

# Tennessee Comprehensive Assessment Program

# TCAP

## Science

### Grade 5 | Practice Test



***Please PRINT all information in the box.***

Student Name: \_\_\_\_\_

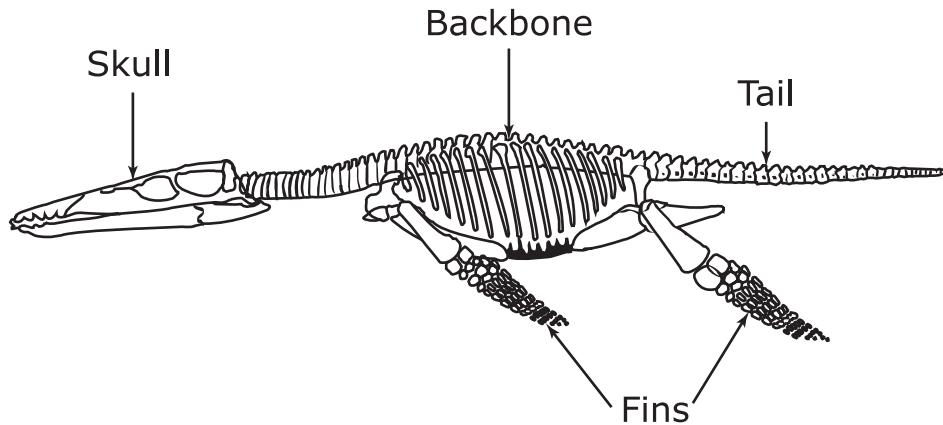
Teacher Name: \_\_\_\_\_

School: \_\_\_\_\_

District: \_\_\_\_\_

**All practice test items represent the appropriate grade level/content standards—however, the practice test may contain item types that no longer appear on the operational assessment.**

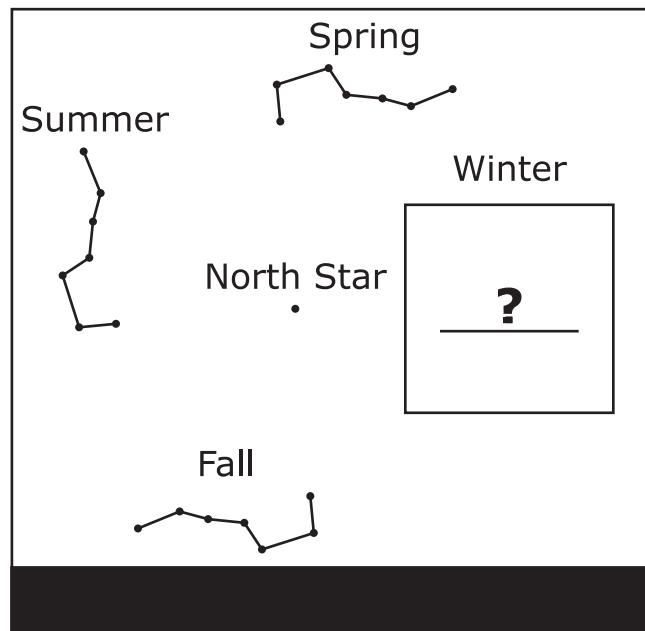
1. Scientists found some fossil bones from an extinct animal. The scientists used the bones to make a model of the animal's skeleton.



Based on the features shown, which of these is the best conclusion the scientists can make?

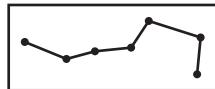
- A. The animal lived in water.
- B. The animal blended in well with its environment.
- C. The animal had many offspring each year.
- D. The animal migrated long distances to find food.

2. A student uses binoculars to observe how Ursa Major looks in the sky during different seasons of the year.

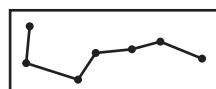


Which of these most likely shows how Ursa Major looks in winter?

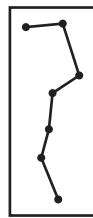
M.



R.



P.



S.



3. A young horse is called a foal. Five foals are born on a farm. All the foals have different parents. The data table shows the color of the coat of each foal.

**Foal Coat Colors**

Foal	Coat Color
1	Black
2	Tan
3	Black
4	Black
5	White

Which three foals most likely had parents with black coats?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

4. The Local Group is a group that contains the Milky Way and about 50 other galaxies. The table lists data for five galaxies in the Local Group. The distance across a galaxy is measured in light-years, which is a unit of distance that contains millions of kilometers.

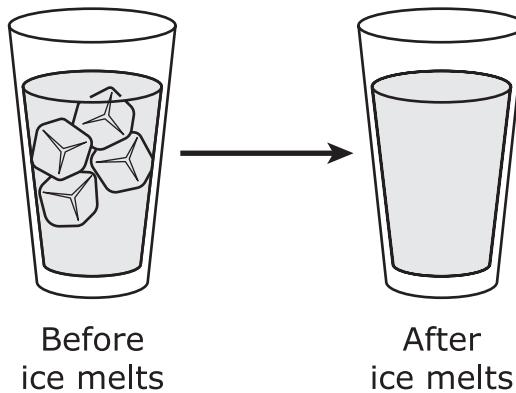
### Local Group Galaxy Data

Galaxy Name	Distance Across Galaxy (light-years)	Shape
Milky Way	100,000	Spiral
M31	220,000	Spiral
M32	6,500	Elliptical
Pegasus Dwarf	26,000	Irregular
Triangulum	60,000	Spiral

Which statement correctly compares the Milky Way to another galaxy in the Local Group?

- M. The Milky Way galaxy is larger than galaxy M31.
- P. The Milky Way galaxy is the same shape as the Pegasus Dwarf galaxy.
- R. The Milky Way galaxy is a different shape than galaxy M32.
- S. The Milky Way galaxy is smaller than the Triangulum galaxy.

5. A glass of ice water is placed on a table inside a room that is at room temperature. The ice inside the glass melts. The diagram represents the changes observed.



Which piece of evidence supports the conservation of matter during the changes shown in the diagram?

- A. The combined mass of the glass and its contents is the same before and after the ice melts.
- B. The combined mass of the glass and its contents is less after the ice melts.
- C. The contents of the glass are wet before and after the ice melts.
- D. The contents of the glass are colorless before and after the ice melts.

6. Organisms have different types of behaviors. Some of these behaviors are natural responses called instincts. Other behaviors are learned through the use of an organism's senses through interactions with the environment.

Which three behaviors are examples of instincts?

- M. birds returning to a bird feeder for food
- P. monkeys using tools
- R. ants living in a colony
- S. sea turtles swimming
- T. geese flying in a group

7. A student's data table is shown. The table lists the distance of four stars from Earth. The four stars are of similar mass and are in the same life cycle stage. Each distance in the table is given in light-years. A light-year contains millions of kilometers.

### Star Distances from Earth

Star	Distance from Earth (light-years)
1	8.6
2	6.0
3	9.4
4	7.7

When the student observes the night sky, which two stars will appear the brightest?

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

8. The picture shows a carousel. The carousel spins while the horses move up and down. A student determines that each horse completes one up-down cycle in 30 seconds. The student rides a horse on the carousel for 2 minutes, which equals 120 seconds.

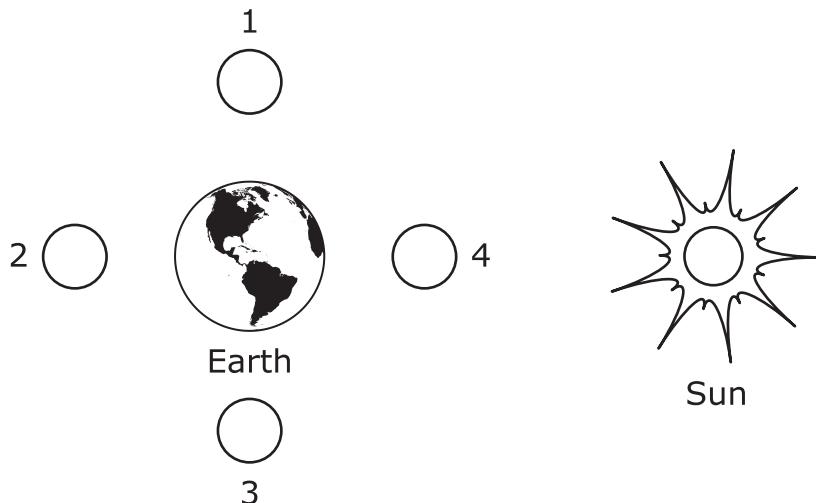
**Carousel**



**How many times did the student riding the horse complete an up-down cycle?**

- M.** 2 times
- P.** 3 times
- R.** 4 times
- S.** 5 times

9. The model represents the sun-Earth-moon system. The numbers represent four positions of the moon in its orbit around Earth.



Which number represents the location of the moon when it is in the new moon phase?

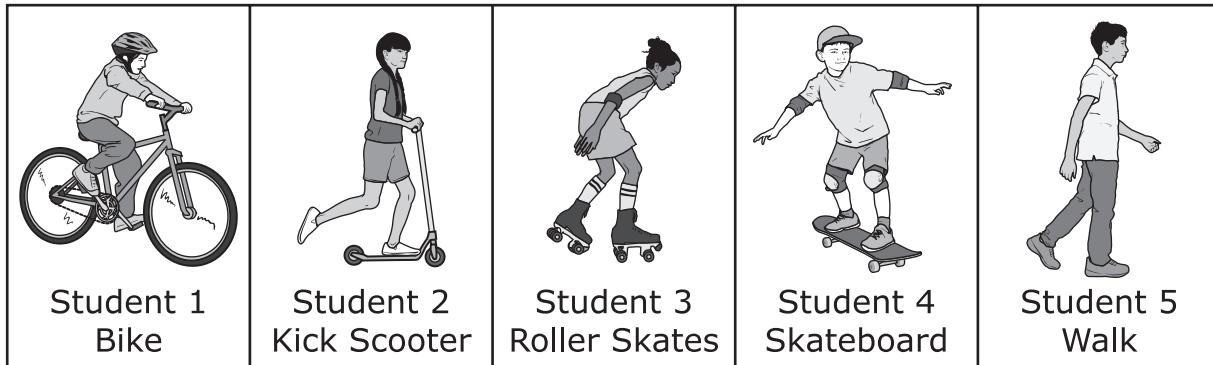
- A. 1
- B. 2
- C. 3
- D. 4

Questions 10 – 13 refer to the passage(s) and image(s) shown.

## Getting Around Town – Part 1

Five students were talking about how long it takes to get to school. They all lived on the same street close enough to school that they could not ride the bus. They met at the end of their street each morning and at the same place outside of school in the afternoon. The students used their own timers to record how long it took each of them to get to school and back home during one day.

### Method Used



### Time Taken to Get to School

Student	Student's Mass, in Kilograms	Method Used	Distance Traveled Each Way, in Miles	Tuesday Morning Time, in Minutes	Tuesday Afternoon Time, in Minutes	Average Time, in Minutes
1	35	Bike	1.0	4	5	4.5
2	35	Kick Scooter	1.0	11	9	10
3	30	Roller Skates	1.0	7	6	6.5
4	25	Skateboard	1.0	6	7	6.5
5	25	Walk	1.0	15	14	14.5

**10. Which question can best be answered using the data collected from the investigation?**

- M.** Do students with less mass move faster?
- P.** Does having more wheels make you faster?
- R.** Does it take longer to get to school than to get home?
- S.** Which student takes the least time to travel a mile?

**11. What should the students do to produce more precise data regarding the speeds of the methods used?**

- A.** Conduct the study for three more days.
- B.** Take a different route home in the evening.
- C.** Switch the method used to get to school in the afternoon.
- D.** Use a different timer in the afternoon than in the morning.

**12. Student 3 and Student 4 noticed that they had the same average time. The students want to do a second investigation to find out who is faster. How can the students best determine who is faster during the second investigation?**

- M.** The students should switch methods. Student 3 should use the skateboard, and Student 4 should use roller skates.
- P.** Both students should use the same method they used for the first investigation. Student 3 should use roller skates, and Student 4 should use the skateboard.
- R.** The students should take turns using the same method. Student 3 should use the skateboard first and then Student 4 should use the skateboard.
- S.** The students should do only half of the investigation. Student 3 should be timed going to school, and Student 4 should be timed on the way back.

**13. For the second investigation, Student 2 decided to use a bike instead of a kick scooter. She was able to obtain an average time of 4 minutes. Which statement correctly describes the difference between Student 1's first investigation and Student 2's second investigation?**

- A.** Student 2 created a larger unbalanced force than Student 1, resulting in a slower speed and longer time.
- B.** Student 2 created a larger unbalanced force than Student 1, resulting in a faster speed and shorter time.
- C.** Student 2 created a smaller unbalanced force than Student 1, resulting in a slower speed and longer time.
- D.** Student 2 created a smaller unbalanced force than Student 1, resulting in a faster speed and shorter time.

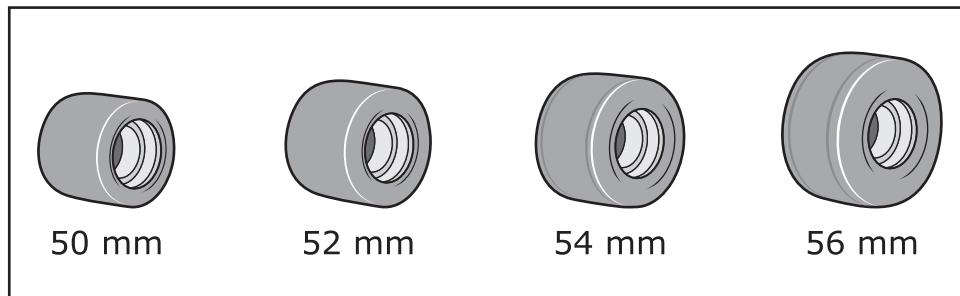
Questions 14 – 16 refer to the passage(s) and image(s) shown.

## Getting Around Town – Part 2

Did you know that skateboards were inspired by surfing? Surfers were looking for something to do when the waves weren't big enough to surf. Some of the first skateboards were made of small wooden surfboards with metal wheels. Next came wheels made of clay. These wheels were quieter, slicker, and faster than metal wheels. After clay wheels came a new material: polyurethane. Polyurethane wheels were softer than clay wheels and gave a smoother and more stable ride.

With so many types of wheels to choose from, one of the students wanted to see how wheel sizes could change her ride. She tested four sizes of wheels over a period of four weeks. The diameter of the wheels is measured in millimeters (mm).

### Skateboard Wheels

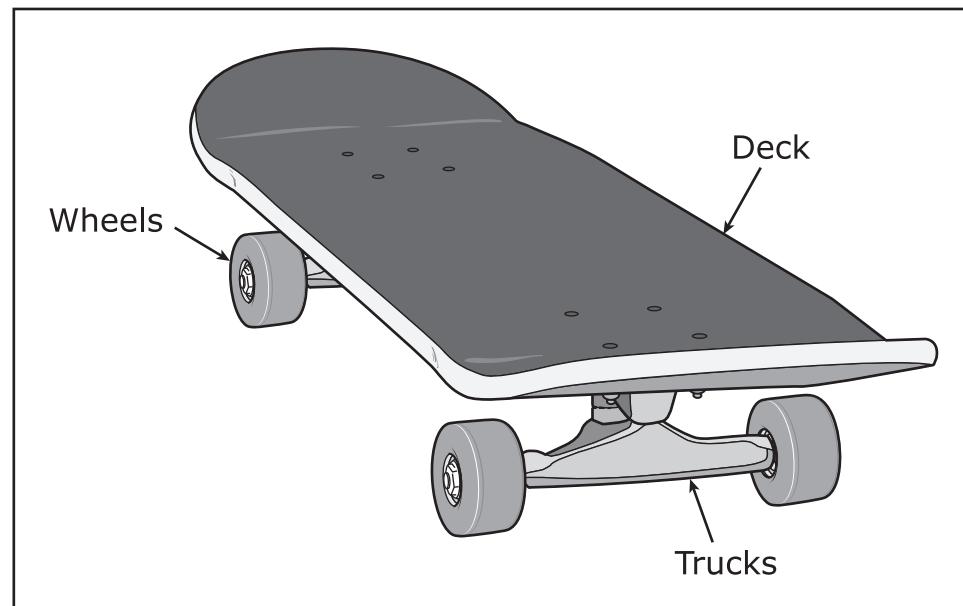


### Wheel Tests

Wheel Diameter in Millimeters, mm	Total Distance, in miles	Time, in Minutes, Day 1	Time, in Minutes, Day 2	Time, in Minutes, Day 3	Time, in Minutes, Day 4	Time, in Minutes, Day 5	Average Time, in Minutes
50	2.0	15	11	13	14	12	13
52	2.0	18	13	12	17	15	15
54	2.0	20	14	16	18	22	18
56	2.0	21	23	25	19	17	21

Important parts of a skateboard are labeled.

## Parts of a Skateboard



**14. Which question do the student's data most likely help her answer?**

- M.** Do larger wheels make you go faster?
- P.** Do smaller wheels make it easier to turn?
- R.** Do taller wheels make the ride smoother?
- S.** Do big wheels cost more than small wheels?

**15. The student looked at the parts on her skateboard and came up with four questions. Which question could scientists help her test?**

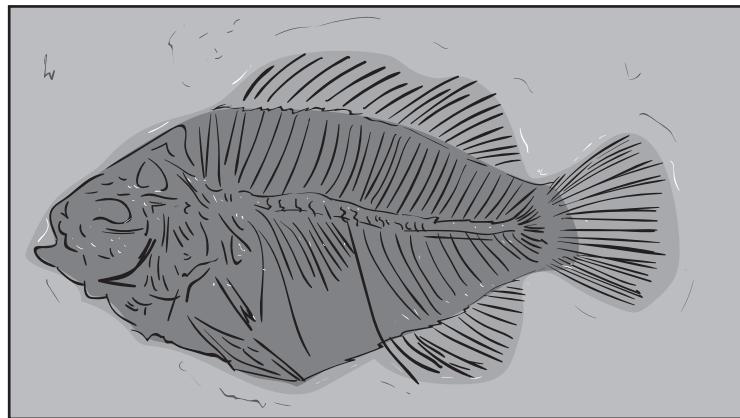
- A.** Why are skateboard wheels bright colors?
- B.** How can I become a famous skateboarder?
- C.** Do girls enjoy skateboarding more than boys do?
- D.** Does an all-wood deck last longer than a deck made with fiberglass?

**16. The student wants to use a scooter to go to school. She cannot decide if she should use an electric scooter or a gas-powered scooter. Electric scooters use a battery that can be charged overnight and used the next day. Gas-powered scooters burn gasoline and release fumes into the air the same way cars and trucks do. Her school is an environmentally friendly campus.**

**Which would be a better choice to keep her in agreement with the school values, and why?**

- M.** Use an electric scooter because it is quiet.
- P.** Use an electric scooter because it reduces pollution.
- R.** Use a gas-powered scooter because it is faster.
- S.** Use a gas-powered scooter because it is more widely used.

- 17. Scientists study a fossil of an extinct fish. The scientists compare the extinct fish to fish that are living today.**



**Which of these is the best conclusion the scientists can make about the extinct fish?**

- A.** The extinct fish had fins on its body similar to the fins on many fish that are living today.
- B.** The extinct fish had stripes on its skin similar to the stripes on some fish that are living today.
- C.** The extinct fish could live for many years, similar to some fish that are living today.
- D.** The extinct fish had many predators, similar to many fish that are living today.

18. A student performs an experiment. The student wants to study the fastest way to dissolve sugar in tea. The student uses 50 milliliters of tea and adds 50 grams of sugar cubes for each trial. The student waits two minutes before making the observations shown in the table.

### Student's Data

Trial	Tea Temperature (degrees Celsius, °C)	Observations
1	30	Most of each sugar cube remains.
2	40	About half of each sugar cube remains.
3	50	A few grains of sugar remain.

**How can the experiment be changed to be sure that as much sugar as possible has dissolved?**

- M.** Use less water at all three temperatures.
- P.** Stir the tea constantly at all three temperatures.
- R.** Use larger sugar cubes in the 40°C tea.
- S.** Use a larger cup to hold the 50°C tea.

19. A student poured five different clear, colorless liquids into five different beakers. Each beaker was half-filled with the liquid. The student added 1 gram of a white powder and stirred each mixture. The student's observations are recorded in the data table.

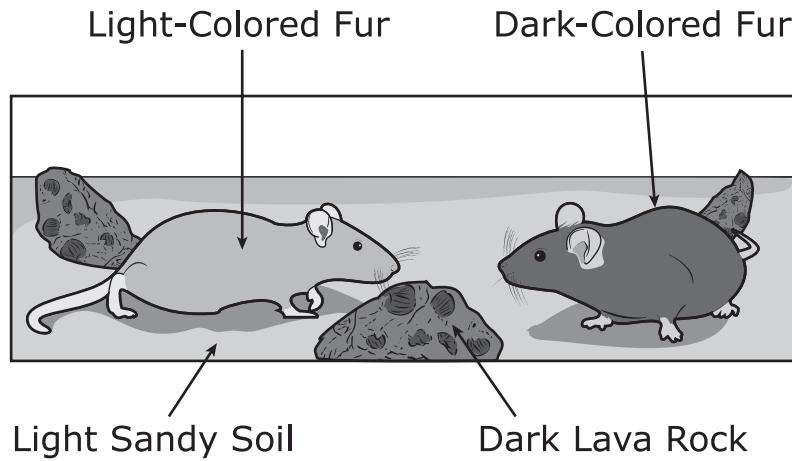
### Student's Data

Mixture	Observations
1	White powder does not dissolve and clumps at the bottom of the beaker.
2	Liquid turns cloudy and later becomes clear.
3	Yellow solid appears at the bottom of the beaker.
4	White powder disappears.
5	White powder disappears and a gas bubbles out of the liquid.

In which two mixtures was a new substance formed?

- A. Mixture 1
- B. Mixture 2
- C. Mixture 3
- D. Mixture 4
- E. Mixture 5

20. The picture shows two mice called pocket mice. Pocket mice can be born with either light-colored fur or dark-colored fur. A group of pocket mice lives in a habitat where there is light sandy soil and dark lava rocks. Mice with light-colored fur blend in with the light sandy soil. Mice with dark-colored fur blend in with the dark lava rocks.



**Which habitat change would most likely benefit mice with dark-colored fur and not help mice with light-colored fur?**

- M. Dark lava rocks break into small pieces from weathering.
- P. Light sandy soil becomes very dry because of direct sunlight.
- R. Lava erupts from a volcano and then hardens into large areas of dark lava rocks.
- S. Light sandy soil blows around in the wind and covers up dark lava rocks.

- 21.** The Milky Way is a spiral galaxy with more than 100 billion stars. Students compare the Milky Way to a data table that lists features of five other galaxies. The distance of each galaxy from the Milky Way is given in light-years. A light-year contains millions of kilometers.

### Features of Five Galaxies

Galaxy	Shape	Number of Stars	Distance Away from the Milky Way (light-years)
1	Ring	8 billion	600 million
2	Spiral	100 billion	24 million
3	Spiral	100 billion	35 million
4	Elliptical	300 billion	24 million
5	Elliptical	400 billion	55 million

Based on this data table, which galaxies are most likely the same type as the Milky Way galaxy?

- A. Galaxy 2 and Galaxy 4, because they are both the same distance from the Milky Way galaxy
- B. Galaxy 2 and Galaxy 3, because they have the same shape as the Milky Way galaxy
- C. Galaxy 4 and Galaxy 5, because they have a similar number of stars as the Milky Way galaxy
- D. Galaxy 1 and Galaxy 5, because they are the galaxies farthest from the Milky Way galaxy

22. Substances have different freezing and boiling points. These values help scientists know when phase changes happen.

### Substance Phase Change Temperatures

Substances	Freezing Point (degrees Celsius, °C)	Boiling Point (degrees Celsius, °C)
Gallium	30	2,204
Phosphorus	44	277
Potassium	64	759
Rubidium	39	688
Sodium	98	883

Which three substances will have a phase change if the temperature goes up from 50°C to 300°C?

- M. Gallium
- P. Phosphorus
- R. Potassium
- S. Rubidium
- T. Sodium

**23. Which of these best describes the positions of the sun, the moon, and Earth during a solar eclipse?**

- A.** The sun, the moon, and Earth are in a straight line, and the moon is between the sun and Earth.
- B.** The sun, the moon, and Earth are in a straight line, and the sun is between the moon and Earth.
- C.** The sun and Earth are in a straight line. The moon is not in a line but is at an angle between Earth and the sun.
- D.** The sun and Earth are in a straight line. The moon is not in a line but is at an angle on the side of Earth away from the sun.

- 24.** Students are learning about the difference between how bright stars appear to be when viewed from Earth and how bright stars actually are. The students draw four stars at different distances from Earth. The stars are labeled by how bright they actually are, not by how bright they appear to be when viewed from Earth.

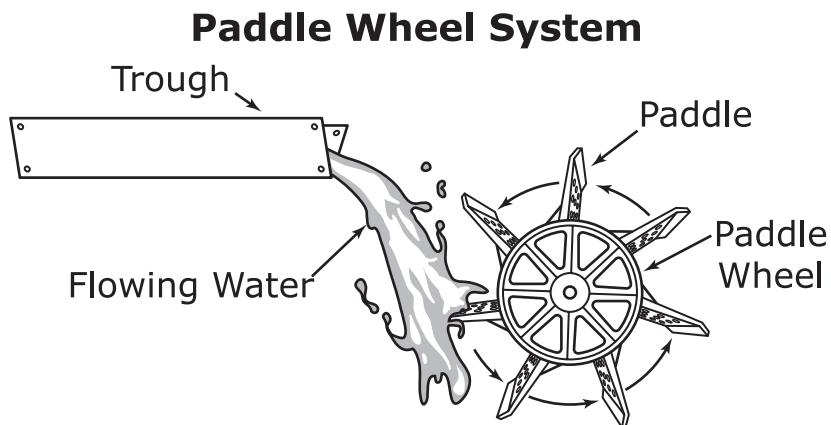


Note: Figure is not drawn to scale.

**The students want to know how bright these stars appear to be from Earth's point of view. Which two statements are true based on the actual brightness of the stars?**

- M.** It is possible that Star W could appear brighter than Star X.
- P.** It is possible that Star X could appear dimmer than Star Z.
- R.** It is possible that Star Y could appear brighter than Star X.
- S.** It is possible that Star Y could appear dimmer than Star Z.
- T.** It is possible that Star Z could appear brighter than Star W.

25. The diagram shows water moving through a trough and falling on a paddle wheel. The force of the water hitting each paddle on the wheel causes the paddle wheel to turn.



**Which change would most likely make the paddle wheel turn faster?**

- A. Place the trough higher above the paddle wheel.
- B. Increase the temperature of the water.
- C. Remove paddles from the paddle wheel.
- D. Make the trough longer.

26. This table shows the different physical traits in a litter of guinea pigs. The father guinea pig has short, black fur. The mother guinea pig has short, white fur.

### Baby Guinea Pigs

Offspring	Fur Length	Fur Color
1	Short	Black
2	Short	White
3	Long	White
4	Short	Black
5	Long	Black
6	Short	Black
7	Short	White

For the litter shown, which trait combination is most common?

- M. long, black fur
- P. long, white fur
- R. short, black fur
- S. short, white fur

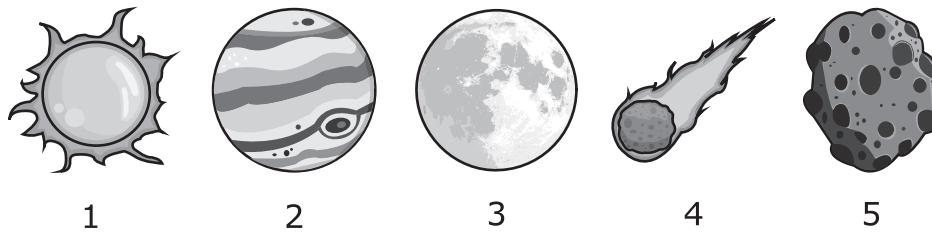
Questions 27 – 30 refer to the passage(s) and image(s) shown.

## A Trip to the Planetarium – Part 1

A fifth-grade class is studying objects in the solar system. The teacher decides to take the students on a field trip to the Sudekum Planetarium located in the Adventure Science Center in Nashville. The teacher tells the students that there are two goals for the field trip. The first goal is to be able to identify different objects in the solar system based on their characteristics. The second goal is to understand how mass and distance affect the force of gravity between objects.

When the students arrive at the planetarium they participate in two activities. The first activity is watching a presentation about different objects in the solar system. The students take notes about what they are learning. Student 1 draws sketches of five different objects in the solar system. Student 2 makes a table to show the characteristics of the same five objects. Student 3 records observations from the presentation. The students' work is shown.

### Student 1: Sketches of Different Objects in the Solar System



Note: Figure is not drawn to scale.

## Student 2: Characteristics of Different Objects in the Solar System

Object	Mass	Composition	Orbits the Sun
1	Largest 	Hydrogen and Helium	No
2		Hydrogen and Helium	Yes
3		Rock, Iron, and Dust	No
4		Ice, Rock, and Dust	Yes
5		Iron and Dust	Yes

## Student 3: Observations from the Presentation

Observation 1	An astronaut on the moon drops a hammer and a feather from the same height. The feather and the hammer hit the surface at the same time.
Observation 2	Astronauts float in the space capsule once they are far enough away from Earth.
Observation 3	Several planets have moons that orbit them.

**27. Students observe the information for Object 2. Which conclusion is correct based on the object's shape, composition, and orbit?**

- A.** Object 2 is a moon.
- B.** Object 2 is an asteroid.
- C.** Object 2 is an inner planet.
- D.** Object 2 is an outer planet.

**28. A student concludes that Object 4 is a comet. Which information best supports this conclusion?**

- M.** Object 4 has a tail and is composed of ice.
- P.** Object 4 has craters on it like an asteroid has.
- R.** Object 4 has less mass than the sun.
- S.** Object 4 is not composed of gases.

**29. Which statement correctly describes Observation 1 of Student 3?**

- A.** The feather has less mass than the hammer, so the force of gravity on the feather is greater than the force of gravity on the hammer.
- B.** The hammer has more mass than the feather, so the force of gravity on the hammer is greater than the force of gravity on the feather.
- C.** Since both objects hit the ground at the same time, they both experience the same force of gravity.
- D.** Since the mass of the moon doesn't change, both objects experience the same force of gravity.

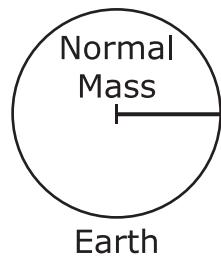
**30. Which statement correctly explains Observation 2 from Student 3?**

- M.** The astronauts still experience the force of gravity but the space capsule and everything inside it are falling all at the same time.
- P.** The astronauts still feel the force of gravity but they are so far away that gravity points away from Earth.
- R.** The astronauts are floating because they are too far away from Earth to have a mass.
- S.** The astronauts are floating because their mass is too small to feel a force of gravity.

Questions 31 – 33 refer to the passage(s) and image(s) shown.

## A Trip to the Planetarium – Part 2

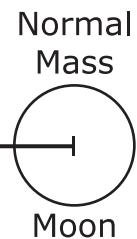
After the planetarium presentation, students participated in a computer-based activity. The computer program showed the sun, the planets, moons, asteroids, and comets moving through the solar system. The program let students change the mass and location of two objects in the solar system. After each change, the computer showed the effect on the gravitational force between both objects. Student 4 chose to experiment with the mass and location of Earth and its moon. Her results are shown.

**Trial 1**

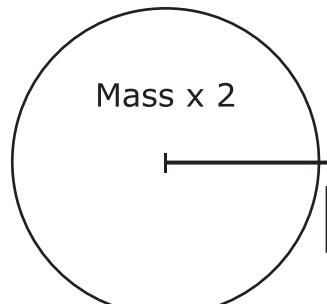
Normal Distance

$$\text{Force of Gravity} = F \times 1$$

Earth



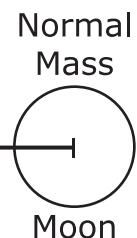
Note: Figure is not to scale.

**Trial 2**

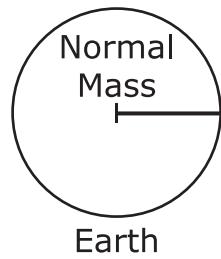
Normal Distance

$$\text{Force of Gravity} = F \times 2$$

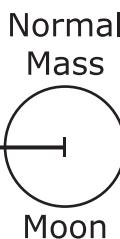
Earth



Note: Figure is not to scale.

**Trial 3**

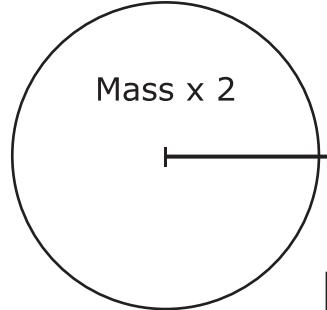
Half the Distance



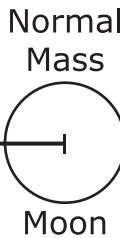
Earth

$$\text{Force of Gravity} = F \times 4$$

Note: Figure is not to scale.

**Trial 4**

Half the Distance



Earth

$$\text{Force of Gravity} = F \times 8$$

Note: Figure is not to scale.

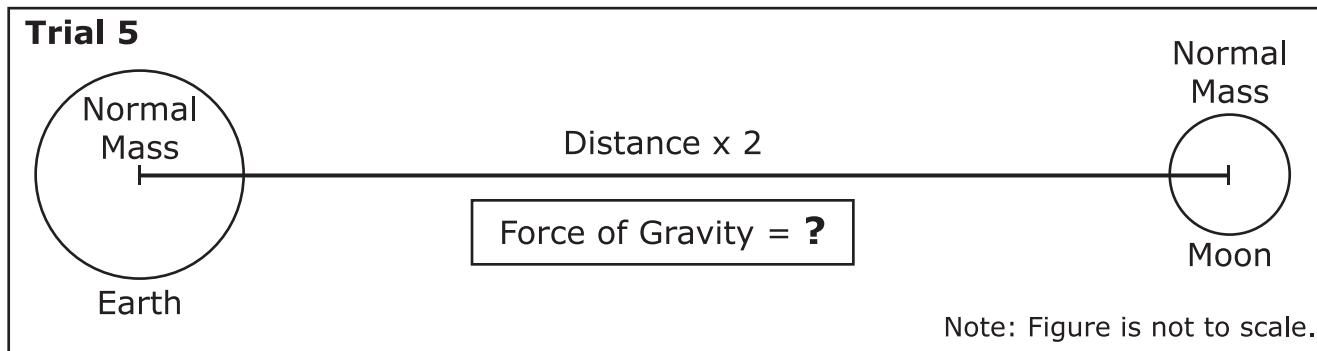
**31. Which trial results in the largest gravitational force?**

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

**32. Students observe the planets on the computer screen. They note that the outer planets move more slowly and have a larger orbit than the inner planets. Which question is best answered with this information?**

- M.** Why do the number of days in a year differ on different planets?
- P.** Why do the outer and inner planets have different compositions?
- R.** Why do the planets have different masses?
- S.** Why do the planets orbit the sun instead of each other?

33. The student runs Trial 5 on the computer. The settings for the trial are shown.

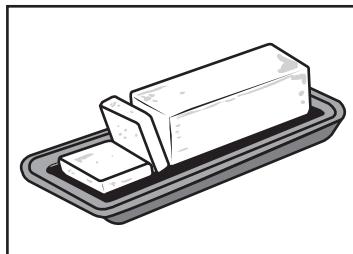


**What will the force of gravity be for this trial?**

- A.  $F \div 4$
- B.  $F \div 2$
- C.  $F \times 3$
- D.  $F \times 5$

34. The pictures show butter and water in solid states. The melting point of each substance is shown.

**Butter**



Melting Point: 35°C

**Water**



Melting Point: 0°C

**Students put solid butter and solid water on a table. The air temperature around the table is 20°C.**

**Which statement describes the most likely state of each substance after 2 hours?**

- M.** The butter and water will both remain solids.
- P.** The butter and water will both become liquids.
- R.** The butter will remain a solid, and the water will become a liquid.
- S.** The butter will become a liquid, and the water will remain a solid.

**35. Students studying constellations noticed that some constellations, like the Big Dipper, can be seen in the Tennessee night sky all year long. Other constellations can be seen only during certain parts of the year. One of the students explained why some constellations can be seen only during certain parts of the year.**

1. All stars appear to revolve around the North Star in the night sky.
2. The Big Dipper is close to the North Star, so it appears to move in a small circle around the North Star and stays above the horizon all year long.
3. Some constellations revolve farther away from the North Star than the Big Dipper does.
4. Since they are farther away, some constellations appear to move in a large circle around the North Star.
5. These circles are so large that part of them goes below the horizon.
6. Therefore, some constellations stay below the horizon at night during certain parts of the year.

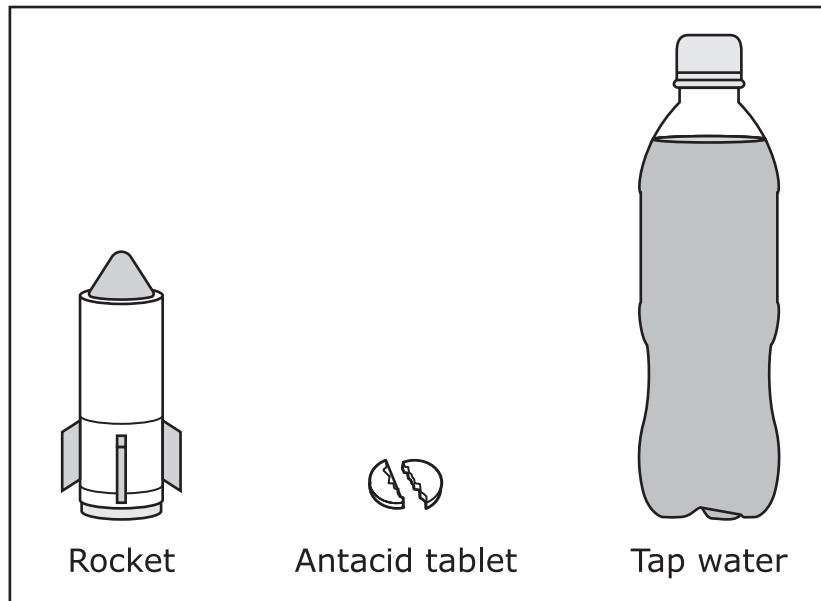
**Which part of the student's explanation best describes why some constellations stay below the horizon at night?**

- A. Statement 1
- B. Statement 2
- C. Statement 3
- D. Statement 5

36. Students build a model rocket. The rocket uses a dissolving antacid tablet for power. The students want to know if the size of the pieces of antacid tablet affects the distance that the rocket flies.

Students pour 20 milliliters of tap water into the rocket. Then they add half an antacid tablet to the water and close the rocket. They launch the rocket and measure the distance it flies. The diagram shows the materials used.

## Students' Materials



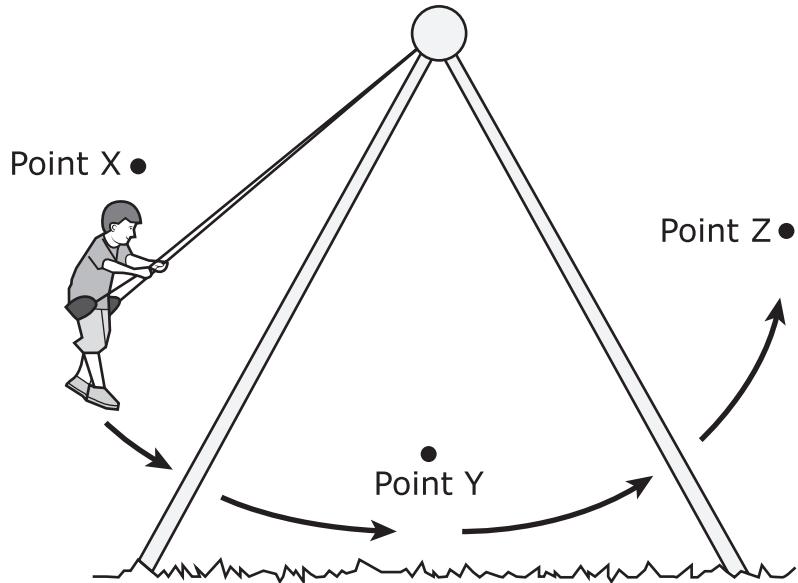
**Which change will help the students answer their question?**

- M.** Repeat the same process three times to improve precision.
- P.** Use a full antacid tablet for the trial instead of half an antacid tablet.
- R.** Do several trials, adding half an antacid tablet to different amounts of water.
- S.** Do one trial using half an antacid tablet broken into a few pieces and one trial using a powdered half of an antacid tablet.

37. A student is swinging on a swing. The table shows data on the positions of the student during six seconds.

### Student Positions

Time	Position
0 seconds	X
1 second	Y
2 seconds	Z
3 seconds	Y
4 seconds	X
5 seconds	Y
6 seconds	Z

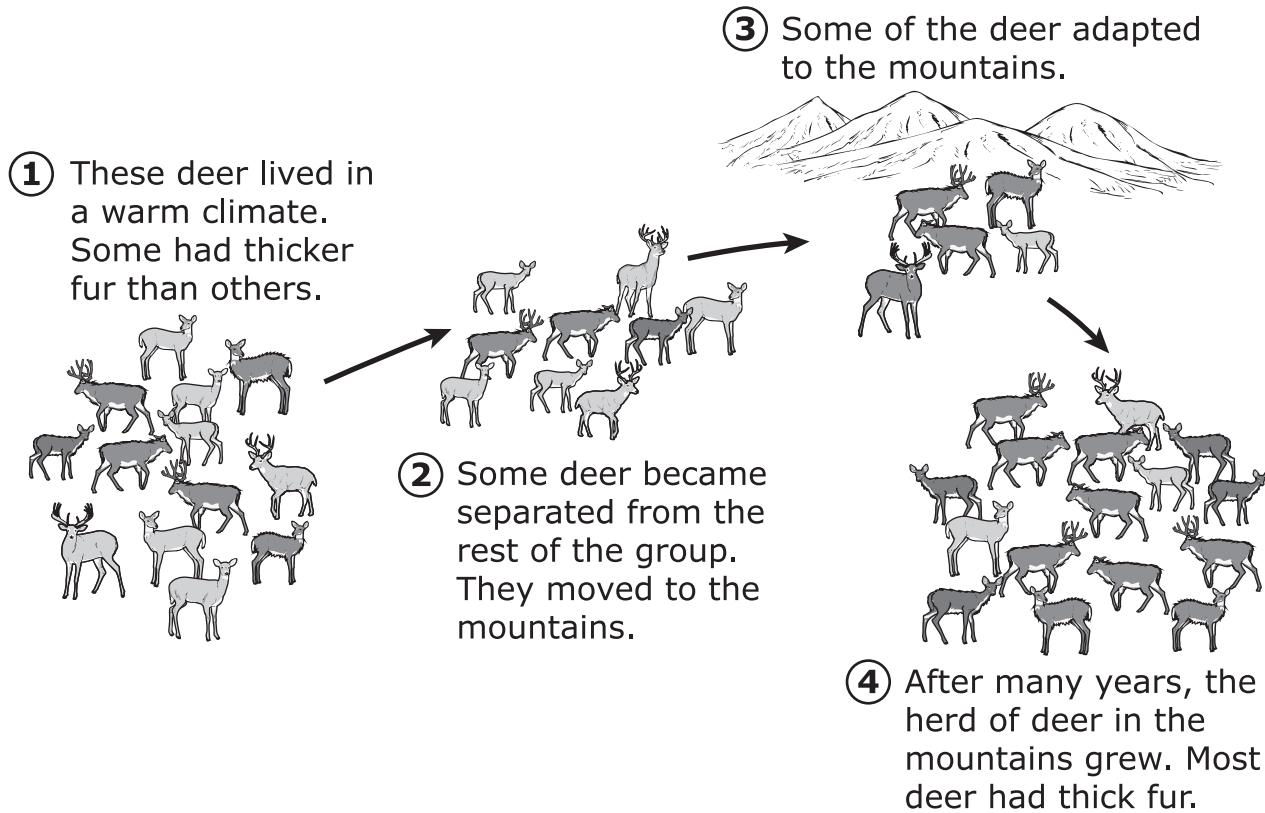


Which two predictions show where the student will be if the pattern continues?

- A. 7 seconds = Point Y
- B. 8 seconds = Point Z
- C. 9 seconds = Point X
- D. 10 seconds = Point X
- E. 11 seconds = Point Y

38. The diagram shows changes within a herd of deer over many hundreds of years.

## Changes Within a Deer Herd Over Time



**Which statement best explains why some deer that went to the mountains survived and others did not?**

- M.** The deer with the thicker fur were able to survive because they could reproduce in the summer.
- P.** The deer with the thicker fur were able to survive because they could digest foods faster in the mountains.
- R.** The deer with the thicker fur were able to survive because they were smaller and could hide in the snow more easily.
- S.** The deer with the thicker fur were able to survive because they could withstand the cold weather in the mountains.

39. The size of a galaxy is determined by measuring the distance across the widest part. The sizes of some galaxies are given in the table. There are many other galaxies, larger and smaller than the Milky Way, that are not included in the table.

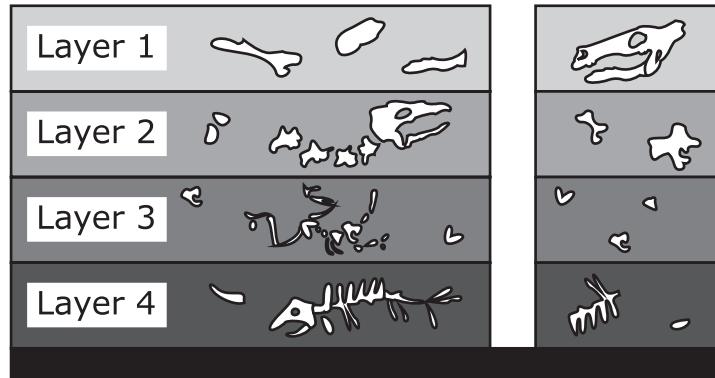
### Galaxy Sizes

Galaxy Name	Size (light-years)
NGC 1316	220,000
Milky Way	100,000
M33	60,000
Cygnus A	500,000
UGC 10214	390,000

Based on the data, which statement correctly compares the Milky Way to other galaxies?

- A. The Milky Way galaxy is the fourth-largest galaxy in the universe.
- B. The Milky Way galaxy is not one of the largest galaxies in the universe.
- C. The galaxies in the universe do not get any smaller than the size of the Milky Way.
- D. The galaxies in the universe do not get any bigger than twice the size of the Milky Way.

40. The diagram shows four layers of sediment under the ground. A vertical shaft was dug and fossils were collected from each layer.



Which three statements can students make about these soil layers?

- M. Fossils collected from Layer 1 will be younger than those collected from Layer 4.
- P. Fossils collected from Layer 3 will contain organisms larger than those collected from Layer 2.
- R. Fossils collected from Layer 1 will be the same age as those collected from Layer 3.
- S. Fossils collected from Layer 4 will be older than those collected from Layer 2.
- T. Fossils collected from Layer 2 could be closely related to those collected from Layer 1.

- 41. Students completed four investigations where they combined two different substances.**

**Which investigation shows evidence that the chemical properties of the substances changed?**

- A.** Sand sinks in water when water and sand are combined.
- B.** Salt dissolves in water when salt and water are combined.
- C.** Bubbles form when baking soda and vinegar are combined.
- D.** Vegetable oil coats the surface of lettuce when oil and lettuce are combined.

42. Woolly mammoths were large extinct animals that had features similar to elephants. Scientists have learned about woolly mammoths by studying their fossils.

The table compares features found on woolly mammoth fossils to features of modern African elephants.

### Woolly Mammoths and African Elephants

Feature	Woolly Mammoth	African Elephant
Tusks	Very long and curved	Long and curved
Ears	Small	Large
Tail	Short	Long
Trunk	Long and flexible	Long and flexible
Body Covering	Long, coarse fur	Thick, leathery skin
Height	About 3.3 m	About 3.3 m

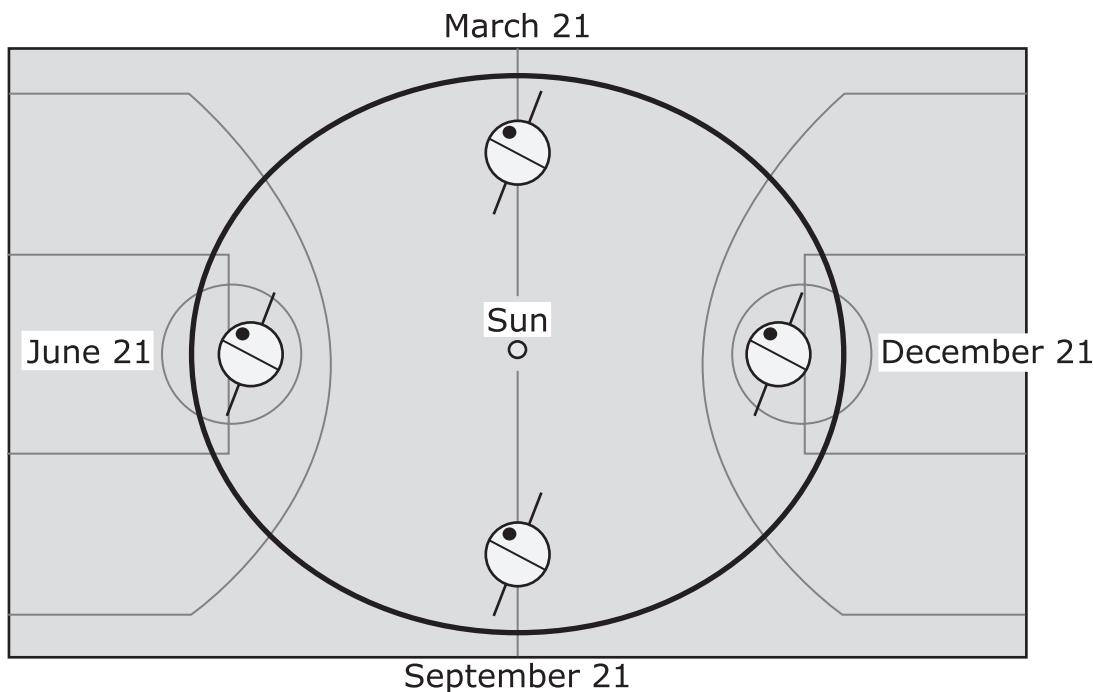
**Woolly mammoths were adapted to cold climates. African elephants have adapted to warmer climates. Which statement about the animals' features best shows this difference?**

- M. The animals have the same tusk shape and different-sized ears.
- P. The animals have similar trunks and different-sized tails.
- R. The animals are about the same height and have different-sized tusks.
- S. The animals have different body coverings and different-sized ears.

Questions 43 – 46 refer to the passage(s) and image(s) shown.

## Plants and Seasons – Part 1

Students are building a model of the Earth-sun system to study the seasons of Earth. They first find out the average distance between Earth and the sun and set up a demonstration in the gym. They place a bright lamp in the center of the room to represent the sun. Then, they put tape in a path that represents Earth's orbit around the sun. They label four different dates next to the tape that show where Earth is during four different times of the year. The diagram shows what the model looks like from above.



Next, they examine the way Earth is tilted when it orbits the sun. They use a foam ball to represent Earth. They stick a pencil through the ball. A student tilts the ball at  $23.5^\circ$  and walks around the sun at the center of the gym. They also draw a black dot on the foam ball to represent Tennessee on Earth's surface in the Northern Hemisphere.

The students walk around the gym floor by following the tape on the ground representing Earth's orbit. They write down the angle at which Earth is located during the dates on the gym floor. Their findings are shown in the table.

	<b>December 21</b>	<b>March 21</b>	<b>June 21</b>	<b>September 21</b>
<b>Northern Hemisphere</b>	Angled away from sun	Not angled toward or away from sun	Angled toward sun	Not angled toward or away from sun
<b>Southern Hemisphere</b>	Angled toward sun		Angled away from sun	

**43. Based on the location of the dot on the foam ball, what is the reason for the difference in the seasons between December and June?**

- A.** Earth is closer to the sun in December and farther away in June.
- B.** Earth is closer to the sun in June and farther away in December.
- C.** Earth is tilted away from the sun in December and tilted toward the sun in June.
- D.** Earth is tilted away from the sun in June and tilted toward the sun in December.

**44. Which statement correctly describes how the number of daylight hours is different at different times of the year in Tennessee?**

- M.** The number of daylight hours is greater in December than it is in March.
- P.** The number of daylight hours is greater in June than it is in December.
- R.** The number of daylight hours is greater in September than it is in June.
- S.** The number of daylight hours is greater in March than it is in September.

**45. How do plants grow differently in March compared to September?**

- A.** As the days become steadily longer, plants grow better in Tennessee.
- B.** As the days become steadily shorter, plants grow better in Tennessee.
- C.** As Earth travels farther from the sun, plants grow better in Tennessee.
- D.** As Earth travels closer to the sun, plants grow better in Tennessee.

**46. Which seasons are the correct labels for one of the dates on the model?**

- M.** September 21: winter in the Northern Hemisphere, spring in the Southern Hemisphere
- P.** December 21: winter in the Northern Hemisphere, summer in the Southern Hemisphere
- R.** June 21: spring in the Northern Hemisphere, summer in the Southern Hemisphere
- S.** March 21: spring in the Northern Hemisphere, spring in the Southern Hemisphere

Questions 47 – 49 refer to the passage(s) and image(s) shown.

## Plants and Seasons – Part 2

The class decides to conduct an investigation to determine how day length affects plant growth. The students learn that there is a type of plant that is native to Tennessee and a variety of that same plant that grows in Nicaragua in Central America.

Their teacher was able to find seeds of this plant from Nicaragua. The students grow the plants native to Nicaragua during the month of December in two greenhouses in Tennessee. In one greenhouse, they use grow lamps to simulate the daylight length in Nicaragua. All other growing conditions for the plants are the same in both greenhouses. This includes the amount of water used and the amount and type of soil used. The students want to make sure that all the growing conditions besides day length are the same so they can compare how the day length will affect the plant growth.

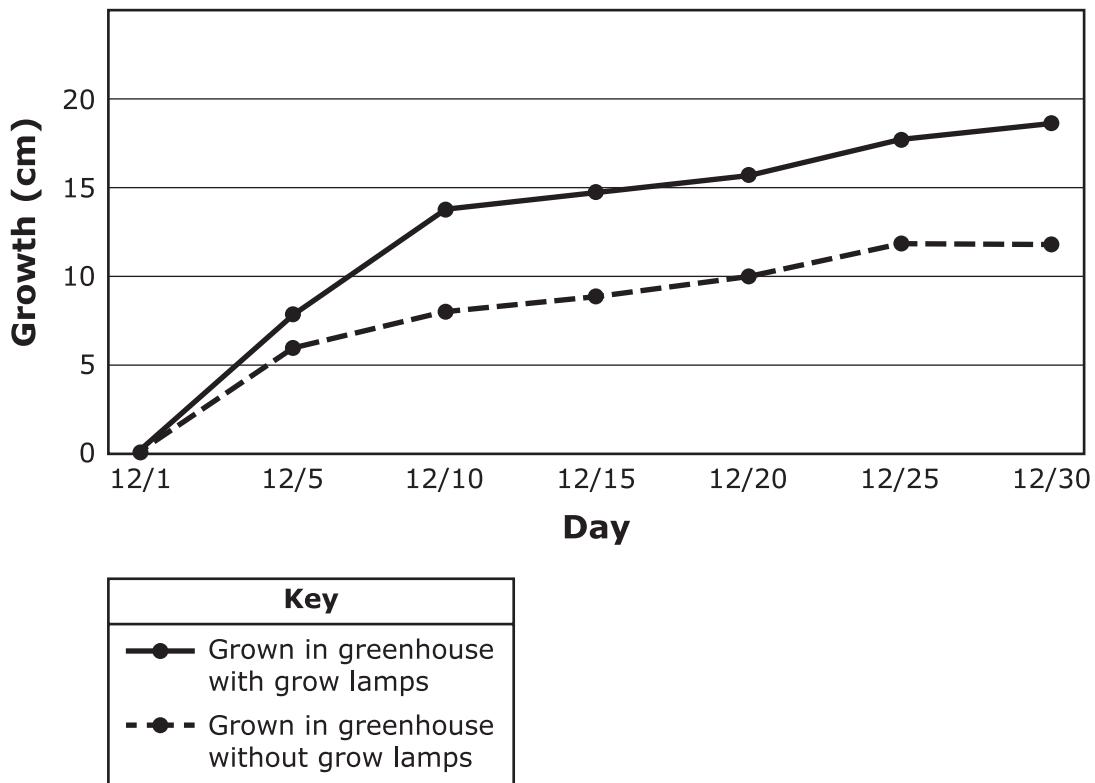
The students research and find out the day lengths in both Tennessee and Nicaragua. The table shows the day lengths for both locations during the month of December.

**Day Length for the Month of December**

	Tennessee	Nicaragua
Date	Day Lengths (number of hours)	
12/1	9.5	11.3
12/5	9.5	11.3
12/10	9.5	11.3
12/15	9.4	11.3
12/20	9.4	11.2
12/25	9.4	11.2
12/30	9.4	11.2

The students create a double-line graph to show the growth of the plants from both greenhouses.

## Average Plant Growth for Plants Grown in Greenhouses in Tennessee



**47. Based on the results of the study, which explanation describes the main benefit to growing plants from Nicaragua indoors under grow lamps when they are grown in Tennessee?**

- A.** The lamps reduce the temperature to match what the plants normally receive.
- B.** The lamps can control the amount of time the plants receive light to match what the plants normally receive.
- C.** Growing the plants indoors exposes them to weather different from what they normally receive.
- D.** Growing the plants indoors provides the plants with the protection from insects they normally receive.

**48. Based on the data from the table, which statement best explains how plants grown in Nicaragua will compare to greenhouse plants grown in Tennessee in December?**

- M.** The plants will grow better in Nicaragua than they will in Tennessee because there are fewer nutrients in the soil.
- P.** The plants will grow better in Nicaragua than they will in Tennessee because the daytime temperatures are colder.
- R.** The plants will grow better in Nicaragua than they will in Tennessee because the days are longer.
- S.** The plants will grow better in Nicaragua than they will in Tennessee because there are more days with cloud cover.

49. Some plants were planted outside in Tennessee in January. The plants did not germinate. The plants most likely did not grow because

- A. the soil temperature was too high.
- B. the soil contained too many nutrients.
- C. the soil did not receive enough direct sunlight.
- D. the soil did not receive enough moonlight in the evening.

50. A glass contains 300 grams of water. A student puts 25 grams of sugar in the water. The student then stirs the water until the sugar is no longer visible.

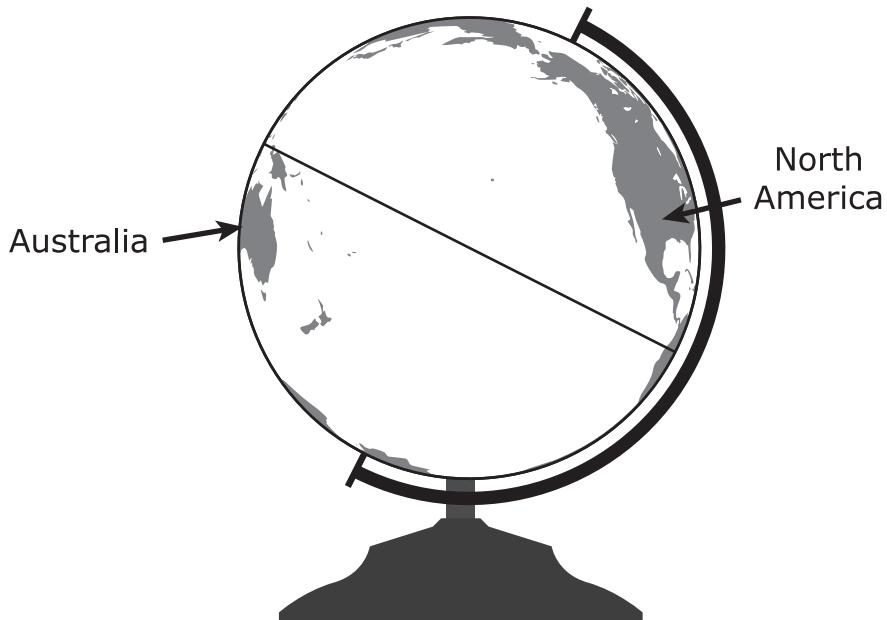
What is the mass of the mixture in the glass?

- M. 25 grams
- P. 275 grams
- R. 300 grams
- S. 325 grams

51. Which of these most likely describes a behavior that an animal learns and is not an instinct?

- A. A moth keeps flying around a bright light many times.
- B. A kitten makes purring sounds as a mother cat cleans its fur.
- C. A dog sits quietly and waits while its owner opens a bag of dog treats.
- D. A sea turtle returns to the location where it was hatched and lays its eggs there.

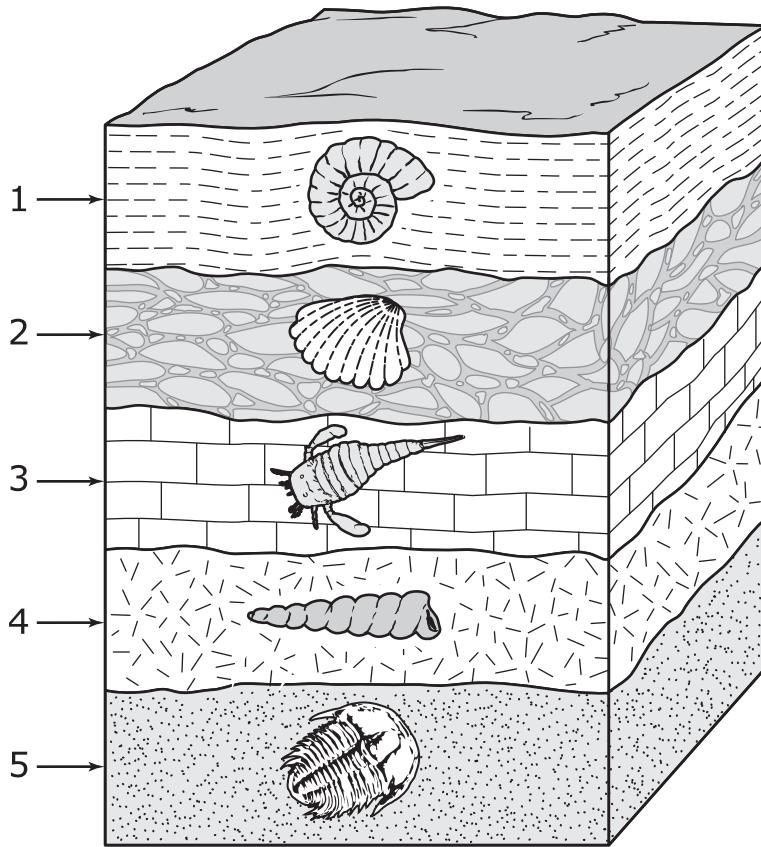
52. Two identical basketballs in two different continents are dropped from the same height above the ground. Basketball 1 is located in North America in the Northern Hemisphere. Basketball 2 is located in Australia in the Southern Hemisphere.



**Which two statements are correct about the gravity acting on Ball 1 and Ball 2?**

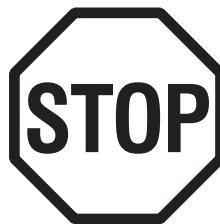
- M. Earth's gravity causes the balls to fall away from each other.
- P. Earth's gravity causes the balls to fall directly toward each other.
- R. Earth's gravity causes both balls to experience a force directed toward Earth's center.
- S. The gravity acting on Ball 1 points to the same location as the gravity acting on Ball 2.
- T. The gravity acting on Ball 1 points in the same direction as the gravity acting on Ball 2.

53. The diagram shows fossils in rock layers. Rock layer 5 formed first.



Which of these correctly compares the age of the fossil in rock layer 3 to fossils in the other rock layers?

- A. The fossil in rock layer 3 is younger than the fossils in rock layers 1 and 2.
- B. The fossil in rock layer 3 is the same age as the fossils in rock layers 2 and 4.
- C. The fossil in rock layer 3 is younger than the fossil in rock layer 2 and older than the fossil in rock layer 5.
- D. The fossil in rock layer 3 is older than the fossil in rock layer 2 and younger than the fossil in rock layer 5.



This is the end of the Grade 5 Science test.

1. ● (B) (C) (D)
2. (M) ● (R) (S)
3. ● (B) ● ● (E) (select **three**)
4. (M) (P) ● (S)
5. ● (B) (C) (D)
6. (M) (P) ● ● ● (select **three**)
7. (A) (B) (C) ●
8. (M) (P) ● (S)
9. (A) (B) (C) ●
10. (M) (P) (R) ●
11. ● (B) (C) (D)
12. (M) (P) ● (S)
13. (A) ● (C) (D)
14. ● (P) (R) (S)
15. (A) (B) (C) ●
16. (M) ● (R) (S)
17. ● (B) (C) (D)
18. (M) ● (R) (S)
19. (A) (B) ● (D) ● (select **two**)
20. (M) (P) ● (S)
21. (A) ● (C) (D)
22. (M) ● ● (S) ● (select **three**)
23. ● (B) (C) (D)
24. ● (P) ● (S) (T) (select **two**)
25. ● (B) (C) (D)
26. (M) (P) ● (S)

27. (A) (B) (C) ●
28. ● (P) (R) (S)
29. (A) ● (C) (D)
30. ● (P) (R) (S)
31. (A) (B) (C) ●
32. ● (P) (R) (S)
33. ● (B) (C) (D)
34. (M) (P) ● (S)
35. (A) (B) (C) ●
36. (M) (P) (R) ●
37. ● (B) (C) (D) ● (select **two**)
38. (M) (P) (R) ●
39. (A) ● (C) (D)
40. ● (P) (R) ● ● (select **three**)
41. (A) (B) ● (D)
42. (M) (P) (R) ●
43. (A) (B) ● (D)
44. (M) ● (R) (S)
45. ● (B) (C) (D)
46. (M) ● (R) (S)
47. (A) ● (C) (D)
48. (M) (P) ● (S)
49. (A) (B) ● (D)
50. (M) (P) (R) ●
51. (A) (B) ● (D)
52. (M) (P) ● ● (T) (select **two**)
53. (A) (B) (C) ●

**TCAP Practice Test Standards Alignment and Key - Grade 5 Science**

<b>Question No.</b>	<b>Key</b>	<b>Standard</b>
1	A	5.LS4.1
2	P	5.ESS1.6
3	A, C, D	5.LS3.2
4	R	5.ESS1.2
5	A	5.PS1.2
6	R, S, T	5.LS1.1
7	D	5.ESS1.1
8	R	5.PS2.2
9	D	5.ESS1.4
10	S	5.PS2.1
11	A	5.PS2.1
12	R	5.PS2.1
13	B	5.PS2.1
14	M	5.ETS2.3
15	D	5.ETS2.3
16	P	5.ETS2.3
17	A	5.LS4.1
18	P	5.PS1.3
19	C, E	5.PS1.4
20	R	5.LS4.2
21	B	5.ESS1.2
22	P, R, T	5.PS1.1
23	A	5.ESS1.4
24	M, R	5.ESS1.1
25	A	5.PS2.5
26	R	5.LS3.2
27	D	5.ESS1.3
28	M	5.ESS1.3
29	B	5.PS2.4
30	M	5.PS2.4
31	D	5.PS2.4

<b>Question No.</b>	<b>Key</b>	<b>Standard</b>
32	M	5.ESS1.3
33	A	5.PS2.4
34	R	5.PS1.1
35	D	5.ESS1.6
36	S	5.PS1.3
37	A, E	5.PS2.2
38	S	5.LS4.2
39	B	5.ESS1.2
40	M, S, T	5.ESS1.7
41	C	5.PS1.4
42	S	5.LS4.1
43	C	5.ESS1.5
44	P	5.ESS1.5
45	A	5.LS3.1
46	P	5.ESS1.5
47	B	5.LS3.1
48	R	5.LS3.1
49	C	5.LS3.1
50	S	5.PS1.2
51	C	5.LS1.1
52	R, S	5.PS2.3
53	D	5.ESS1.7