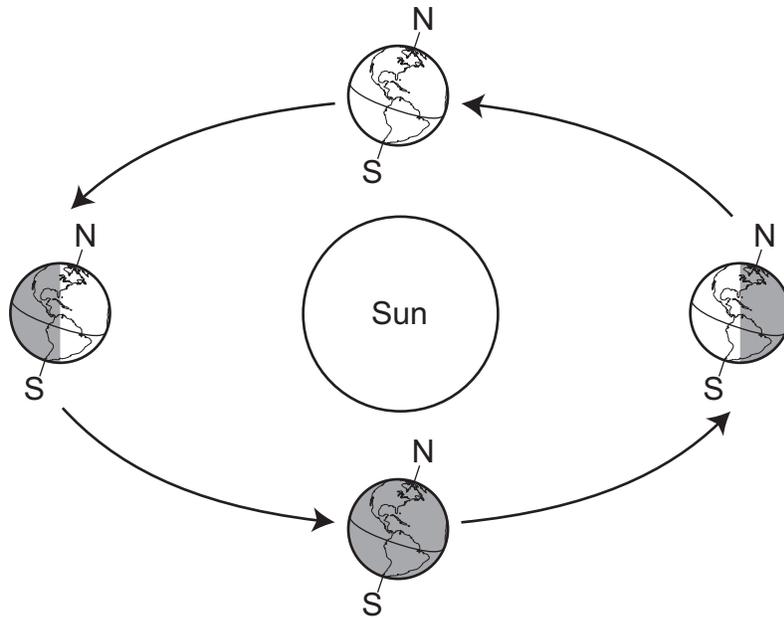


What factor is responsible for the changes in Orion's position when viewed during the winter months?

- A. the rotation of the Sun
- B. the rotation of Earth on its axis
- C. the revolution of the Sun around the Earth
- D. the revolution of the moon around the Sun

15. The model shows the position of Earth around the Sun at different times.

Part A: Circle the position of Earth that represents summer in the Northern Hemisphere.



Part B: Complete the chart by marking **three** factors that can be observed in this model to help understand seasons.

	Helps Understand Seasons
distance between Earth and Sun	
tilt of Earth on its axis	
location of Earth in its orbit	
amount of heat produced by the Sun	
angle of sunlight reaching the surface of Earth	
speed of Earth in its orbit	

16. The chart below shows environmental characteristics of four ecosystems.

Ecosystem Characteristics

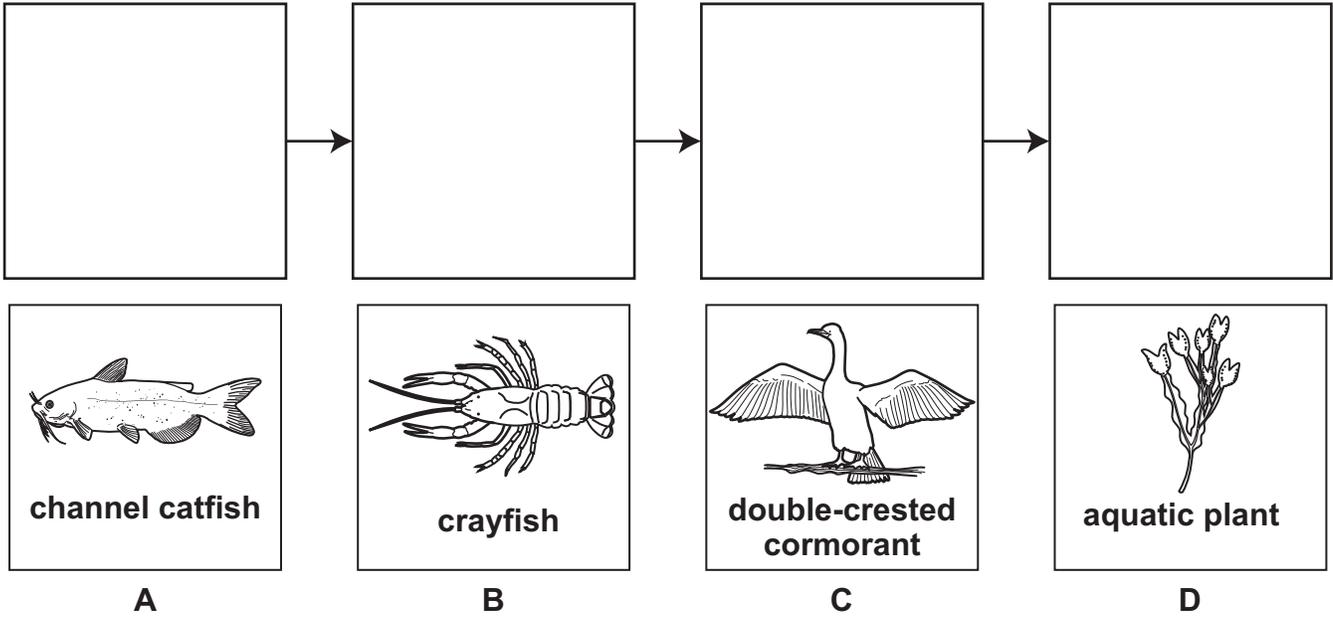
Ecosystem	Temperature	Water	Sunlight
desert	hot during the day, cold at night	dry, with occasional brief rainfall	abundant
tropical rainforest	hot and humid	large amounts of frequent rain	abundant on the tree canopy with a decreased amount on the forest floor
lakes and ponds	cold to warm (depending on location)	freshwater	abundant near the surface, decreasing with depth
polar tundra	cold	dry, frozen	varies throughout the year

Which statement accurately describes the vegetation or animals that would be **best** supported by the ecosystem?

- A. The desert would support animals that need to remain cool.
- B. The pond would support animals that can survive in saltwater environments.
- C. The tropical rainforest would support plants that are tall and have thin needles.
- D. The polar tundra would support plants that are small and grow close to the ground.

17. **Part A:** Write the letter below each organism in the boxes to complete the food chain.

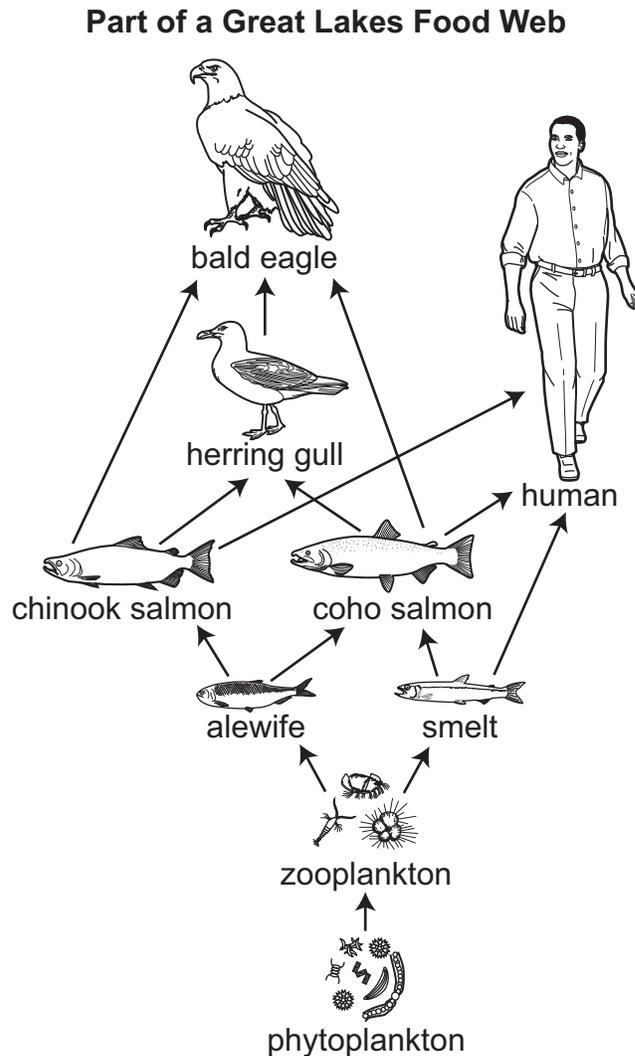
Channel Catfish Food Chain



Part B: Complete the chart by classifying each organism as a producer or as a consumer.

	Producer	Consumer
channel catfish		
crayfish		
double-crested cormorant		
aquatic plant		

18. The diagram shows part of a food web in a Great Lakes ecosystem.



Which statement **best** describes an effect of humans on this food web?

- A. The population of bald eagles may be reduced by humans consuming too many smelt.
- B. Competition among humans, alewife, and smelt decreases food availability for bald eagles.
- C. Humans decrease the populations of phytoplankton and zooplankton by consuming chinook salmon.
- D. Human consumption of coho salmon and chinook salmon may reduce food sources for herring gulls.

19. Students observe a demonstration by their teacher. The teacher places a thermometer and ice water in a beaker and slowly heats the beaker on a hot plate. The students know that water freezes at 0°C and boils at 100°C . At three different times, the teacher reads the temperature on the thermometer while the students describe the spacing and motion of the particles in the beaker.

Which data table correctly represents the spacing and motion of the particles at each temperature?

A.

Temperature ($^{\circ}\text{C}$)	Spacing of Particles	Motion of Particles
20	very far apart	very slow
50	close together	slow
80	very close together	very fast

B.

Temperature ($^{\circ}\text{C}$)	Spacing of Particles	Motion of Particles
20	very close together	very slow
50	close together	slow
80	very far apart	very fast

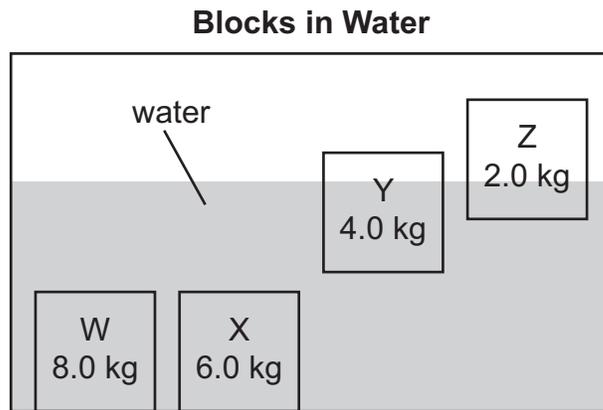
C.

Temperature ($^{\circ}\text{C}$)	Spacing of Particles	Motion of Particles
20	very far apart	very fast
50	close together	slow
80	very close together	very slow

D.

Temperature ($^{\circ}\text{C}$)	Spacing of Particles	Motion of Particles
20	very close together	very fast
50	close together	slow
80	very far apart	very slow

20. The diagram shows four blocks of the same size in a water tank. Block Y has the same density as the water.



Four additional blocks are being added to the water as detailed in the table below. The table lists the masses of the additional blocks, which are the same size as blocks W, X, Y, and Z. Complete the chart by marking whether each block will sink or float.

Block	Mass	Sink	Float
J	1 kg		
K	3 kg		
L	5 kg		
M	7 kg		

21. A group of students was challenged to construct a boat that could transport 10 milliliters (13.38 grams) of corn syrup across a small, plastic swimming pool.

Which question will **best** help the students design their boat?

- A. What is the mass of the boat and the corn syrup?
- B. What force is needed to push the boat across the length of the pool?
- C. What boat shape is needed to lower the density of the boat and the corn syrup?
- D. What is the distance from one point of the pool to the point on the exact opposite side?

22. Which process would be the **best** way to increase the concentration in a solution of sugar and water?
- A. Decrease the amount of sugar, and increase the amount of water.
 - B. Increase the amount of sugar, and keep the amount of water constant.
 - C. Decrease the amount of sugar, and decrease the amount of water.
 - D. Increase the amount of water, and keep the amount of sugar constant.

23. A student needs to separate a mixture composed of iron filings and sand. How can the student **most** easily separate all the iron filings from the mixture?
- A. Use a magnet to attract the iron filings.
 - B. Use filter paper to isolate the iron filings.
 - C. Add water to the mixture and pour off the floating iron filings.
 - D. Add water to the mixture and allow it to evaporate and leave behind the iron filings.

24. A student is conducting an investigation using an electric fan and a ping-pong ball. A ping-pong ball is hollow and made of light-weight plastic.

Investigation Procedure

1. Place a ping-pong ball on the ground in front of an electric fan.
2. Turn the fan on to its lowest setting.
3. Measure the total distance the ping-pong ball travels.
4. Repeat for trials 2 and 3.
5. Repeat steps 1–4 with the fan on a medium setting, and then repeat again with the fan on its highest setting.

The student has completed the investigation with using the fan’s low and medium settings. These data are shown in the table.

Trial	Distance Traveled with Fan Set to Low (cm)	Distance Traveled with Fan Set to Medium (cm)	Distance Traveled with Fan Set to High (cm)
1	20	32	?
2	19	35	?
3	18	34	?

Based on the collected data, which set of data **best** predicts the distances, in centimeters, the ping-pong ball will travel with the fan set to high?

- A. 10, 11, 13
- B. 25, 27, 26
- C. 37, 35, 38
- D. 44, 47, 42

25. Two students are discussing different ways to move a wagon filled with bricks.

Part A: Circle **one** claim that explains the forces that cause the wagon to move.

Claim

A balanced force is needed to move the wagon.

An unbalanced force is needed to move the wagon.

Part B: Select **one** plan that will result in the **most** motion of the wagon.

Plan

One student pulls the wagon forward while the other student pushes sideways on the wagon.

One student pulls the wagon forward while the other student pushes the wagon in the opposite direction.

One student pushes the wagon forward while the other student pulls the wagon forward.

One student pushes the wagon forward while the other student pulls the wagon upward from the back of the wagon.

**Mississippi Academic Assessment Program
Science**

Grade 5

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 the items that will appear in administrations starting in Spring 2019.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	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	Multiple Choice	A
2	E.5.8B.2 Develop and use a model of the Earth-Sun-Moon system to analyze the cyclic patterns of lunar phases, solar and lunar eclipses, and seasons.	2	Technology Enhanced	See Answer Key
3	P.5.5A.1 Obtain and evaluate scientific information to describe basic physical properties of atoms and molecules.	2	Technology Enhanced	See Answer Key
4	E.5.8A.1 Develop and use scaled models of Earth's solar system to demonstrate the size, composition (i.e., rock or gas), location, and order of the planets as they orbit the Sun.	1	Technology Enhanced	See Answer Key
5	E.5.8A.2 Use evidence to argue why the sun appears brighter than other stars.	2	Technology Enhanced	See Answer
6	L.5.3B.3 Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	2	Multiple Choice	B
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	Multiple Choice	C
8	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.	3	Multiple Choice	A
9	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).	2	Multiple Choice	D
10	P.5.6.5 Predict how a change of force, mass, and/or friction affects the motion of an object to convert potential energy into kinetic energy.	2	Multiple Choice	C

**Mississippi Academic Assessment Program
Science**

Grade 5

Practice Test

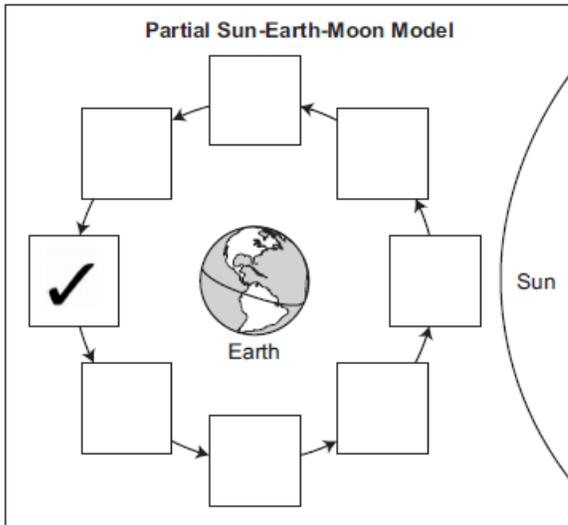
The information for each item, including the performance objective, DOK level, item type, and correct answer, is located in this document. The items appear in the order as shown in the table.

Note: The item types are representative of items that will appear in administrations starting in Spring 2019.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
11	(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	Multiple Choice	D
12	(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.	3	TE	See Answer Key
13	(E.5.10.1) Collect and organize scientific ideas that individuals and communities can use to conserve Earth's natural resources and systems (e.g., implementing watershed management practices to conserve water resources, utilizing no-till farming to improve soil fertility, reducing emissions to abate air pollution, or recycling to reduce landfill waste).	2	Multiple Choice	D
14	(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).	3	Multiple Choice	B
15	(E.5.8B.3) Develop and use models to explain the factors (e.g., tilt, revolution, and angle of sunlight) that result in Earth's seasonal changes.	3	Technology Enhanced	See Answer Key
16	(L.5.3B.1) Obtain and evaluate scientific information regarding the characteristics of different ecosystems and the organisms they support (e.g., salt and fresh water, deserts, grasslands, forests, rain forests, or polar tundra lands).	3	Multiple Choice	D
17	(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
18	(L.5.3B.3) Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	2	Multiple Choice	D
19	(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
20	(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	Technology Enhanced	See Answer Key
21	(P.5.5A.5) Design a vessel that can safely transport a dense substance (e.g., syrup, coins, marbles) through water at various distances and under variable conditions. Use an engineering design process to define the problem, design, construct, evaluate, and improve the vessel.*	3	Multiple Choice	C
22	(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	Multiple Choice	B
23	(P.5.5B.4) Design an effective system (e.g., sifting, filtration, evaporation, magnetic attraction, or floatation) for separating various mixtures. Use an engineering design process to define the problem, design, construct, evaluate, and improve the system.*	2	Multiple Choice	A
24	(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	D
25	(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

Answer Key

Item Number 2



Item Number 3

Properties of Particles

	Atom	Molecule
particles held together by bonding		✓
smallest particle of an element with properties of that element	✓	
composed of more than one particle	✓	✓

or

Properties of Particles

	Atom	Molecule
particles held together by bonding		✓
smallest particle of an element with properties of that element	✓	
composed of more than one particle		✓

Note: A molecule is composed of more than one particle, so this is a correct answer for this chart. However, this statement could also apply to an atom if the student understands that atoms are composed of particles called protons, neutrons, and electrons. Knowing the particles that compose an atom is not required for this performance objective but could be considered a correct answer.

Item Number 4

Part A: Write the information into the correct position in the data table.

Outer Planet Information

Planet	Distance from Sun (millions of km)
Jupiter	778.3
	1,427.0
	2,871.0
	4,497.1

Uranus	Neptune	Saturn
2,871.0	778.3	4,497.1

Part B: Circle two words that correctly identify properties of these planets.

- rocky
- gaseous
- large
- small

Item Number 5

The Sun appears (dimmer / brighter) than the other stars because it is (closer to Earth / farther from Earth / larger / smaller) than the other stars.

Item Number 12

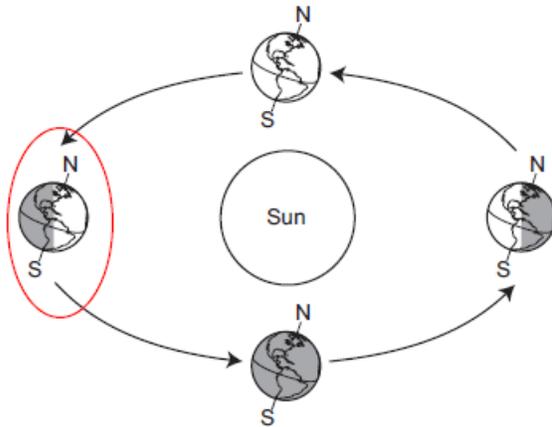
Saltwater Solution

H_2O	$NaCl$	H_2O
solvent	solute	adding this substance decreases the concentration of the solution

Item Number 15

The model shows the position of Earth around the Sun at different times.

Part A: Circle the position of Earth that represents summer in the Northern Hemisphere.



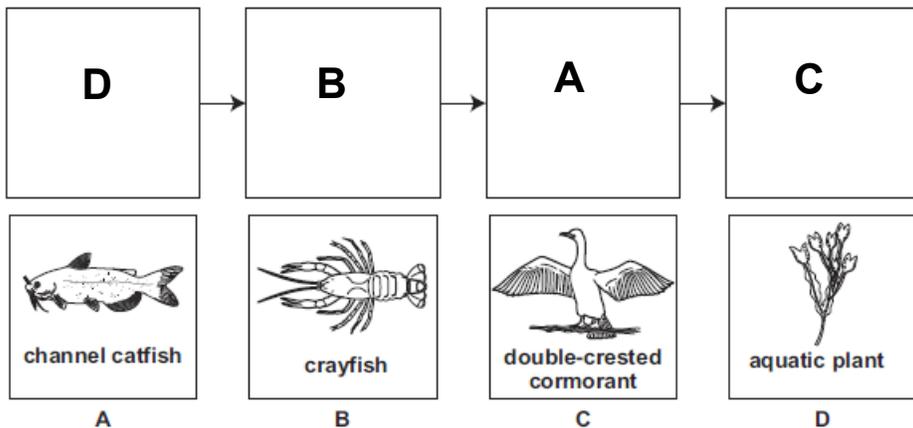
Part B: Complete the chart by marking three factors that can be observed in this model to help understand seasons.

	Helps Understand Seasons
distance between Earth and Sun	
tilt of Earth on its axis	✓
location of Earth in its orbit	✓
amount of heat produced by the Sun	
angle of sunlight reaching the surface of Earth	✓
speed of Earth in its orbit	

Item Number 17

Part A: Write the letter below each organism in the boxes to complete the food chain.

Channel Catfish Food Chain



Part B: Complete the chart by classifying each organism as a producer or as a consumer.

	Producer	Consumer
channel catfish		✓
crayfish		✓
double-crested cormorant		✓
aquatic plant	✓	

Item Number 20

Block	Mass	Sink	Float
J	1 kg		✓
K	3 kg		✓
L	5 kg	✓	
M	7 kg	✓	

Item Number 25

Part A: Circle one claim that explains the forces that cause the wagon to move.

Claim

A balanced force is needed to move the wagon.

An unbalanced force is needed to move the wagon.

Part B: Select one plan that will result in the most motion of the wagon.

Plan

One student pulls the wagon forward while the other student pushes sideways on the wagon.

One student pulls the wagon forward while the other student pushes the wagon in the opposite direction.

One student pushes the wagon forward while the other student pulls the wagon forward.

One student pushes the wagon forward while the other student pulls the wagon upward from the back of the wagon.

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**Science
Practice Test**

Grade 5



**Data Recognition Corporation
13490 Bass Lake Road
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