

Student Name _____

Teacher Name _____

School _____

System _____

ACH



TENNESSEE

LEARNING

Tennessee Comprehensive Assessment Program Achievement Test ~ Grade 7 Practice Test





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Science

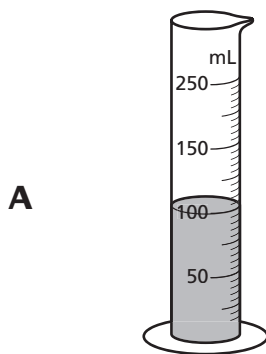


Part 1

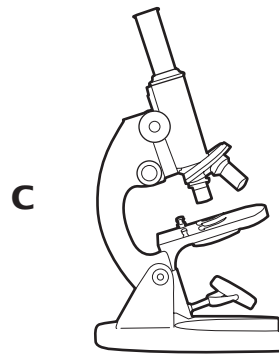
- 1** Students were investigating some properties of rocks. They wanted to compare the volumes of the rocks.



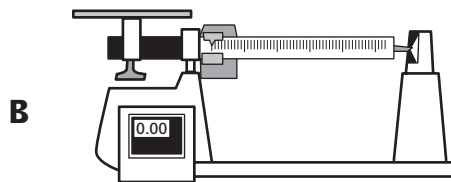
Which tool should the students use to accurately measure the volume of each rock?



Graduated Cylinder



Light Microscope



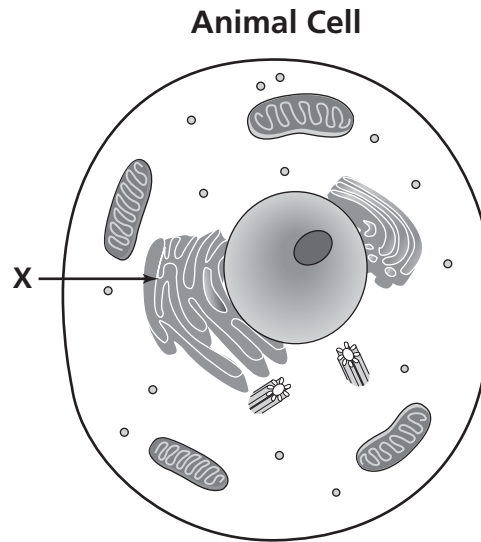
Balance



Ruler

Go On ►

- 2** An animal cell is shown in the diagram below.

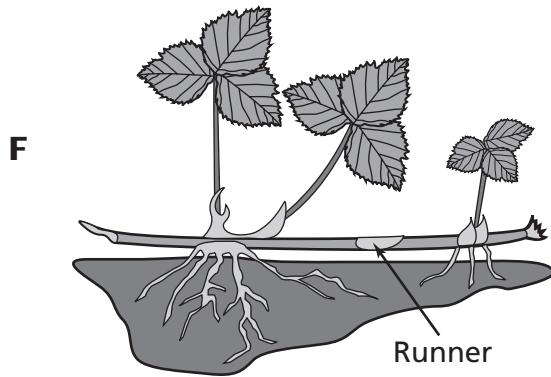


What organelle is identified by the X?

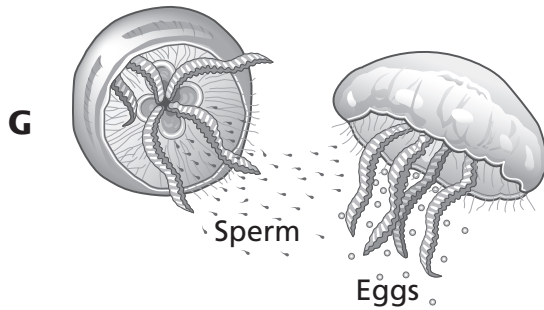
- F** centriole
 - G** ribosome
 - H** Golgi apparatus
 - J** endoplasmic reticulum
- 3** Which of these equations best shows the reactants and products of cellular respiration?
- A** carbon dioxide + water \rightarrow sugar + oxygen
 - B** water + oxygen \rightarrow sugar + carbon dioxide
 - C** sugar + oxygen \rightarrow carbon dioxide + water
 - D** sugar + carbon dioxide \rightarrow oxygen + water

4 Which diagram is the best example of an organism undergoing sexual reproduction?

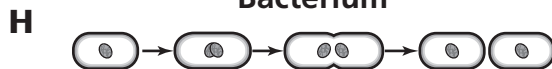
Strawberry Plant



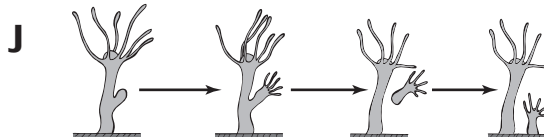
Jellyfish



Bacterium

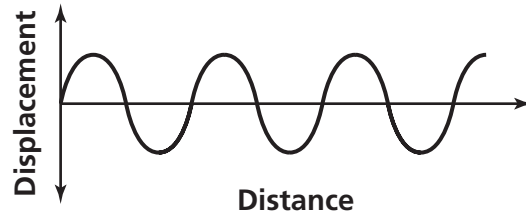


Hydra



Go On ►

- 5** A wave is shown in the diagram below.



Which best describes the wave?

- A** The wavelength ends at the crest.
- B** The amplitude equals the wavelength.
- C** The amplitude of the crest equals the amplitude of the trough.
- D** The wavelength is the height of the crest plus the height of the trough.

- 6** Which of these must happen for the sea floor to spread apart?

- F** a flood
- G** a hurricane
- H** plate movement
- J** volcanic eruption

- 7** Some processes in the rock cycle are described in the chart below.

Some Processes in the Rock Cycle

1	New rock forms from rock that is melted and then cools.
2	New rock forms after rock experiences high temperatures and pressure.
3	New rock forms after pieces of rock weather and then erode and are deposited in layers.

What type of rock is most likely formed by process 1?

- A** sedimentary
- B** igneous
- C** metamorphic
- D** magma

- 8** The main function of which system is to help protect inner organs from being damaged by an outside force?

- F** excretory
- G** nervous
- H** skeletal
- J** circulatory

- 9** The characteristic for having dimples (D) is dominant to the characteristic for not having dimples (d). A Punnett square showing a cross between a dimpled person and a non-dimpled person is shown below.

	D	d
d		
d		

What percentage of the offspring from this cross will most likely have dimples?

- A** 25%
- B** 50%
- C** 75%
- D** 100%

10 Different types of water pollution and their effects are described in the table below.

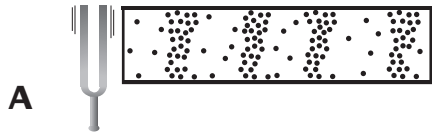
Descriptions of Water Pollution

Type	Effect
Raw Sewage	Illnesses such as typhoid and hepatitis can spread to humans
Phosphate and Nitrate	Increases algae, then decaying algae uses up oxygen in water
Poison	Stored in the bodies of fish and builds up in organisms that eat fish
Oil	Becomes stuck on bird feathers
Thermal (heat)	Causes water to be less able to contain oxygen; causes bacteria to grow

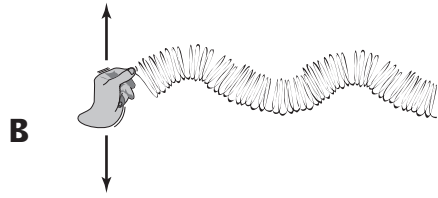
Based on the table, which results from both phosphate and nitrate pollution and thermal (heat) pollution in water?

- F** Diseases are carried through the water.
- G** Materials contaminate the bodies of birds.
- H** Growth of algae rapidly increases.
- J** Levels of oxygen in the water decrease.

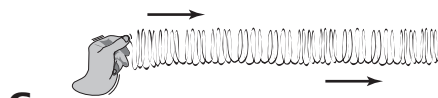
11 Which diagram shows only a transverse wave?



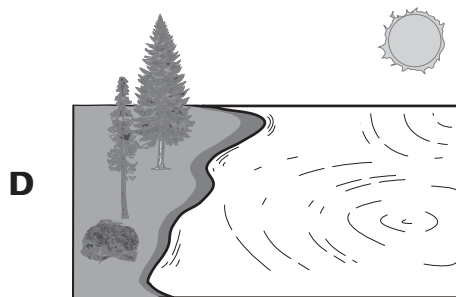
A tuning fork producing sound



A coil spring vibrating up and down



A coil spring vibrating horizontally

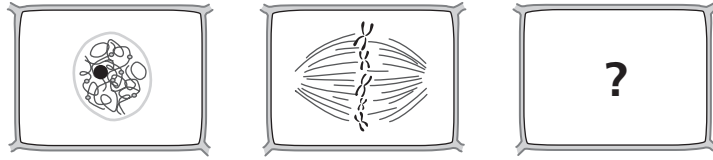


Water traveling toward a shore

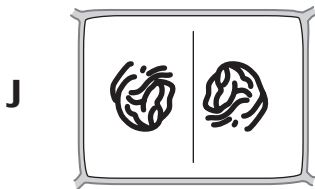
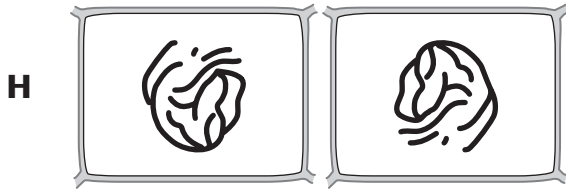
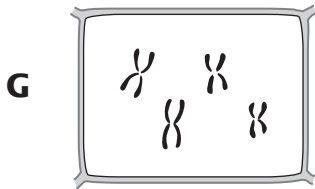
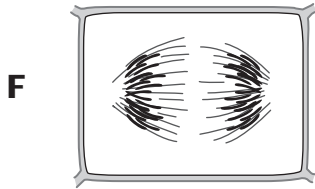
- 12** Scientists theorize that the Atlantic Ocean is slowly increasing in width. Which is the best approximation of the rate at which lithospheric plates beneath the Atlantic Ocean are moving?
- F** 2 millimeters per year
 - G** 2 centimeters per year
 - H** 2 meters per year
 - J** 2 kilometers per year

- 13** A screw is an example of a simple machine that would be most useful for
- A** cutting a sandwich.
 - B** hammering a nail.
 - C** opening a corked bottle.
 - D** lifting a rock.

14 Some phases of a dividing plant cell are shown in the diagram.



What is the next phase of plant cell division?



15 Some researchers are developing a new fertilizer designed to improve the growth of plants in hot, dry climates. The fertilizer was applied to one hundred desert plants in a greenhouse. The average daytime temperature in the greenhouse was 90°F, and the humidity levels were low. Which is best for the researchers to do next?

- A** compare plants that received fertilizer to similar plants that received none
- B** begin selling the fertilizer to gardeners living in hot, dry climates
- C** change the conditions in the greenhouse and retest the fertilizer
- D** test the fertilizer on plants that are adapted to cooler climates

16 A student performed 50 joules of work by raising an object 2 meters with a pulley.

$$\text{Force} = \frac{\text{work}}{\text{distance}}$$
$$F = \frac{W}{d}$$

What was the force on the object?

- F** 25 newtons
- G** 48 newtons
- H** 52 newtons
- J** 100 newtons

17 Which is not a major function of the muscular system?

- A** moving the bones of the skeleton
- B** helping the stomach digest food
- C** helping the lungs take in air
- D** relaying messages to the brain

- 18** Students observed an unknown mineral. The mineral was yellow, had a white streak, and was able to be scratched by quartz.

Mineral Properties

Name	Hardness	Common colors	Streak color
Sulfur	2	Yellow, yellow-brown	Yellow
Calcite	3	White, colorless, yellow, pink	White
Quartz	7	White, colorless, pink, gray	White
Topaz	8	Clear, yellow, orange	White
Diamond	10	White, colorless, yellow, brown	White

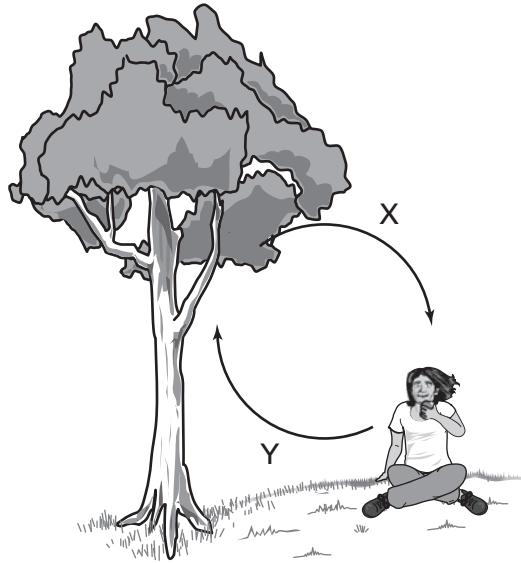
Based on the table, which of these minerals were the students most likely observing?

- F** Sulfur
- G** Calcite
- H** Topaz
- J** Diamond

- 19** Which is the best example of an adaptive bioengineered product?

- A** sugar cane that is processed to make fuel
- B** mules that are bred from horses and donkeys for farm work
- C** ladybugs that are raised to eat garden pests
- D** eyeglasses that are used to correct near-sighted vision

20 The picture shows an exchange of gases between plants and animals.



What gas is most likely represented by the arrow labeled X?

- F** carbon dioxide
- G** hydrogen
- H** nitrogen
- J** oxygen

21 Which structure of a flower is correctly matched with its function?

- A** The petal protects young buds.
- B** The stamen produces female gametes.
- C** The pistil guides pollen to the ovary.
- D** The anther holds the ovule.

Go On ►

- 22** Students in a science class were observing properties of an unknown mineral. The mineral was soft enough to be scratched by a fingernail. The students compared the hardness of the mineral to the chart below.

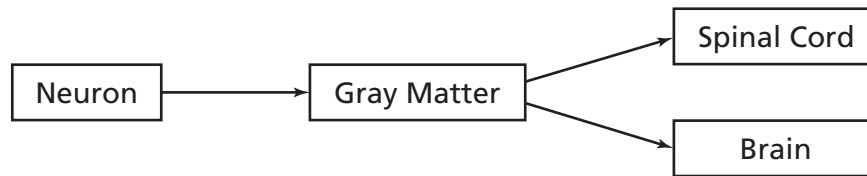
Mineral Hardness Chart

1	Talc
2	Gypsum
2.5	Fingernail
3	Calcite
3.5	Penny
4	Fluorite
5	Apatite
5.5	Steel File
6	Feldspar

Which mineral could the students have been observing?

- F** Gypsum
 - G** Calcite
 - H** Apatite
 - J** Feldspar
- 23** Which is the best example of Newton's first law of motion?
- A** A basketball thrown in the air falls to the ground.
 - B** A soccer ball remains motionless until it is kicked by a player.
 - C** A baseball player swings at an approaching ball.
 - D** An ice skater pushes off from a wall and moves backwards.

24 The chart shows structures that work together in an organism.



What do the structures as a whole represent?

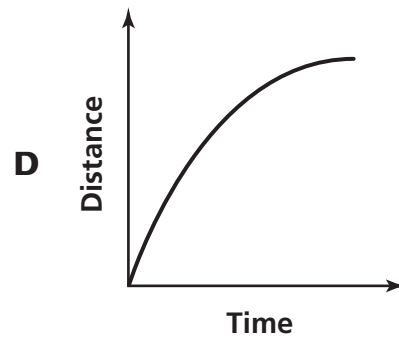
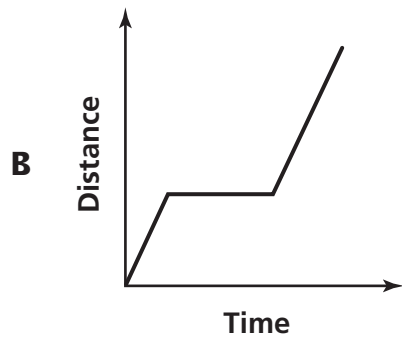
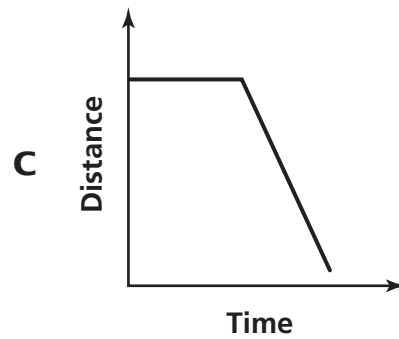
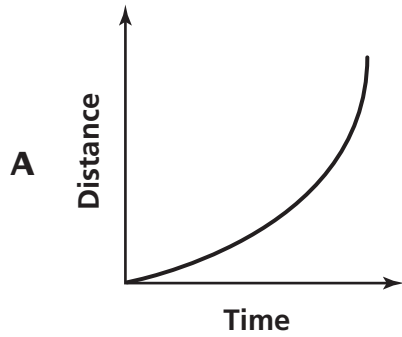
- F** an organ system
- G** an organ
- H** a tissue
- J** a cell

- 25** A student took a field trip on a bus. The student recorded the distance traveled by the bus every 10 minutes for one hour. The student's data are shown below.

Field Trip Time vs. Distance

Time (minutes)	Distance from School (kilometers)
0	0
10	8
20	28
30	50
40	74
50	80
60	85

Which line best represents the data?



26 Use the equation to solve the problem.

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

A cheetah can run at a rate of 30 meters per second. How far could a cheetah travel in 60 seconds?

- F** 90 meters
- G** 120 meters
- H** 150 meters
- J** 1800 meters

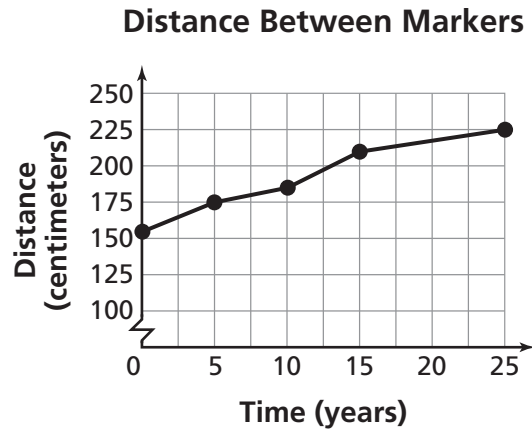
27 Medical researchers are developing a wireless blood pressure monitoring system for use in hospitals. This system allows nurses to measure a patient's blood pressure without awakening the patient. Which is the intended benefit of this technology?

- A** Patients will not be disturbed.
- B** Patients will have to take fewer medications.
- C** Patients can experience pain relief.
- D** Patients can avoid having surgery.

28 Which of these best describes the composition of the inner core of Earth?

- F** liquid iron and nickel
- G** carbon dioxide and ice
- H** quartz and oxygen
- J** solid iron and nickel

29 Scientists measured the movement of tectonic plates relative to one another over time by placing markers on either side of a fault. The graph below displays the results.



Which data set was most likely used to create the graph?

Distance Between Markers

A

Time (years)	Distance (centimeters)
1	155
2	175
3	185
4	210
5	225

Distance Between Markers

C

Time (years)	Distance (centimeters)
1	225
2	210
3	185
4	175
5	155

Distance Between Markers

B

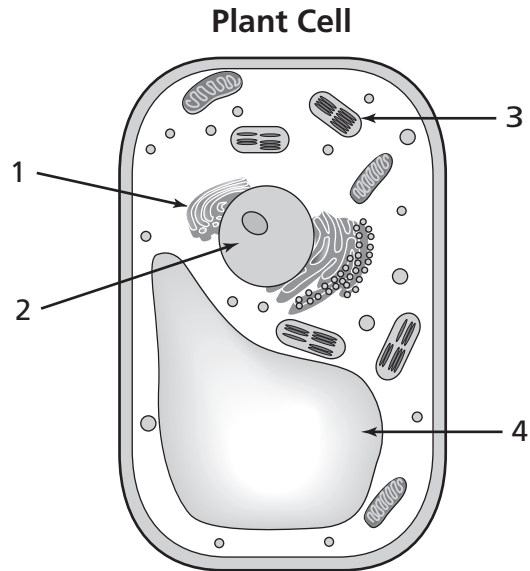
Time (years)	Distance (centimeters)
155	0
175	5
185	10
210	15
225	25

Distance Between Markers

D

Time (years)	Distance (centimeters)
0	155
5	175
10	185
15	210
25	225

30 The diagram shows some organelles in a plant cell.



Which organelle captures and absorbs light energy?

- F** 1
- G** 2
- H** 3
- J** 4

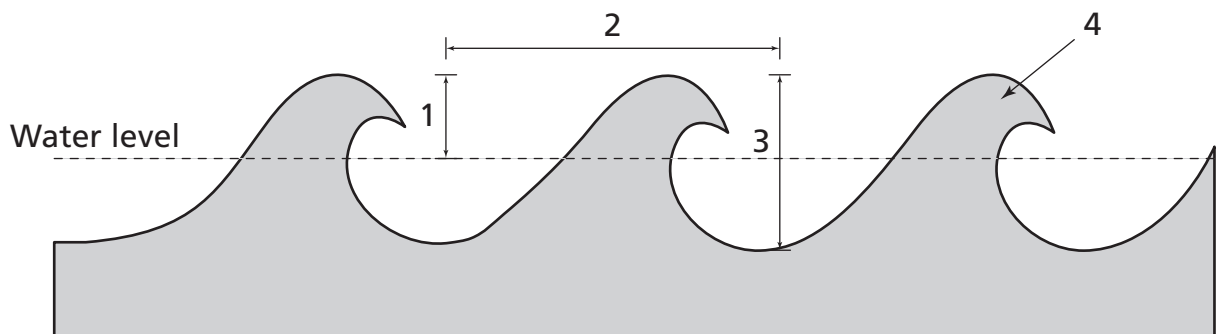
- 31** In guinea pigs, black fur (B) is dominant to white fur (b). A Punnett square of a cross between a black-furred and a white-furred guinea pig is shown below.

	B	b
b		
b		

What can be determined from this Punnett square?

- A** There is a 100% chance that these guinea pigs will have live offspring.
- B** There is a 100% chance that these guinea pigs will have four offspring.
- C** There is a 50% chance that the offspring will have gray fur.
- D** There is a 50% chance that the offspring will have black fur.

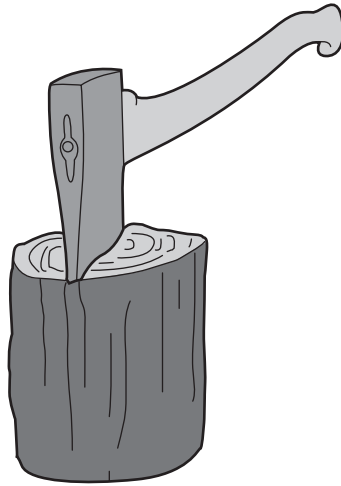
- 32** Scientists measured the amplitude of ocean waves during a storm.



Which part of the diagram shows the amplitude of a wave?

- F** 1
- G** 2
- H** 3
- J** 4

33 A logger splits a piece of wood.



What simple machine splits the wood?

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

34 Which processes can change a metamorphic rock into an igneous rock?

- F** weathering and erosion
- G** melting and cooling
- H** deposition and cementation
- J** heat and pressure

35 Which is a major function of the human reproductive system?

- A** protecting internal organs
- B** producing gametes
- C** breaking down food
- D** eliminating wastes

STOP 

Part 2

36 The Andes Mountains of South America were gradually formed when the Nazca and South American tectonic plates collided. Which of these caused this collision?

- F** convection currents in Earth's mantle
- G** volcanic activity in Earth's crust
- H** movement of material within Earth's core
- J** changes in Earth's magnetic field

37 During respiration, what substances combine to release energy for the cell?

- A** glucose and oxygen
- B** oxygen and carbon dioxide
- C** glucose and water
- D** water and oxygen

38 Which statement best explains the difference between longitudinal and transverse waves?

- F** Longitudinal waves have troughs, while transverse waves have crests.
- G** Longitudinal waves produce energy, while transverse waves consume energy.
- H** Particles in longitudinal waves travel towards a force, while particles in transverse waves travel away from a force.
- J** Particles in longitudinal waves travel in the direction of the wave, while particles in transverse waves travel perpendicular to the wave.

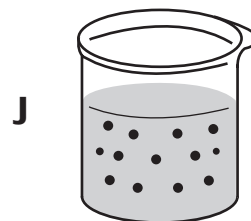
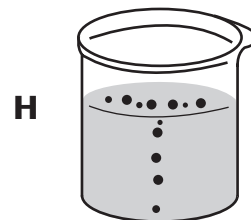
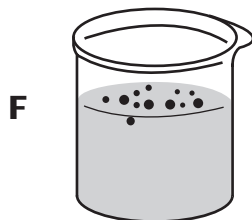
39 Which is the best description of where earthquakes are likely to occur?

- A in the middle of a continent
- B along a coastline
- C along two plate boundaries
- D in the middle of an ocean

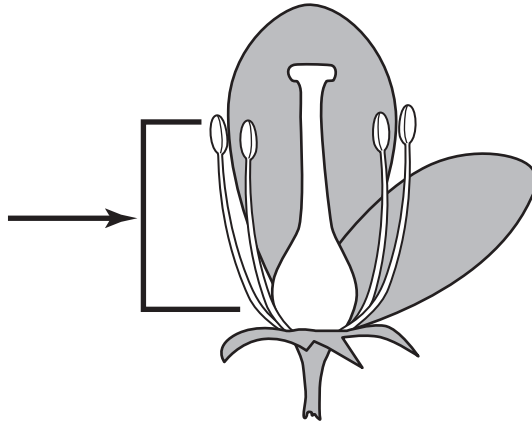
40 A student adds drops of dye to a beaker of room-temperature water, as shown in the diagram below.



Which diagram best shows the end result of diffusion?



41 A flower is shown in the diagram.



What is the main function of the flower part indicated by the arrow?

- A** attracting pollinators
- B** producing pollen
- C** protecting the ovule
- D** supporting the pistil

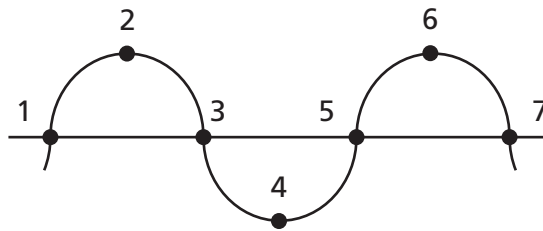
42 Which layer of Earth is composed mostly of liquid water and different types of rock crystals such as quartz?

- F** crust
- G** mantle
- H** inner core
- J** outer core

43 Which of these is the best reason to use a renewable energy source instead of relying on fossil fuels?

- A** Fossil fuels can be solids, liquids, or gases.
- B** Fossil fuels power many different devices.
- C** Fossil fuels form naturally on Earth.
- D** Fossil fuels create many kinds of pollution.

44 Some points are marked on a wave, as shown in the diagram below.



The wavelength is the distance between which points?

- F** 1 and 3
- G** 2 and 6
- H** 4 and 5
- J** 1 and 7

45 A gardener uses a lever to lift a rock from the ground. The gardener applies a force of 50 newtons and moves the rock 1.5 meters.

$$w = F \times d$$

How much work is being done by the gardener?

- A** 33.0 newton-meters
- B** 48.5 newton-meters
- C** 51.5 newton-meters
- D** 75.0 newton-meters

Go On ►

46 A scientist investigates the effect of carbon dioxide on plant height. The scientist grows plants in several closed containers. All the plants receive the same amounts of water and light, but the air in each container has a different amount of carbon dioxide. What is the independent variable in this experiment?

- F** the amount of carbon dioxide in each container
- G** the number of plants in each container
- H** the amount of water provided to the plants
- J** the height of each plant after a period of time

47 Which cell parts are found in pairs and move towards the opposite ends of the nucleus during cell division?

- A** centrioles
- B** vacuoles
- C** ribosomes
- D** Golgi bodies

48 In some breeds of dogs, wire hair texture is dominant to smooth hair texture. Two parents with wire hair produce an offspring with smooth hair. To express smooth hair, the offspring would need to have inherited

- F** the same chromosomes from each parent.
- G** an allele for smooth hair from each parent.
- H** two of the same type of chromosomes from one of its parents.
- J** an allele for wire hair from one parent and an allele for smooth hair from the other.

49 Some processes in the rock cycle are listed below.

Rock Cycle Process

Process	Description
X	Rocks change by heat and pressure.
Y	Rocks melt and cool.
Z	Rocks weather and erode.

Which type of rock is most likely to form by Process Z?

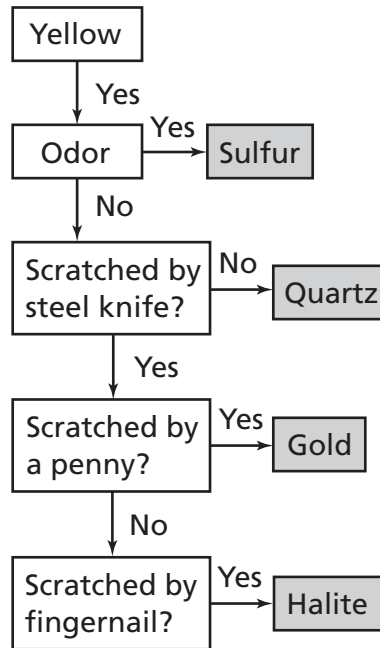
- A lava
- B metamorphic
- C igneous
- D sedimentary

50 An object is resting motionless on a surface. According to Newton's first law, the object will only start to move if

- F the net forces on the object equal zero.
- G an unbalanced force is applied to the object.
- H the upward force of the object is equal to its acceleration.
- J two forces that are equal and opposite are applied to the object.

- 51** A student wanted to identify a mineral based on the flow chart below. The mineral was yellow and odorless. The student scratched the mineral with a steel knife and a penny, but not with a fingernail.

Mineral Flow Chart



Based on this flow chart, which mineral could the student have been observing?

- A** Sulfur
- B** Quartz
- C** Gold
- D** Halite

- 52** A bus traveled at an average speed of 100 kilometers per hour for 5 hours.

$$\text{Distance } (d) = \text{Speed } (s) \times \text{Time } (t)$$

How far did the bus travel?

- F** 20 kilometers
- G** 95 kilometers
- H** 105 kilometers
- J** 500 kilometers

53 A meteorologist recorded high temperatures for five days at three locations on land. The data are shown in the table below.

High Temperatures

Date	Temperature at the Beach (°C)	Temperature 25 km West of Beach (°C)	Temperature 50 km West of Beach (°C)
June 1	29.4	18.8	36.1
June 2	27.2	26.6	27.2
June 3	27.7	27.7	28.8
June 4	27.7	28.8	26.6
June 5	26.6	22.7	25.0

Which is the best conclusion based on these data?

- A** Areas at the beach have the coolest temperatures.
- B** Areas farther from the beach always have the warmest temperatures.
- C** Areas at the beach have the most stable temperatures.
- D** Areas farther from the beach always have the same weather as areas at the beach.

- 54** In watermelons, a solid green color (G) is dominant to green stripes (g). Two solid green watermelons are crossed, as shown in the Punnett square below.

	G	g
G		
g		

Which type of watermelon has the greatest chance of being produced by this cross?

- F** homozygous solid
- G** heterozygous solid
- H** homozygous striped
- J** heterozygous striped

- 55** Which systems work most closely together to carry oxygen to cells and to remove carbon dioxide waste?

- A** digestive and excretory
- B** skeletal and muscular
- C** circulatory and respiratory
- D** nervous and reproductive

- 56** Which chemical compounds are the reactants of photosynthesis and products of cellular respiration?

- F** water (H₂O) and glucose (C₆H₁₂O₆)
- G** oxygen (O₂) and carbon dioxide (CO₂)
- H** glucose (C₆H₁₂O₆) and oxygen (O₂)
- J** carbon dioxide (CO₂) and water (H₂O)

- 57** Some students investigated plant growth by growing two sets of the same type of plant. One set was grown indoors and the other set was grown outdoors. They recorded data in the table below.

Indoor vs. Outdoor Plant Growth

	Indoor Plants Height (cm)			Outdoor Plants Height (cm)		
	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6
Week 1	18.0	14.3	16.6	15.0	16.2	14.7
Week 2	22.1	16.5	18.2	16.5	17.3	15.9
Week 3	24.4	19.0	20.5	17.2	19.1	17.0
Week 4	26.3	22.1	23.6	19.1	20.6	19.4

The students concluded that the plants grown indoors grew faster because they received better quality light than the plants grown outdoors. Which is the most likely reason this conclusion may be flawed?

- A** The students measured the plants at different times.
- B** The students should have grown different types of plants.
- C** The growth of the plants in each set was affected by more than one factor.
- D** The outdoor plants grew faster than the indoor plants.

- 58** Which example could only be classified as an outcome of sexual reproduction?

- F** when all of the offspring are genetically identical
- G** when two of the offspring are produced from one parent
- H** when one parent combines its genetic information with another parent to produce offspring
- J** when the cells in the offspring have the same number of chromosomes as cells in the parent

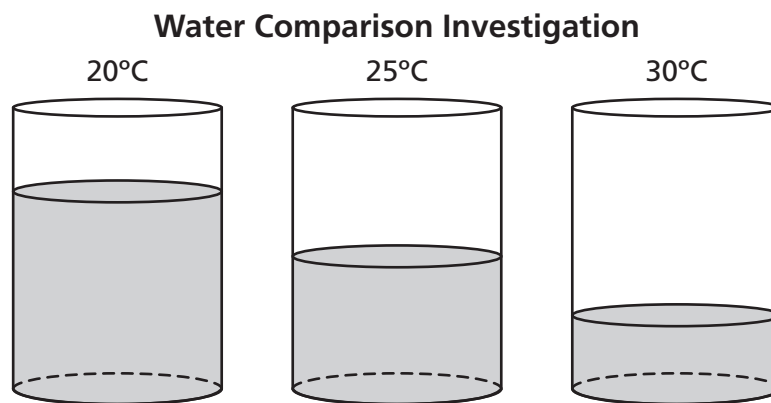
59 Some scientists want to design a system of instruments that will evaluate ocean currents, temperatures, and winds in order to predict weather patterns. What should they do before they produce the first complete working version of the system?

- A build a prototype of the system
- B evaluate the results of the system
- C improve the design of the system
- D conduct tests on the system

60 Which statement accurately describes the process that forms a type of rock?

- F Metamorphic rock forms when igneous rocks are compacted at low temperatures.
- G Sedimentary rock forms when metamorphic rock melts.
- H Sedimentary rock forms when small pieces of rock are compacted and cemented.
- J Metamorphic rock forms when magma cools and crystallizes.

61 A student filled three identical cups with equal amounts of water. The student placed each cup in a room with a different air temperature. After a few days, the student compared the amounts of water remaining in each cup.

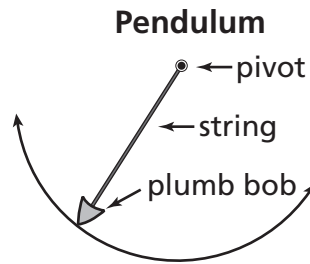


What cause-and-effect relationship does this investigation support?

- A As evaporation decreases, air temperature decreases.
- B As evaporation increases, air temperature increases.
- C At higher air temperatures, more water evaporates.
- D At higher air temperatures, less water evaporates.

Go On ►

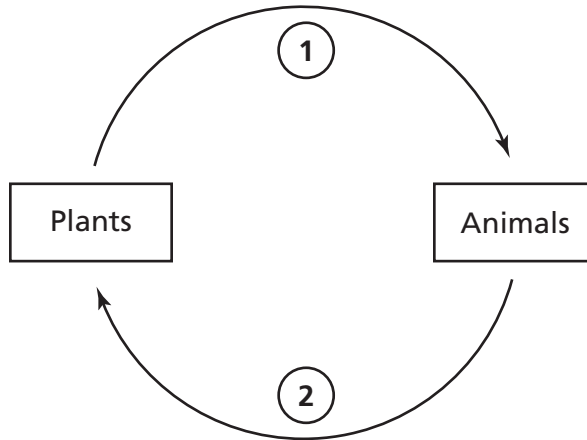
- 62** Students in a science class plan to investigate a factor that affects the rate at which a pendulum swings.



In which way should the students manipulate the variables to get valid results in this investigation?

- F** use equal string lengths and different plumb bob masses
- G** use different string lengths and different plumb bob masses
- H** use equal string lengths and the same plumb bob shapes
- J** use different string lengths and different plumb bob shapes

- 63** Students need to label a diagram that shows the exchange of gases between plants and animals as the plants and animals obtain energy.



Which best completes the diagram?

- A** 1- nitrogen, 2 - oxygen
- B** 1- oxygen, 2 - nitrogen
- C** 1- carbon dioxide, 2 - oxygen
- D** 1- oxygen, 2 - carbon dioxide

64 Scientists theorize that millions of years ago South America and Africa formed a single land mass.



Which statement best explains why South America and Africa are now thousands of miles apart?

- F** Lithospheric plates moved the continents apart at a rate of centimeters per year.
- G** Ocean currents carried some land masses east and some land masses west.
- H** Tectonic plates slid together forming mountains that forced the continents apart.
- J** Strong winds continually pushed the land masses away from each other.

65 As the wheels of a train push down on a track, the track pushes back against the wheels. Which of Newton's laws is used to explain these forces?

- A** An object at rest tends to stay at rest unless acted upon by an unbalanced force.
- B** The net force of an object is equal to its mass times its acceleration.
- C** For every action, there is an equal and opposite reaction.
- D** Any two objects exert a gravitational force of attraction on each other.

- 66** Students placed a raw egg without its shell into a highly concentrated solution of sugar. If the amount of sugar in the solution is greater than in the egg, which of these is most likely to occur?
- F** Water will flow into the egg and cause the egg to expand.
 - G** Water will flow out of the egg and cause the egg to shrink.
 - H** The sugar will dissolve the egg.
 - J** The sugar will break the egg into pieces.

- 67** Where are the genes for the physical traits of an organism located?
- A** on a strand of RNA
 - B** on a chromosome
 - C** inside a hormone
 - D** inside a carbohydrate

- 68** Which organ system is most responsible for helping a swimmer push her body through water?
- F** circulatory
 - G** excretory
 - H** muscular
 - J** integumentary

- 69** What type of simple machine is a ramp?
- A** wedge
 - B** lever
 - C** screw
 - D** inclined plane



Tennessee Comprehensive Assessment Program

Achievement Test ~ Grade 7

Practice Test



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