MISSISSIPPI DEPARTMENT OF EDUCATION

Ensuring a bright future for every child

Mississippi Academic Assessment Program (MAAP)

Science
Grade 5

PRACTICE TEST
Version 2
3/13/23

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.**

Items updated on March 13, 2023
Item 3
Item 11
Item 15
Item 21

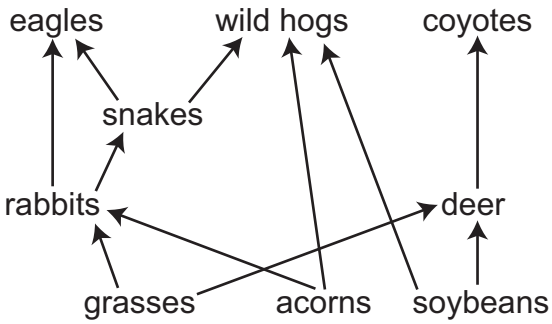
Use the scenario to answer the next two questions.

Wild Hogs

In 1530, Spanish explorer Hernando de Soto traveled through what is now 14 different states, including Mississippi. The explorer brought along pigs (hogs) as a food source. Throughout the 3,100-mile journey, some of the hogs escaped into the wild. These hogs were previously not part of the Mississippi ecosystem and became known as wild hogs. They are classified as an invasive species and cause large amounts of damage to the ecosystem throughout the Southeast to this day. They use their tusks and hoofs to search for food, which destroys plant life. Wild hogs are omnivores, which means they eat both producers and consumers. There is very little that wild hogs will not eat.

The model shows the position of wild hogs in a Mississippi food web.

Mississippi Food Web



Humans have made attempts to reduce the numbers of wild hogs. Some methods include using fencing to keep wild hogs out of livestock areas, trapping, and hunting with dogs.

1. Which statement describes the **most likely** effect of successful efforts by humans to reduce the number of wild hogs in an area?

A. Certain animal populations will become extinct.

B. New animal species will move into the ecosystem.

C. Different types of predators will keep wild hogs from returning.

D. Plant species will grow where they were destroyed by wild hogs.

2. Based on the food web, which **three** reasons explain why wild hogs are harmful to the ecosystem in Mississippi?

A. Wild hogs eat soybeans, which are an important crop.

B. Wild hogs eat all the other consumers in the ecosystem.

C. Rabbits and eagles must compete with wild hogs for food.

D. Eagles are an endangered species and are not able to eat wild hogs.

E. Wild hogs have no natural predators and therefore become overpopulated.

3. Workers at a warehouse use a steep ramp to help them move large boxes out of a truck. The ramp is made of painted wood. Workers can slip and fall if the ramp gets wet. A worker at the warehouse would like to decrease the chances of slipping while using the ramp.

The worker researches four different materials that could be added to the surface of the ramp. The table shows the possible material types and a description of each material.

Possible Materials for the Ramp

Material Type	Material Description
heavy-duty sandpaper	• Increases the amount of friction • Cannot get wet or be used outside
ridged carpeting	• Increases the amount of friction • Can get wet and be used outside
plastic sheeting	• Decreases the amount of friction • Can get wet and be used outside
paint with sand	• Increases the amount of friction if dry • Can get wet and be used outside

Part A: Which material should the worker **most likely** add to the surface of the ramp?

A. heavy-duty sandpaper

B. ridged carpeting

C. plastic sheeting

D. paint with sand

Part B: Which sentence **best** explains the reason for the material selected in part A?

A. It keeps friction constant and can be used outside.

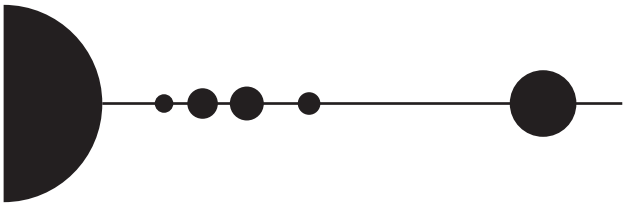
B. It keeps friction constant and can be used inside.

C. It increases friction and can be used in wet locations.

D. It decreases friction and can be used in wet locations.

4. A student made a model of the five planets that are closest to the Sun. The student needs to add more information to the model.

Solar System Model



Which two steps should the student perform next?

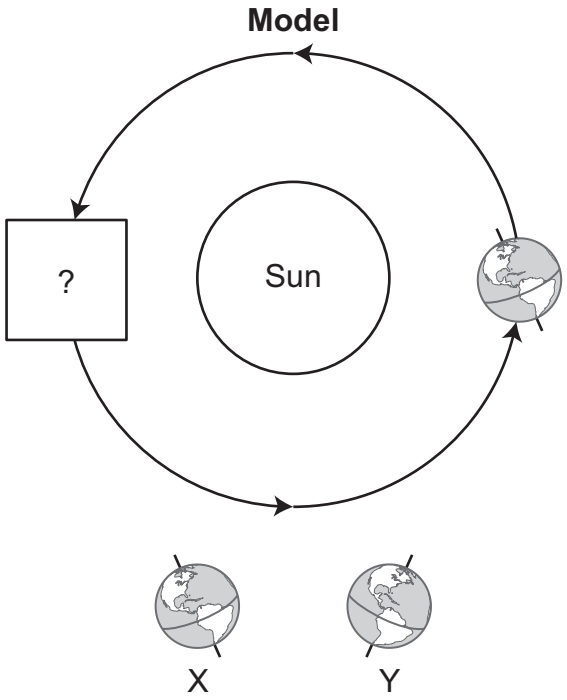
A. Label the four planets closest to the Sun as gas planets.
Label the largest planet as Mars.

B. Label the four planets closest to the Sun as rocky planets.
Label the largest planet as Jupiter.

C. Label the planet that is farthest from the Sun as a gas planet.
Label the smallest planet as Venus.

D. Label the planet that is farthest from the Sun as a rocky planet.
Label the smallest planet as Mercury.

5. Students are making a model of Earth and the Sun.



What does this model **best** represent, and how should the students complete the model?

A. The model represents day and night.
The students should complete the model by using diagram Y.

B. The model represents summer and winter.
The students should complete the model by using diagram Y.

C. The model represents day and night.
The students should complete the model by using diagram X.

D. The model represents summer and winter.
The students should complete the model by using diagram X.

6. Students are asked to design a boat that can transport 40 grams of coins from one end of a container of water to the opposite end. Which statement **best** describes a possible outcome when students follow the engineering design process?

A. If the boat is successful, the students will improve the design.

B. If the boat is unsuccessful, the students will redefine the problem.

C. If the boat is successful, the students will communicate the results.

D. If the boat is unsuccessful, the students will retest with more coins.

7. A student researches methods to conserve Earth's natural resources. The student makes the list below.

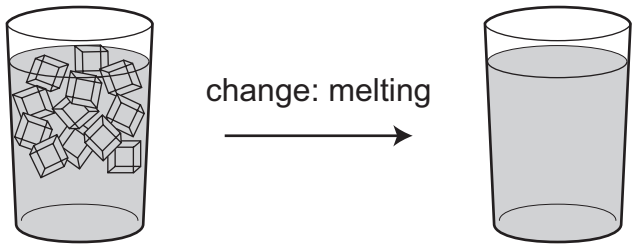
Circle the **two** conservation methods that would **most likely** reduce the amount of waste going into landfills.

Conservation Methods

- Recycle more materials.
- Plant trees and flowers.
- Ride a bicycle to school.
- Ride the bus or the train.
-
- Open up windows in the summer.

8. A student combined ice cubes and water in a glass. The ice cubes melted, leaving only liquid water. The masses of the ice cubes and water before the change are shown in the diagram.

Ice Melting



ice cubes and water

water

Beginning Mass

ice cubes	50 grams
water	60 grams

Final Mass

water	?

Which statement **best** describes the final mass of the water after the ice has melted?

A. It is 60 grams because the final mass does not include the ice cubes because they melted.

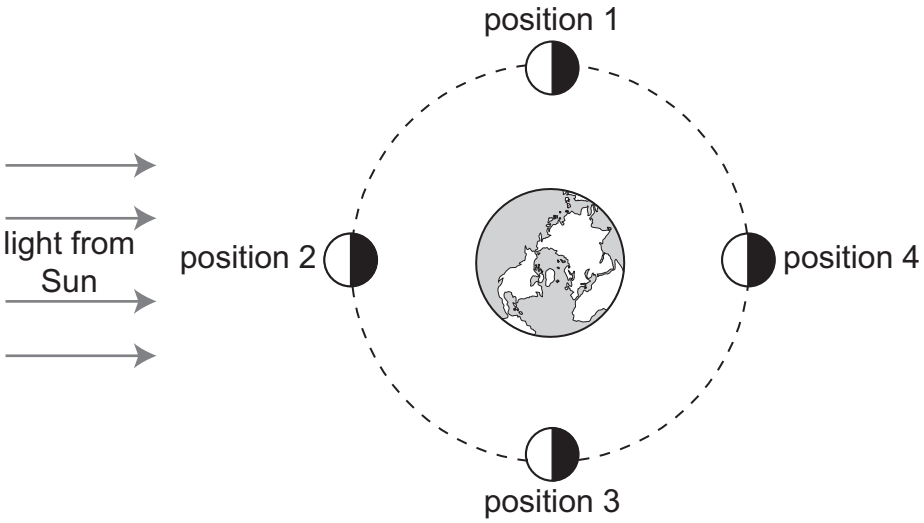
B. It is 110 grams because the beginning mass is equal to the final mass in a physical change.

C. It is 60 grams because the beginning mass is larger than the final mass in a physical change.

D. It is 110 grams because the final mass does not include the water because it stayed the same.

9. The model shows positions of the Moon as it orbits Earth.

Positions of the Moon around Earth



Based on the information in the model, which position of the Moon would **most likely** allow a person to observe a full moon?

A. position 1

B. position 2

C. position 3

D. position 4

10. Study the information in the table.

Two Reactions

Reaction	Description
1	A match burns.
2	A steel nail rusts.

Which list uses the information in the table to correctly describe which reactions are chemical reactions and provide evidence?

A. **description:** Both reactions are chemical reactions.
evidence: A color change occurs in both reactions.

B. **description:** Both reactions are chemical reactions.
evidence: Heat and light are produced in both reactions.

C. **description:** Only reaction 1 is a chemical reaction.
evidence: An odor is produced in reaction 1.

D. **description:** Only reaction 2 is a chemical reaction.
evidence: A new substance is produced in reaction 2.

11. A student is constructing a poster to help other students understand mixtures and solutions.

Part A: Record an "X" in each row of the table to identify the correct description of a mixture and of a solution.

	Mixture	**Solution**
One substance dissolves into another when combined; one substance is distributed evenly into another substance; each particle is not visible.		
Two or more substances keep their individual properties when combined; no chemical reaction occurs; each part is visible.		

Part B: Using the descriptions from part A, record the number of each of the given examples in the column that **best** identifies the example.

Mixture	**Solution**

(1) air

(2) cereal and milk

(3) salad

(4) salt water

12. A teacher started class by holding up a jar. The jar contained water, sawdust, sand, and salt. The goal for the class was to work in small teams to separate the parts of the mixture.

Record the number of each separation method in the correct place in the table to identify which part of the mixture can be separated using that method.

Mixture

Part of the Mixture	Location in the Mixture	Separation Method
sawdust	floating on top	
sand	at the bottom	
salt	dissolved in the water	

(1) evaporating the water

(2) removing with a sifter

(3) using filter paper

13. Two students investigate how forces affect the motion of a marble. The students place a marble on a flat table. On opposite sides of the marble, the students each blow air through a straw toward the marble.

If the air coming out of student 1's straw has a greater force than the air coming out of student 2's straw, in which direction will the marble move and why?

A. toward student 1 because the forces are balanced

B. toward student 2 because the forces are balanced

C. toward student 1 because the forces are unbalanced

D. toward student 2 because the forces are unbalanced

14. Locating the North Star has helped people determine direction throughout history. Its northern position in the sky stays the same. Sailors used it to help navigate their ships across open water. Later, people began to use compasses for navigating ships.

A student claims that using a compass results in better navigation than locating the North Star. Which statement provides the **best** evidence to support the student's claim?

A. A compass needle moves as the user changes direction.

B. A compass can be used to find direction during the daytime.

C. A compass needle must be made of a magnetic iron material.

D. A compass allows the user to find directions other than north.

15. The Moon completes an orbit around Earth about once a month. Which **two** statements **best** explain why the Moon stays in orbit around Earth?

A. A magnetic attraction exists between the Moon and Earth.

B. A force of motion causes Earth to push outwardly on the Moon.

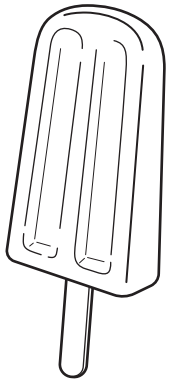
C. A force of attraction due to Earth's mass pulls the Moon toward Earth.

D. A repelling force keeps the Moon moving in a straight line around Earth.

E. A force of attraction due to the Moon's mass pulls Earth toward the Moon.

16. A student blends a mixture of fruit and water and pours the liquid blend into a special mold with sticks. After leaving the mold in a freezer for several hours, the student pulls the resulting ice-pop treats out of the mold.

Ice-Pop Treat



What will **most likely** happen if the student leaves an ice-pop treat on a plate outside the freezer?

A. The fruit and water mixture will change into a liquid because it will absorb heat energy.

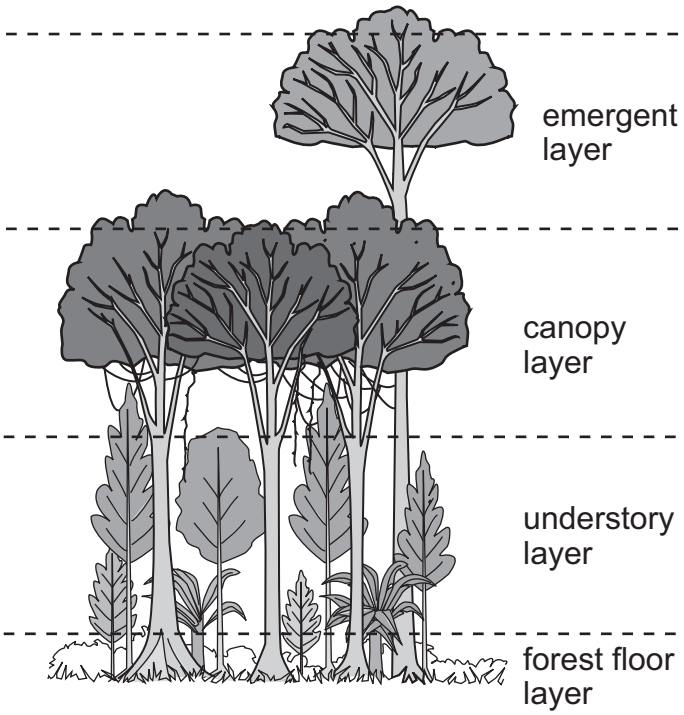
B. The fruit and water mixture will remain a solid because freezing is an irreversible change.

C. The fruit and water mixture will remain a solid because only its shape and texture will change.

D. The fruit and water mixture will change into a different substance because it will absorb heat energy.

17. The rain forest is divided into four basic layers. The amount of water, nutrients, and sunlight a plant receives is related to its layer.

Rain Forest Layers



Which pair of statements is true about the amount of sunlight received by the leaves of plants in different rain forest layers?

A. Plants in the emergent layer receive the most sunlight. These plants are more likely to be shorter than canopy layer plants, which receive the least sunlight.

B. Plants in the emergent layer receive the most sunlight. These plants are more likely to be taller than forest floor layer plants, which receive the least sunlight.

C. Plants in the canopy layer receive the most sunlight. These plants are more likely to be taller than understory layer plants, which receive the least sunlight.

D. Plants in the forest floor layer receive the most sunlight. These plants are more likely to be shorter than understory layer plants, which receive the least sunlight.

18. Students have three numbered containers. Each container has a different yellow liquid in it—either apple juice, corn syrup, or vegetable oil—that they need to identify.

Three Liquids

Container	Liquid Name
1	?
2	?
3	?

Their teacher tells them that density can be used to identify the liquids. The data table shows the densities of the three liquids.

Liquid Densities

Liquid Name	Density (grams per milliliter)
apple juice	1.04
corn syrup	1.37
vegetable oil	0.91

Part A: The students add all three liquids to a clear jar. Circle a result to explain how the students will be able to identify vegetable oil.

Vegetable oil will (sink to the bottom / float on top / be in the middle of the other liquids).

Part B: The students observe that the liquid from container 1 is on top and the liquid from container 3 is on the bottom. Circle the names of the liquids that were originally in each container.

Container 1 had (apple juice / corn syrup / vegetable oil) in it.

Container 2 had (apple juice / corn syrup / vegetable oil) in it.

Container 3 had (apple juice / corn syrup / vegetable oil) in it.

19. Some medicines must be kept cool in a refrigerator to be effective. Which step would a scientist **most likely** take to prepare for a warm-weather natural disaster that could cause several days without electricity?

A. Stock a freezer with ice.

B. Install a wood-burning stove.

C. Gather a generator and the fuel to power it.

D. Store enough medicine to make up for delivery delays.

20. A student has two boxes. Box 1 has a mass of 10 kg and box 2 has a mass of 20 kg. The student wants to push both boxes the same distance across the floor.

Part A: Circle a word in each set of options to compare the forces acting on the boxes.

(Less / More) (noncontact / contact) force will be needed to move box 1 than box 2.

Part B: Which pair of forces will be acting on the boxes once the student begins pushing?

A. friction and applied

B. spring and electrical

C. magnetic and friction

D. applied and magnetic

21. A student observes a beaker of ice cubes over time.

Ice Cube Observations

Time (minutes)	Observation
0	only solid ice cubes
10	smaller ice cubes, some liquid water
30	only liquid water

Which statement is **most likely** true?

A. At 30 minutes, the particles in the beaker stop moving.

B. At 30 minutes, the particles in the beaker move very little.

C. At 0 minutes, the particles in the beaker move very rapidly.

D. At 0 minutes, the particles in the beaker move very little.

22. Humans' understanding of our solar system has changed over time. Scientists throughout history have made models based on observations.

Which statement **best** represents Ptolemy's model of the solar system?

A. Like Aristotle, Ptolemy placed Earth at the center of the solar system.

B. Like Aristotle, Ptolemy placed the Sun at the center of the solar system.

C. Like Copernicus, Ptolemy placed Earth at the center of the solar system.

D. Like Copernicus, Ptolemy placed the Sun at the center of the solar system.

23. A student observed that the appearance of the constellations in the night sky changed over a year.

Circle one word or phrase in each set of options to **best** explain the reason for the change observed by the student.

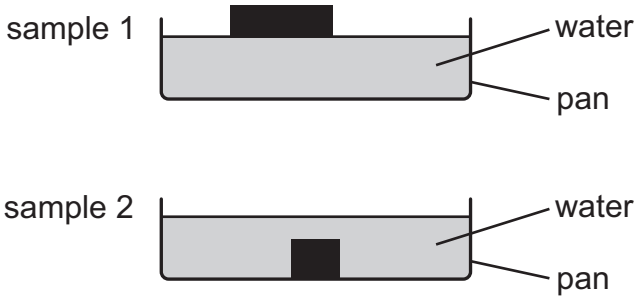
The constellations appear to change (size / location / brightness / stars) throughout the year

because Earth (rotates on an axis / changes distances from the stars /

revolves around the Sun / changes seasonal weather) over time.

24. The drawing shows a student's investigation.

Student Investigation



Which prediction do these results support?

A. Sample 1 is more dense than sample 2, so it is more likely to float in water.

B. Sample 1 is less dense than sample 2, so it is more likely to float in water.

C. Sample 2 is larger than sample 1, so it is less likely to float in water.

D. Sample 2 is smaller than sample 1, so it is less likely to float in water.

25. A student lists the following information about atoms.

Atoms

1. Atoms are too small to be observed by the human eye.
2. Atoms make up all types of matter.
3. Each type of atom has a certain mass.

Which statement **best** describes another feature of atoms?

A. Atoms bond together to form molecules.

B. Atoms of different types are the same size.

C. Atoms are spaced the same in different types of matter.

D. Atoms in gases are more easily observed than atoms in solids.

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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 2023.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	(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	D
2	(L.5.3B.3) Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.	2	Technology Enhanced	See Answer Key
3	(P.5.6.6) Design a system to increase the effects of friction on the motion of an object (e.g., non-slip surfaces or vehicle braking systems or flaps on aircraft wings). Use an engineering design process to define the problem, design, construct, evaluate, and improve the system.*	3	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.	2	Multiple Choice	B
5	(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.	2	Multiple Choice	D
6	(P.5.5A.5) Design a vessel that can safely transport a dense substance (e.g., syrup, coins, marbles) through water at various distances and under variable conditions. Use an engineering design process to define the problem, design, construct, evaluate, and improve the vessel.*	2	Multiple Choice	C
7	(E.5.10.1) 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	Technology Enhanced	See Answer Key
8	(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	B
9	(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	D
10	(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	A
11	(P.5.5B.1) Obtain and evaluate scientific information to describe what happens to the properties of substances in mixtures and solutions.	2	Technology Enhanced	See Answer Key
12	(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	Technology Enhanced	See Answer Key
13	(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	Multiple Choice	D

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Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
14	(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	B
15	(P.5.6.1) Obtain and communicate information describing gravity's effect on an object.	2	Technology Enhanced	See Answer Key
16	(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	Multiple Choice	A
17	(L.5.3A.2) Analyze environments that do not receive direct sunlight and devise explanations as to how photosynthesis occurs, either naturally or artificially.	2	Multiple Choice	B
18	(P.5.5A.3) Analyze matter through observations and measurements to classify materials (e.g., powders, metals, minerals, or liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, or density).	2	Technology Enhanced	See Answer Key
19	(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	C
20	(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	Technology Enhanced	See Answer Key
21	(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).	3	Multiple Choice	D
22	(E.5.8B.4) Obtain information and analyze how our understanding of the solar system has evolved over time (e.g., Earth-centered model of Aristotle and Ptolemy compared to the Sun-centered model of Copernicus and Galileo).	1	Multiple Choice	A
23	(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	Technology Enhanced	See Answer Key
24	(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	B
25	(P.5.5A.1) Obtain and evaluate scientific information to describe basic physical properties of atoms and molecules.	2	Multiple Choice	A

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Technology Enhanced Items
Answer Key

Item #2

(A.) Wild hogs eat soybeans, which are an important crop.

B. Wild hogs eat all the other consumers in the ecosystem.

(C.) Rabbits and eagles must compete with wild hogs for food.

D. Eagles are an endangered species and are not able to eat wild hogs.

(E.) Wild hogs have no natural predators and therefore become overpopulated.

Item #3

Part A: B

Part B: C

Item #7

Conservation Methods

- Recycle more materials.
- Plant trees and flowers.
- Ride a bicycle to school.
- Ride the bus or the train.
- Use longer-lasting light bulbs.
- Open up windows in the summer.

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Technology Enhanced Items
Answer Key

Item #11

Part A: Select the correct description of a mixture and of a solution.

	Mixture	Solution
One substance dissolves into another when combined; one substance is distributed evenly into another substance; each particle is not visible.	☐	☑
Two or more substances keep their individual properties when combined; no chemical reaction occurs; each part is visible.	☑	☐

Part B: Using the descriptions from part A, drag each of the given examples into the column that **best** identifies the example.

Mixture	Solution
cereal and milk salad	air salt water

OR

Mixture	Solution
2, 3	1, 4

Item #12

Mixture

Part of the Mixture	Location in the Mixture	Separation Method
sawdust	floating on top	2
sand	at the bottom	3
salt	dissolved in the water	1

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Technology Enhanced Items
Answer Key

Item #15

A. A magnetic attraction exists between the Moon and Earth.

B. A force of motion causes Earth to push outwardly on the Moon.

C. A force of attraction due to Earth's mass pulls the Moon toward Earth.

D. A repelling force keeps the Moon moving in a straight line around Earth.

E. A force of attraction due to the Moon's mass pulls Earth toward the Moon.

Item #18

Part A: The students add all three liquids to a clear jar. Circle a result to explain how the students will be able to identify vegetable oil.

Vegetable oil will (sink to the bottom / float on top / be in the middle of the other liquids).

Part B: The students observe that the liquid from container 1 is on top and the liquid from container 3 is on the bottom. Circle the names of the liquids that were originally in each container.

Container 1 had (apple juice / corn syrup / vegetable oil) in it.

Container 2 had (apple juice / corn syrup / vegetable oil) in it.

Container 3 had (apple juice / corn syrup / vegetable oil) in it.

Mississippi Academic Assessment Program
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Technology Enhanced Items
Answer Key

Item #20

Part A: Circle a word in each set of options to compare the forces acting on the boxes.

(Less / More) (noncontact / contact) force will be needed to move box 1 than box 2.

Part B: Which pair of forces will be acting on the boxes once the student begins pushing?

A. friction and applied

B. spring and electrical

C. magnetic and friction

D. applied and magnetic

Item #23

The constellations appear to change (size / location / brightness / stars) throughout the year because Earth (rotates on an axis / changes distances from the stars / revolves around the Sun / changes seasonal weather) over time.