



State of Texas Assessments of Academic Readiness

GRADE 8

Science

Practice Assessment

STAAR GRADE 8 SCIENCE REFERENCE MATERIALS



FORMULAS

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{V}$$

$$\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$s = \frac{d}{t}$$

$$\text{Net force} = (\text{mass})(\text{acceleration})$$

$$F = ma$$

STAAR GRADE 8 SCIENCE REFERENCE MATERIALS

PERIODIC TABLE OF THE ELEMENTS

1 1A	2 2A	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9	10	11 1B	12 2B	13 3A	14 4A	15 5A	16 6A	17 7A	18 8A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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SCIENCE

DIRECTIONS

Read each question carefully. Choose the best answer to each question. For open-response questions, determine the best answer to the question.

- 1 Which statement about the sun is true?
- (A) It is the hottest star in the universe.
 - (B) It is closer to Earth than any other star.
 - (C) It is located in the center of the Milky Way galaxy.
 - (D) It is the largest type of star known to exist.
-

- 2 Which statement **BEST** describes a component of cell theory?
- (A) All cells form from molecules.
 - (B) All cells come from preexisting cells.
 - (C) All cells create genetically identical cells.
 - (D) All cells reproduce from simpler cells.

- 3 Students measure and record the mass and volume of a sample of material.

Mass (g)	Volume (cm ³)
35	14

The table shows the densities for four substances.

Identity	Density (g/cm ³)
Plywood	0.54
Aluminum	2.7
Rubber	1.1
Glass	2.5

Based on the density of the sample, which material is the sample **MOST LIKELY** made of?

- (A) Plywood
- (B) Aluminum
- (C) Rubber
- (D) Glass

- 4 Controlled burns are fires that are purposely set within a designated area when conditions are safe for the public and for the firefighters who watch over the fire. Weather and forest conditions are monitored both before and during the burn. Controlled burns rid forests of tree limbs, dead leaves, and other debris.

Which prediction can be made about a forest after a controlled burn has occurred?

- (A) The ability of plants to reproduce will decrease.
 - (B) Important nutrients for new plant growth will be returned to the soil.
 - (C) Short-term air quality in the area will improve.
 - (D) Long-term biodiversity will be reduced.
-

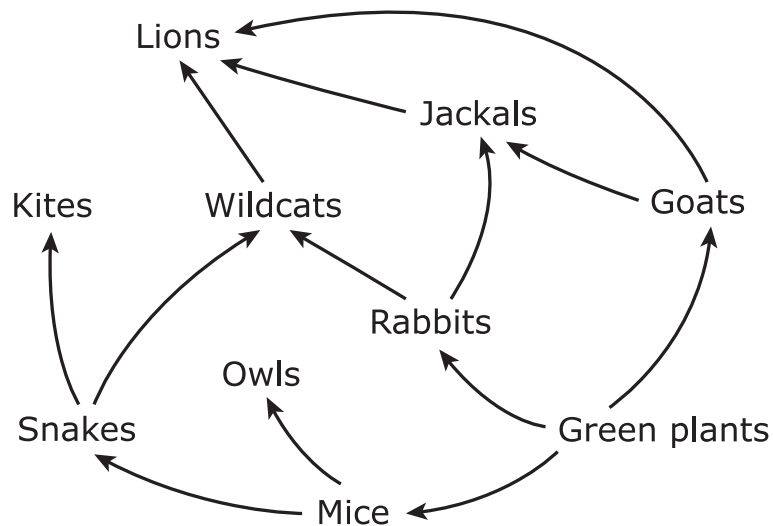
- 5 Students are baking a cake. They mix together all the necessary ingredients and pour them into a pan. Then they place the pan into the oven to cook for 40 minutes.

Which statement **BEST** explains why baking a cake is evidence of a chemical reaction?

- (A) The state of matter of some of the ingredients changed while being cooked.
- (B) The total mass of the ingredients was the same before and after they were cooked.
- (C) The temperature of the ingredients increased as they absorbed thermal energy from the oven.
- (D) The ingredients formed a new substance after they were cooked in the oven.

- 6 Which factor contributes **MOST** to the formation of a hurricane?
- (A) High water temperatures
 - (B) High water density
 - (C) High water oxygen levels
 - (D) High water volume
-

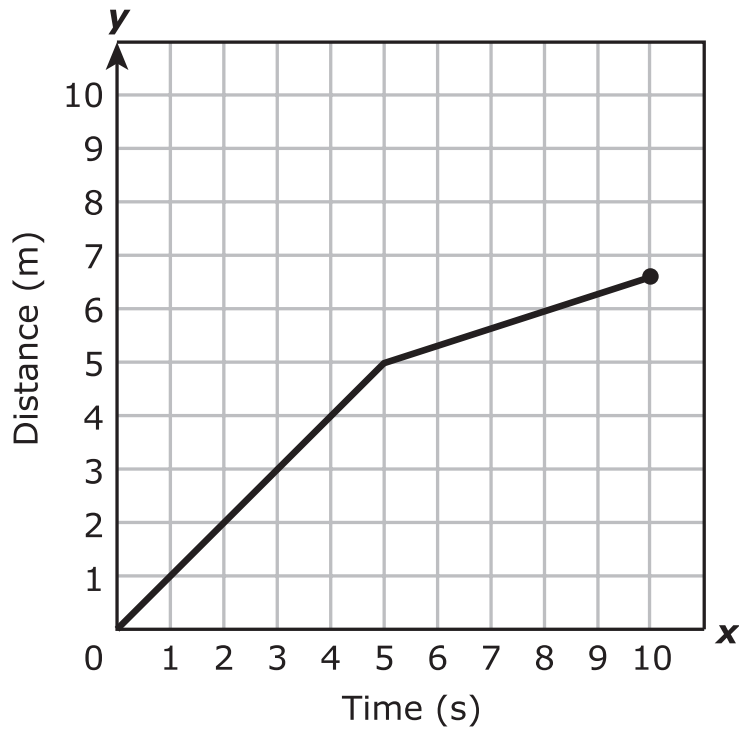
- 7 A student researches an ecosystem and draws the food web shown.



How many secondary consumers are in this food web?

Record your answer in the space provided.

- 8 A student graphs the motion of a toy car moving in a straight line over a 10-second time period.

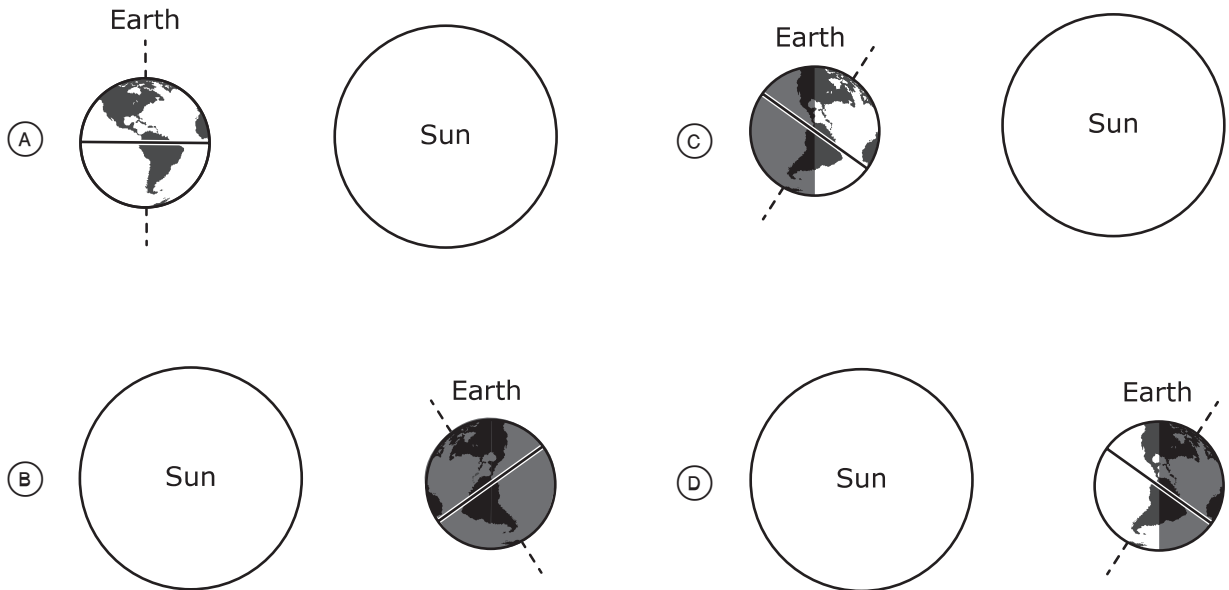


Which statement **BEST** describes the motion of the car?

- (A) The car moved at a speed of 5 meters per second during the first 5 seconds and then moved at a slower speed during the next 5 seconds.
- (B) The car moved at a speed of 5 meters per second during the first 5 seconds and then moved at a faster speed during the next 5 seconds.
- (C) The car moved at a speed of 1 meter per second during the first 5 seconds and then moved at a slower speed during the next 5 seconds.
- (D) The car moved at a speed of 1 meter per second during the first 5 seconds and then moved at a faster speed during the next 5 seconds.

9 A student draws models of Earth and the sun in different positions.

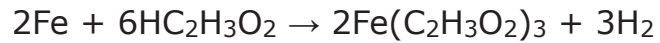
Which drawing should be used to represent summer in the Southern Hemisphere?



10 Which quantity determines the identity of an atom?

- (A) The number of neutrons
- (B) The number of protons
- (C) The number of electrons
- (D) The number of valence electrons

11 A balanced chemical equation is shown.



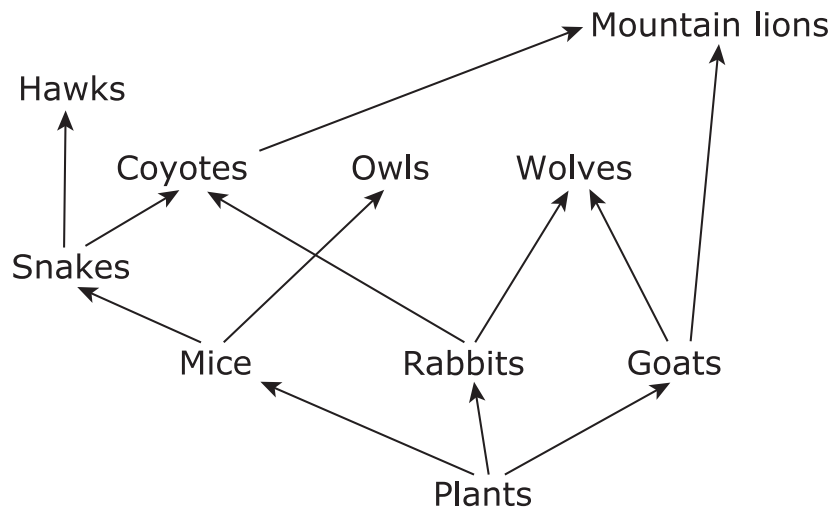
How many different elements are in the chemical equation?

- (A) 2
 - (B) 4
 - (C) 13
 - (D) 50
-

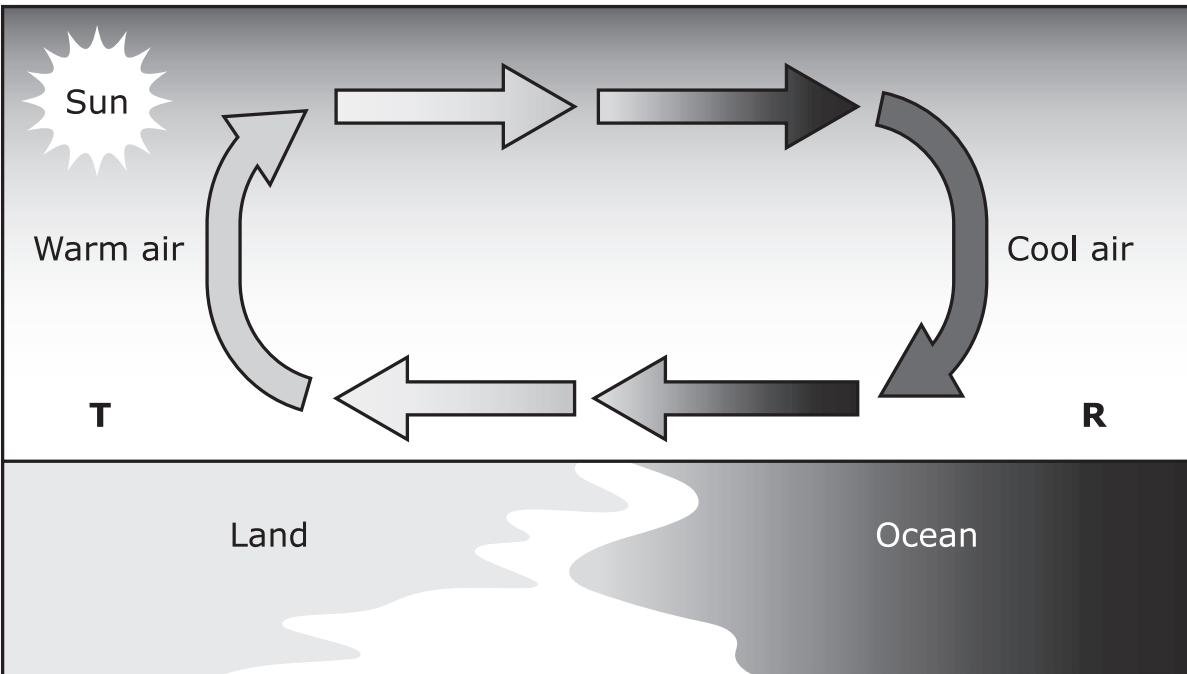
12 A partial food web is shown.

Which two organisms compete with rabbits for biotic resources?

Circle **TWO** correct answers.



13 A diagram of a convection current is shown.



Which statement correctly describes the changes in the air as it moves from Location R to Location T?

- (A) The sun heats the land faster than the ocean water, so high-density air moves from the ocean to the land, becoming less dense.
- (B) The sun heats the land faster than the ocean water, so high-density air moves from the land to the ocean, becoming less dense.
- (C) The sun heats the land slower than the ocean water, so high-density air moves from the ocean to the land, becoming less dense.
- (D) The sun heats the land slower than the ocean water, so high-density air moves from the land to the ocean, becoming less dense.

- 14** A student is looking at a model of a neutral atom. The model shows that the atom has 19 subatomic particles in the nucleus. Ten of those subatomic particles do not have a charge.

Which statement about the model of the atom is true?

- Ⓐ It has an atomic number of 19.
- Ⓑ It has 10 electrons.
- Ⓒ It has 9 protons.
- Ⓓ It has an atomic mass of 29 amu.

- 15** Student 1 claims that whenever the color of a substance changes, a chemical change has occurred.

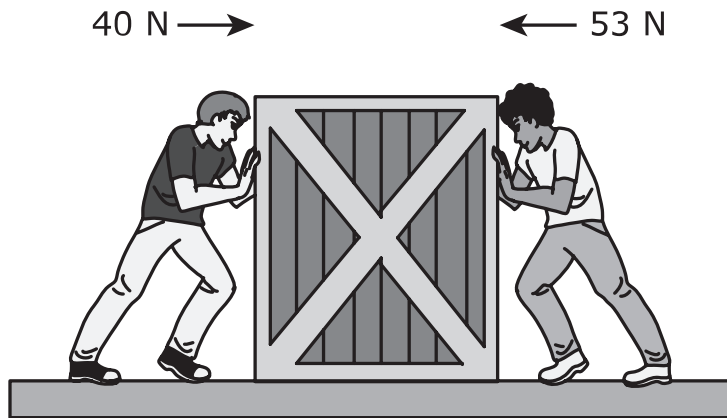
Student 2 claims that food coloring can change the color of a substance without causing a chemical change.

To test their claims, the students add red food coloring to a glass of water. The students observe that the clear water turns a light pink color. Their teacher then runs a test to show that the pink solution contains both water molecules and food-coloring molecules.

Based on these findings, which student is correct?

- (A) Student 1, because the food-coloring molecules were found in the pink solution
- (B) Student 1, because the state of matter changed when the food coloring was added
- (C) Student 2, because no new substance was formed when there was a color change
- (D) Student 2, because the red food coloring caused the water to change to a pink color

- 16** Two students push on the opposite sides of a crate, with the force applied by each student in newtons (N), as shown in the diagram.



Assuming the crate is on a frictionless surface, describe the effect of these forces on the crate.

- Will the crate move toward the left, toward the right, or not at all?
- What is the direction and the magnitude of the net force on the crate?

Think about the questions carefully. Then record your answers in the box provided.

- 17** Overfishing reduces the number of fish at a rate that causes long-term reductions in fish populations. The table shows the percentage of fish species in the ocean that were overfished in three different years.

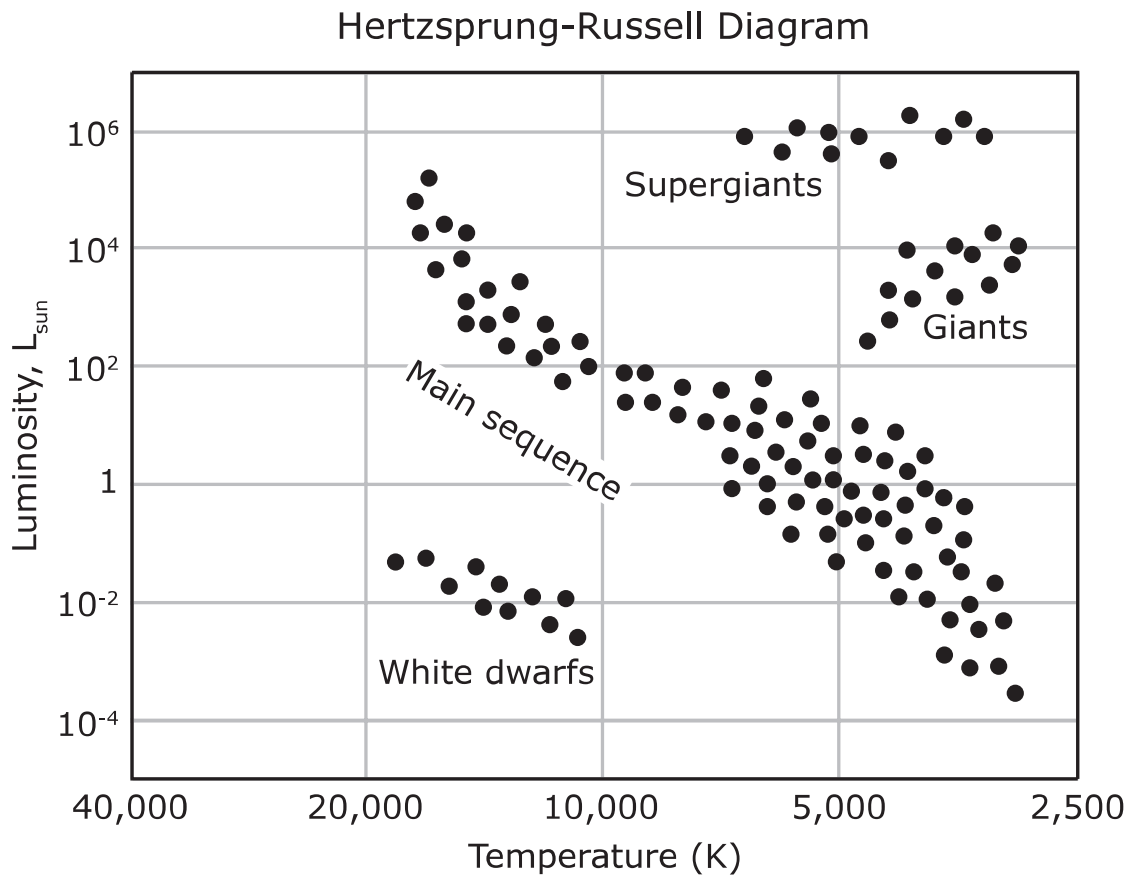
Year	Percentage of Fish Species Overfished (%)
1979	13
1989	27
2008	33

Which action would **MOST LIKELY** reverse the trend shown in the table?

- (A) Increasing the total weight of fish that each ship can remove from the ocean each day
- (B) Requiring ships to return non-adult fish to the ocean so that they can grow and reproduce
- (C) Decreasing the number of policing ships in order to lessen capacity restrictions and regulations
- (D) Promoting meals centered around specific fish species in restaurants in order to increase profits

18 This question has two parts. First, answer Part A. Then, answer Part B.

A Hertzsprung-Russell diagram is shown.



An astronomer discovers a star that has a temperature of 3,750 K and a luminosity of $10^3 L_{\text{sun}}$.

Part A

According to the diagram, which type of star did the astronomer discover?

- Ⓐ White dwarf
- Ⓑ Giant
- Ⓒ Main sequence
- Ⓓ Supergiant

Part B

Which statement supports the answer to Part A?

- Ⓐ The star is cool and bright compared to other types of stars.
- Ⓑ The star is hot and bright compared to other types of stars.
- Ⓒ The star is cool and dim compared to other types of stars.
- Ⓓ The star is hot and dim compared to other types of stars.

19 A tennis ball is dropped down a stairwell.

Which statement **BEST** describes the energy of the tennis ball?

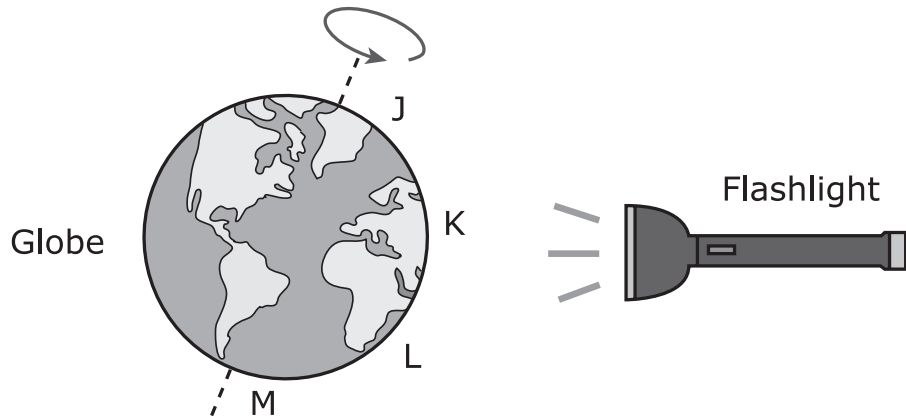
- (A) The tennis ball's kinetic energy decreases as it falls to the ground.
 - (B) The tennis ball has the most potential energy just before it is dropped.
 - (C) The tennis ball has the most kinetic energy as soon as it is dropped.
 - (D) The tennis ball's potential energy increases as it falls to the ground.
-

20 The Olympic Mountains formed along the west coast of the United States at the boundary between the Juan de Fuca Plate and the North American Plate.

Which type of boundary **MOST LIKELY** exists between the Juan de Fuca Plate and the North American Plate?

- (A) Convergent boundary, where the plates are moving toward each other
- (B) Convergent boundary, where the plates are moving parallel to each other
- (C) Transform boundary, where the plates are moving closer to each other
- (D) Transform boundary, where the plates are sliding past each other

- 21** A student is modeling how sunlight affects different locations on Earth. The student uses a globe and a flashlight as shown.



Based on the model, which statement is correct?

- (A) Locations J and M will be experiencing daytime in 12 hours.
- (B) Locations K and L will be experiencing daytime in 24 hours.
- (C) Locations J and K will be starting to experience nighttime in 12 hours.
- (D) Locations L and M will be starting to experience nighttime in 24 hours.

22 This question has two parts. First, answer Part A. Then, answer Part B.

A player hits a baseball with a baseball bat.

Part A

Which statement about the forces between the ball and the bat is correct?

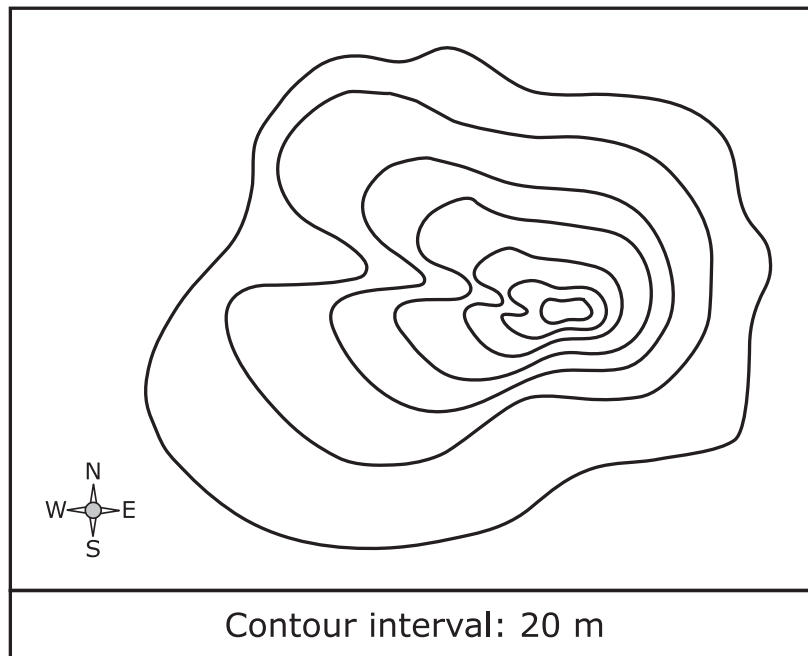
- (A) The force of the ball on the bat was less than the force of the bat on the ball.
- (B) The force of the ball on the bat was equal to the force of the bat on the ball.
- (C) The force of the ball on the bat was greater than the force of the bat on the ball.

Part B

Which statement **BEST** supports the answer to Part A?

- (A) Whenever two objects interact, the more massive object always applies a greater force than the less massive object.
- (B) Whenever two objects interact, the faster object always applies a greater force than the slower object.
- (C) Whenever two objects interact, they always apply equal and opposite forces on each other.
- (D) Whenever two objects interact, their forces always combine and are applied in the direction of the object that is moving the fastest.

23 A topographic map is shown.



Which statements accurately describe features of the land represented by the topographic map?

Select **TWO** correct answers.

- There is a stream.
- There is a large valley.
- There is a consistent slope.
- There is one peak.
- There is a river valley.

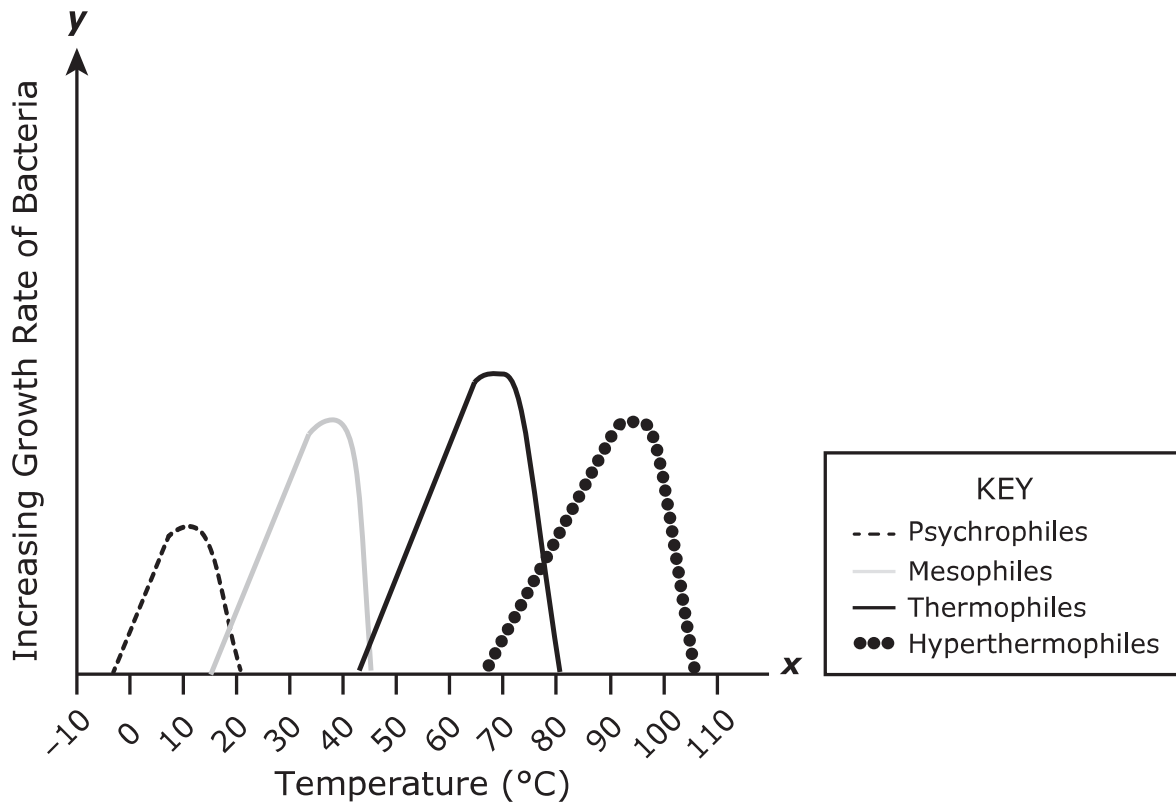
- 24** A student sets a 0.4 kilogram (kg) soccer ball on the ground and gives it a hard kick. The ball traveled a distance of 37 meters (m). The acceleration of the ball was 2,550 meters per second squared (m/s^2).

Based on the data, how much force in newtons (N) did the student apply to the ball?

- (A) 14.8 N
- (B) 68.9 N
- (C) 1,020.0 N
- (D) 6,375.0 N

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25 The graph shows the optimal growth temperatures for four types of bacteria.



- 26** A researcher observes a car speeding up from rest. The researcher records data about the car and the car's motion.

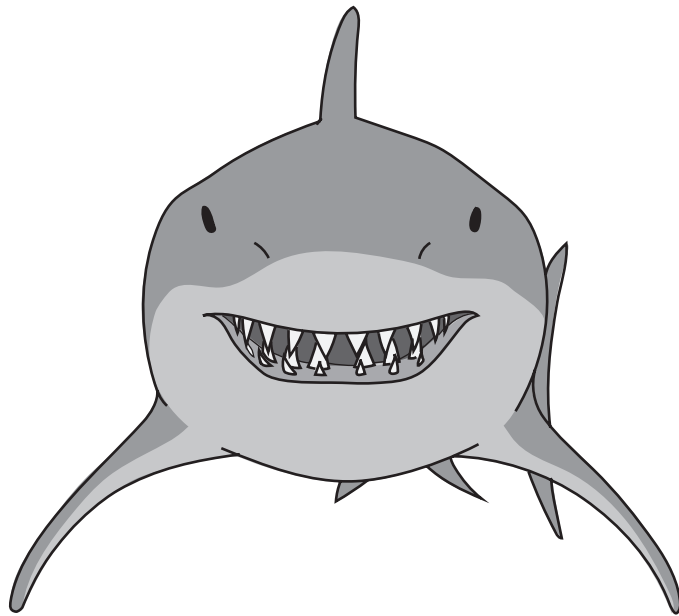
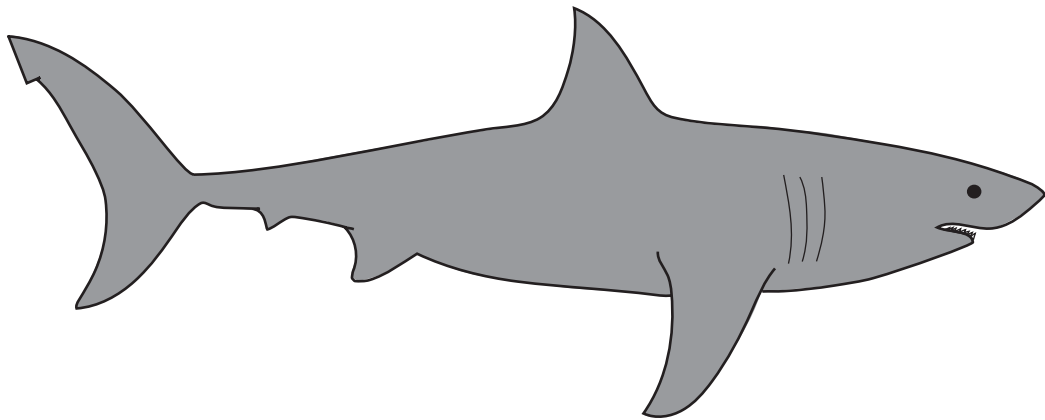
Which data points can be used to calculate the net force that was acting on the car when it was speeding up?

Select **TWO** correct answers.

- The car's mass is 1,000 kg.
- The car's speed increased for 7 seconds.
- The car started from rest.
- The car's acceleration was 4 m/s^2 .
- The car traveled a total of 300 m.

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27 A drawing of the side view and front view of a shark is shown.



A student creates this dichotomous key for shark orders and uses it to classify the shark in the drawing.

Dichotomous Key

Step	Description	Order
1a	Has a flat body	Squatiniformes
1b	Has a long, round body	Go to 2
2a	Has a long, saw-like snout (nose)	Pristiophoriformes
2b	Has a rounded or pointed snout (nose)	Go to 3
3a	Has a wide, T-shaped head	Carcharhiniformes
3b	Does not have a wide, T-shaped head	Go to 4
4a	Has one large fin on its back	Lamniformes
4b	Has multiple large fins on its back	Heterodontiformes

Based on the dichotomous key, which order does the shark in the drawing belong to?

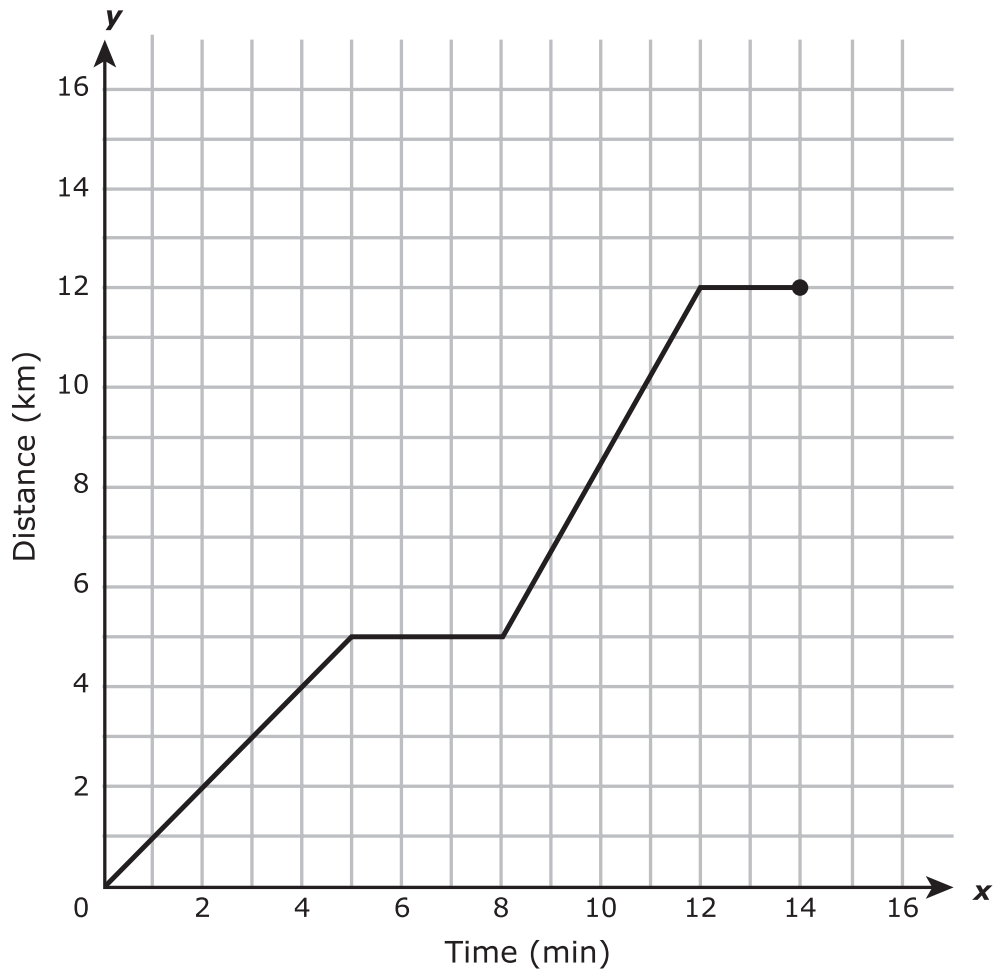
- (A) Pristiophoriformes
- (B) Carcharhiniformes
- (C) Lamniformes
- (D) Heterodontiformes

- 28** A scientist studies the freshwater organism known as a hydra. Hydras reproduce by budding, a process in which a piece of the adult hydra breaks off and becomes a separate organism.

Which statement accurately describes the parent hydra?

- Ⓐ The parent hydra used asexual reproduction and is genetically identical to the newly formed hydra.
- Ⓑ The parent hydra used sexual reproduction and is genetically identical to the newly formed hydra.
- Ⓒ The parent hydra used asexual reproduction and is genetically different from the newly formed hydra.
- Ⓓ The parent hydra used sexual reproduction and is genetically different from the newly formed hydra.

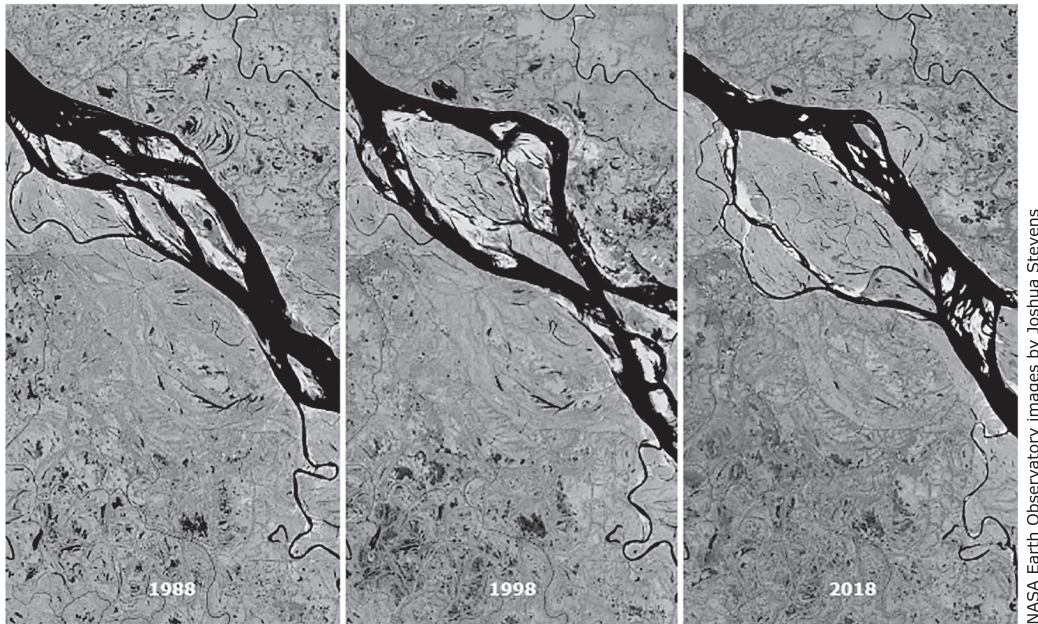
29 A car drives down a long road. A graph of the car's motion is shown.



What was the car's average speed in kilometers per minute for the entire 14-minute trip?

- (A) 12 km/min
- (B) 0.86 km/min
- (C) 0.23 km/min
- (D) 1.17 km/min

- 30 The satellite images show how the Padma River in Bangladesh has changed over time.



Which of these **MOST LIKELY** caused the changes in the shape of the Padma River?

- (A) The weathering of sediment within the river caused landslides along the riverbank.
- (B) Increased droughts caused weathering and erosion in areas surrounding the river.
- (C) The flow of the water in the river caused erosion along the riverbanks.
- (D) Decreased city development along the riverbanks caused an accumulation of sediment.

- 31** A student is examining a cell under a microscope. The student identifies two features: a large vacuole and a cell wall.

Which table correctly describes the cell and the two features that the student identified?

(A)

Type of cell	Plant cell
Function of cell wall	Regulates the transport of materials
Function of vacuole	Site of photosynthesis

(B)

Type of cell	Animal cell
Function of cell wall	Site of cellular respiration
Function of vacuole	Directs the operations within the cell

(C)

Type of cell	Plant cell
Function of cell wall	Provides structure for the cell
Function of vacuole	Stores and transports molecules

(D)

Type of cell	Animal cell
Function of cell wall	Directs the operations within the cell
Function of vacuole	Provides a site for chemical reactions

- 32** A student turns on a battery-operated fan. The batteries are located in the base of the fan. After five minutes, the student notices that the base of the fan is warm.

Which statement **BEST** describes the conversion of energy taking place in the fan?

- (A) Chemical energy is being converted into mechanical energy and light energy.
 - (B) Chemical energy is being converted into mechanical energy and thermal energy.
 - (C) Electrical energy is being converted into chemical energy and light energy.
 - (D) Electrical energy is being converted into thermal energy and sound energy.
-

- 33** A student wants to plan a family camping trip during a full moon. The student looks outside to see that the moon is currently in its first quarter phase.

About how many days does the student need to wait in order to go camping on the night of a full moon?

- (A) 4 days
- (B) 8 days
- (C) 13 days
- (D) 20 days

34 Which environmental change would **MOST LIKELY** have long-term effects on both the environment and the species within the environment?

- Ⓐ High amounts of rainfall that cause flood conditions for three months
- Ⓑ Clearing out sections of rain forest, degrading soil quality in a specific region
- Ⓒ A large amount of pests that destroy a season's crops
- Ⓓ A planned burn, resulting in the loss of some trees

35 The table shows characteristics of three unknown materials.

Material	Characteristics
X	<ul style="list-style-type: none">• solid at room temperature• shiny• brittle• conducts thermal energy
Y	<ul style="list-style-type: none">• solid at room temperature• shiny• malleable• conducts electricity
Z	<ul style="list-style-type: none">• solid at room temperature• dull• brittle• poor conductor of electricity

How could the materials **BEST** be classified?

- (A) X: Metal
Y: Metalloid
Z: Nonmetal
- (B) X: Nonmetal
Y: Metal
Z: Nonmetal
- (C) X: Metalloid
Y: Metalloid
Z: Nonmetal
- (D) X: Metalloid
Y: Metal
Z: Nonmetal

36 A student drinks a beverage that contains 78 grams of sugar.

Which system produces the hormone insulin that helps break down the sugar in the human body?

- Ⓐ Endocrine system
 - Ⓑ Excretory system
 - Ⓒ Integumentary system
 - Ⓓ Circulatory system
-

37 Scientists have found some of the same types of rock containing the same types of fossil species in Africa and Antarctica.

Which explanation does this information support?

- Ⓐ Both continents gradually increased in size over time.
- Ⓑ Both continents were attached by glacial ice millions of years ago.
- Ⓒ Both continents were attached but drifted away from each other over time.
- Ⓓ Both continents were underwater millions of years ago.

38 A student is comparing four elements on the periodic table. The elements are labeled in the image.

	1																	18
1		2											13	14	15	16	17	
2																		
3	A		3	4	5	6	7	8	9	10	11	12						
4															C			
5																		D
6																		
7																		

6																		
7																		

Which two elements have properties that are the **MOST** similar?

- (A) A and B
- (B) B and C
- (C) C and D
- (D) A and D



**STAAR
GRADE 8
Science
PRACTICE**

