

Tennessee Comprehensive Assessment Program

TCAP

Science Grade 6 Test Practice





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Metadata—Science

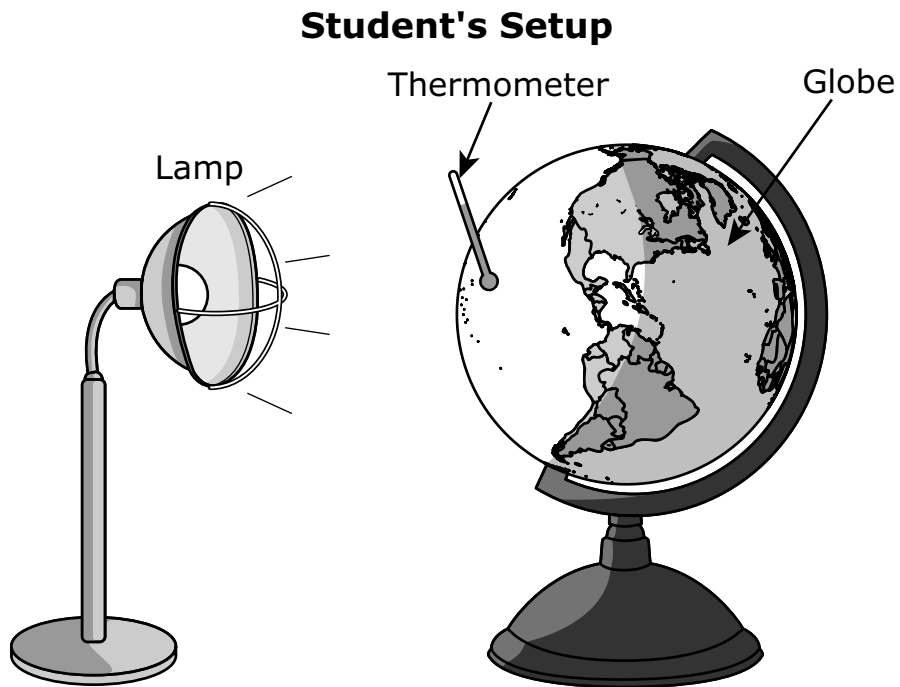
Items

Page Number	Cluster (N/A for Standalone items)	Grade	Item Type	Key	TN Standards	SEP	CCC
1	N/A	6	MC	D	6.PS3.2	-	SF
2	N/A	6	TE	supports, decrease	6.LS4.1	ARGS	CE
3	N/A	6	MC	C	6.ESS2.7	-	SYS
4	N/A	6	MC	A	6.LS2.4	MATH	PAT
6	N/A	6	MC	C	6.PS3.2	DATA	EM
11	Spring-Loaded Car	6	MC	D	6.PS3.1	DATA	EM
12	Spring-Loaded Car	6	MC	C	6.PS3.1	-	EM
13	Spring-Loaded Car	6	MC	A	6.PS3.1	-	EM
14	Spring-Loaded Car	6	MC	D	6.PS3.1	CEDS	EM
15	Spring-Loaded Car	6	MC	B	6.PS3.1	CEDS	EM
16	N/A	6	MC	A	6.ESS2.2	MOD	CE
17	N/A	6	MS	C, D	6.LS2.1	MATH	CE
18	N/A	6	TE	Location 1, high- pressure	6.ESS2.1	MOD	CE
19	N/A	6	MS	B, C	6.ESS3.2	INV	-
20	N/A	6	MC	D	6.PS3.1	-	SYS

Metadata Definitions

Grade	Grade level or Course.
Item Type	Indicates the type of item. MC= Multiple Choice; MS= Multiple Select; TE= Technology Enhanced
Key	Correct answer.
TN Standards	Primary educational standard assessed.
SEP	SEP Science and Engineering Practices: These are the essential practices of scientists and engineers which help students figure out explanations for phenomena or solutions for design problems.
CCC	CCC Cross Cutting Concepts: These are concepts that permeate all science disciplines and provide a lens through which students can apply their science ideas to phenomena or design problems.

00. Students performed a classroom investigation to explore how radiation from the sun is different in various regions of Earth. The figure shows how the students set up the investigation.



Which change to the setup would improve the data collection?

- A. using a larger lamp
- B. moving the globe closer to the lamp
- C. turning the lamp on and off every few minutes
- D. adding thermometers to other parts of the globe

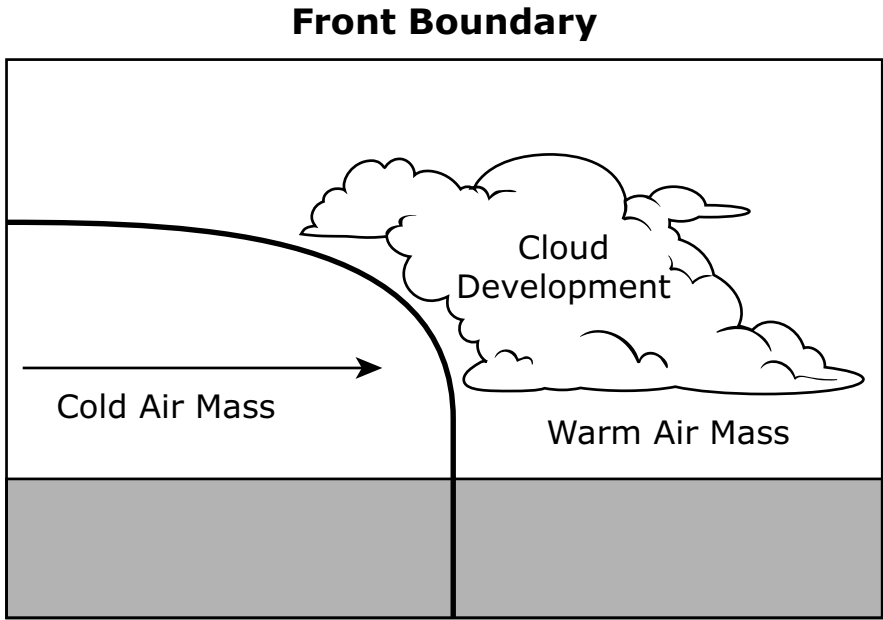
Areas in the Selawik National Wildlife Refuge in Alaska are becoming warmer and drier during the summer. These conditions cause an increase in forest fires. The forest fires destroy lichens, which caribou prefer to eat. Scientists observed that caribou herds have stopped going to parts of the Selawik National Wildlife Refuge because there are no lichens to eat there.

A claim is made that forest fires are making the ecosystems within the Selawik National Wildlife Refuge less stable. Complete the sentence that explains whether the evidence supports or refutes the claim.

Select the correct answer from **each** drop-down menu.

The evidence the claim because forest fires destroyed lichens in the Selawik National Wildlife Refuge, causing the biodiversity in some areas to .

00. The figure shows a fast-moving cold air mass rapidly pushing into a warm, humid air mass.



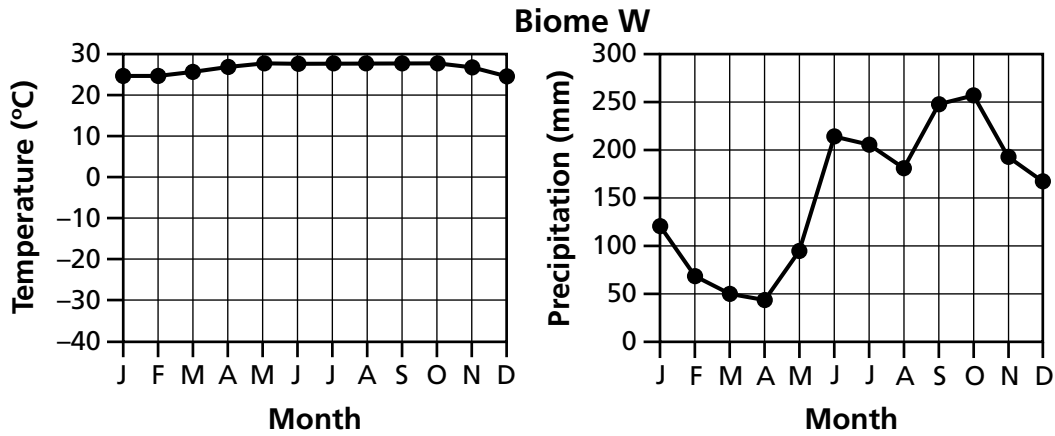
How does weather **most likely** change along the boundary between these two air masses?

- A. Advancing cold air causes fog.
- B. Rising warm air causes steady, light rain.
- C. Rising humid, warm air causes thunderstorms.
- D. Advancing cold air causes many cloudy days.

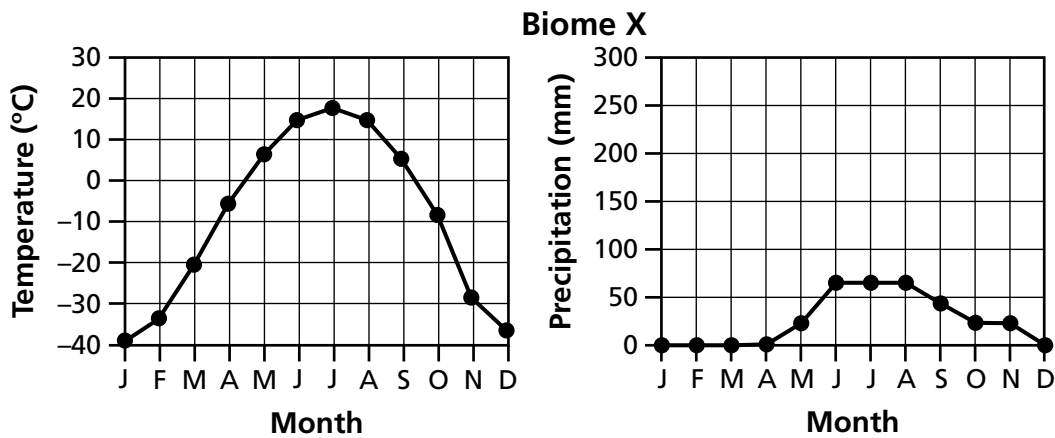
00. Orchids are plants that require warm, stable temperatures throughout the year. They also require precipitation regularly and cannot tolerate periods of drought.

Which set of graphs represents a biome in which orchids **most likely** live?

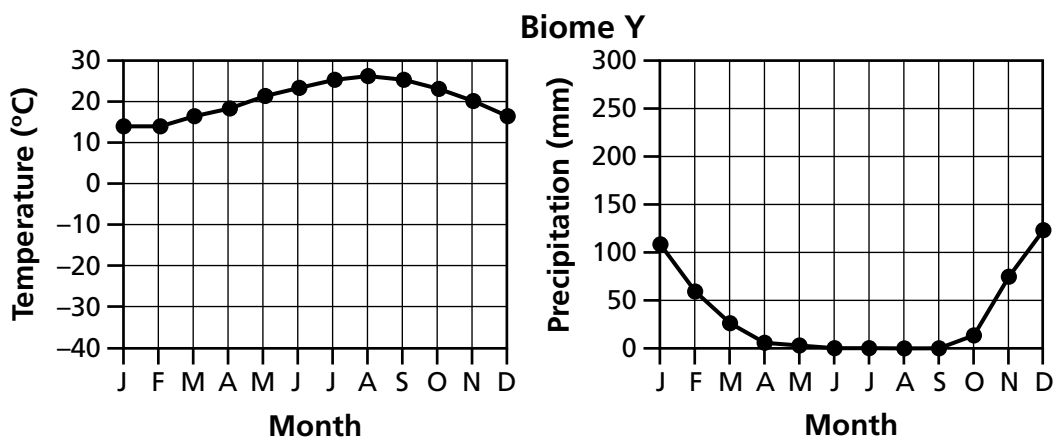
A.



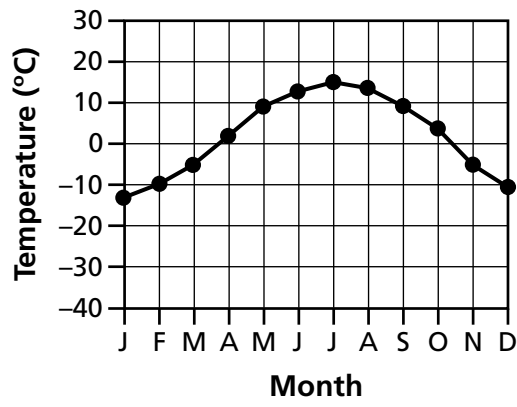
B.



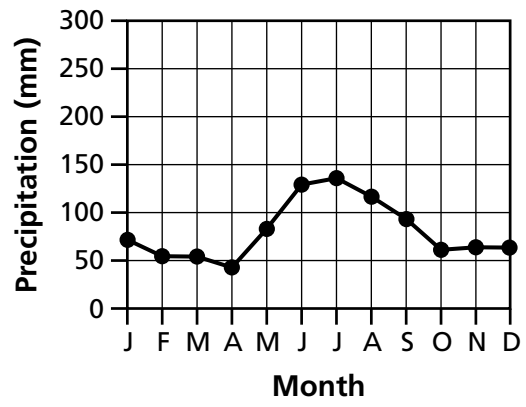
C.



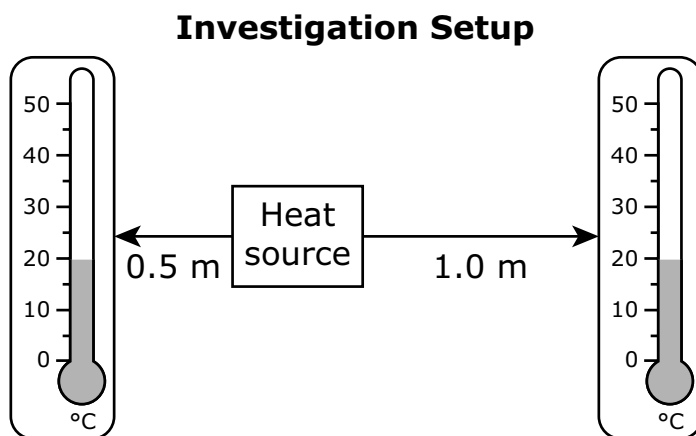
D.



Biome Z



00. A scientist investigated the temperatures near four sources of heat. Two thermometers were placed at different distances, measured in meters (m), on opposite sides of each heat source. Each heat source was turned on for the same amount of time. The figure shows the setup of the investigation.



The scientist turned one heat source on, collected a temperature reading, turned off the heat source, and then allowed both thermometers to return to room temperature. This procedure was repeated three times for each heat source. The table shows the data from the investigation.

Heat Source	Average Temperature at 0.5 m (°C)	Average Temperature at 1 m (°C)
Gas fireplace	45	33
Ceiling lamp	37	26
Electric stove	45	37
Thin candle	32	22

Which statement **correctly** describes the heat source that transferred the most thermal energy and how that energy was transferred?

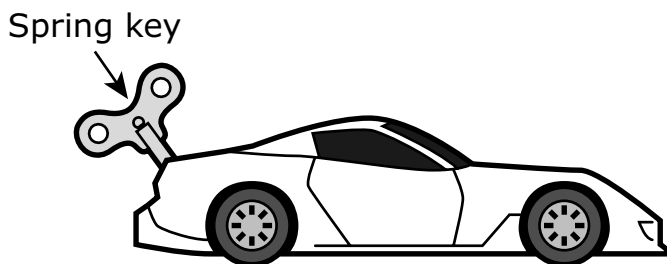
- A. The gas fireplace transferred the most thermal energy by radiation, losing the least energy with distance.
- B. The ceiling lamp transferred the most thermal energy by conduction, losing the least energy with distance.
- C. The electric stove transferred the most thermal energy by radiation, losing the least energy with distance.
- D. The thin candle transferred the most thermal energy by conduction, losing the least energy with distance.

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

Spring-Loaded Car – Part 1

A spring-loaded toy car is operated by turning a key in the back of the car. The key is attached to a spring inside the car. When the key is turned 10 times, the spring has the maximum elastic potential energy that it can hold.

Figure 1. Car Model



A student makes observations as the car moves along a level track. The student measures the speed of the car at different locations on the track.

The student performs two trials and begins each trial by winding the spring key, holding the car at rest, and then letting it go. In Trial 1, the key is turned 10 times. In Trial 2, the key is turned only 5 times.

Table 1 shows the data for Trials 1 and 2.

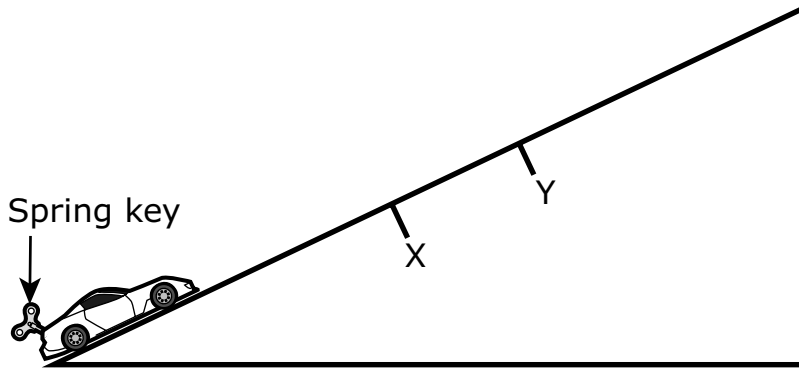
Table 1. Trial 1 and Trial 2 Data

Location on Track (meters)	Speed of Toy Car (meters/second)	
	Trial 1 (key turned 10 times)	Trial 2 (key turned 5 times)
0	0	0
0.5	1.6	1.0
1.0	2.2	1.4
1.5	2.7	1.2
2.0	3.1	0.8
2.5	3.5	0
3.0	2.9	-
3.5	2.1	-
4.0	0.6	-
4.1	0	-

Spring-Loaded Car – Part 2

The spring key used to wind the spring inside the car is turned 10 times, and the car is placed at the bottom of a long ramp.

Figure 2. Car Model on Ramp



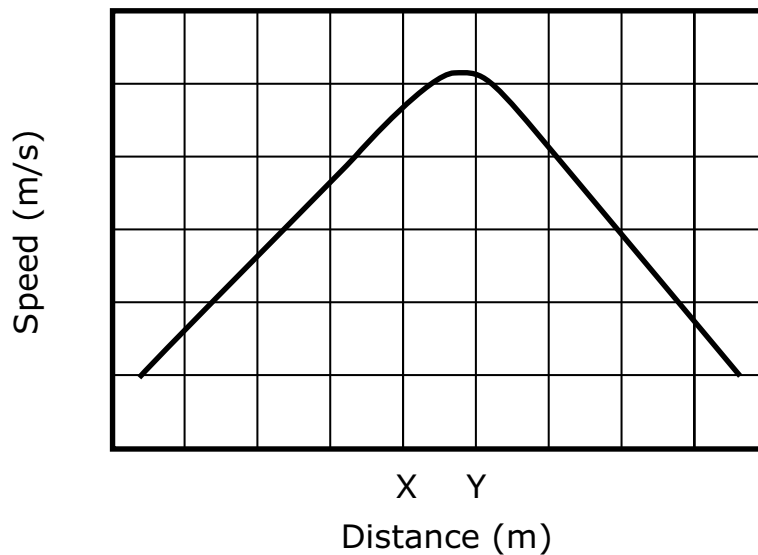
The car moves up the ramp. Two points, X and Y, are indicated on the ramp. Careful data collection and calculation presented in Table 2 shows the amount of energy the car has at Point X.

Table 2. Energy at Point X

Type of Energy	Amount of Energy (joules)
Elastic potential energy	5
Gravitational potential energy	5
Kinetic energy	10
Thermal energy	2

After the car passes Point Y, it slows and stops 2 meters from the starting position. Graph 1 shows the approximate speed of the car as it climbs the ramp and before it begins to roll backward because of gravity.

Graph 1. Speed of Car



- 00.** Based on Table 1 (Part 1), which data are needed to determine where the toy car was located when it had the **most** kinetic energy?
- A.** the location of the car when it stopped
 - B.** the location of the car at the start of each trial
 - C.** the location of the car when it was slowing down
 - D.** the location of the car when it was going the fastest

- 00.** Based on Table 1 (Part 1), which statement **best** explains why the car in Trial 1 traveled farther than the car in Trial 2?
- A.** The car lost more thermal energy in Trial 2.
 - B.** The car lost more kinetic energy in Trial 2.
 - C.** The car started with more elastic potential energy in Trial 1.
 - D.** The car started with more gravitational potential energy in Trial 1.

- 00.** Based on Table 1 (Part 1), which change could be made to one of the trials so that the car would begin with the same amount of potential energy during each trial?
- A.** In Trial 2, turn the key 10 times instead of 5 times.
 - B.** In Trial 2, turn the key 15 times instead of 5 times.
 - C.** In Trial 1, turn the key 20 times instead of 10 times.
 - D.** In Trial 1, turn the key 15 times instead of 10 times.

00. The student compared the two trials where the car's spring key had been turned 10 times: the one on the level track (Part 1) and the one on the ramp (Part 2). On the level track, the car traveled 4.1 meters. On the ramp, the car did not travel as far.

Which statement **best** explains why the car traveling up the ramp did not travel the same distance?

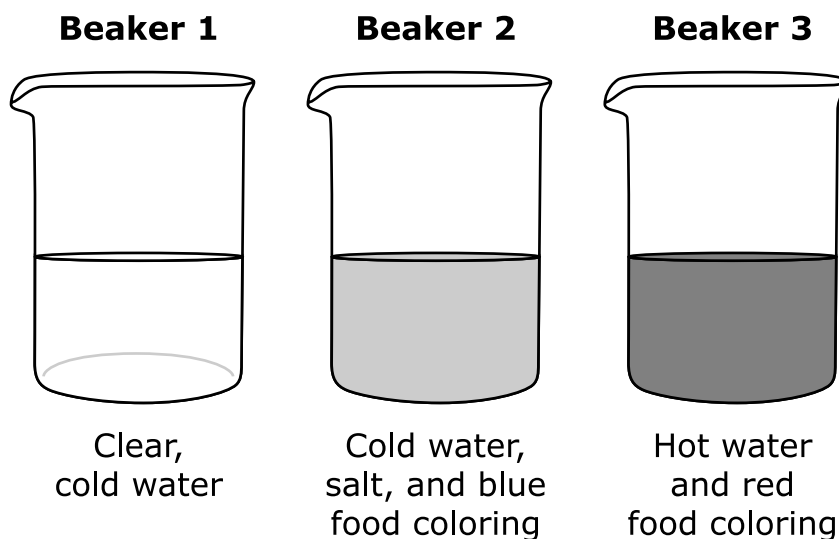
- A.** The car began with less elastic potential energy.
- B.** Gravitational potential energy was transformed into kinetic energy.
- C.** More of the elastic potential energy was transformed into kinetic energy.
- D.** Some of the elastic potential energy of the car was transformed into gravitational potential energy.

- 00.** The student wants to know how much energy was transformed into gravitational potential energy.

Based on Figure 2 (Part 2) and Table 2 (Part 2), which data should the student collect to answer this question?

- A.** the speed of the car
- B.** the height of the ramp
- C.** the angle of the ramp
- D.** the number of turns of the key

00. Two students were creating a model to demonstrate the ocean currents. They used three beakers, all with the same amount of liquid.



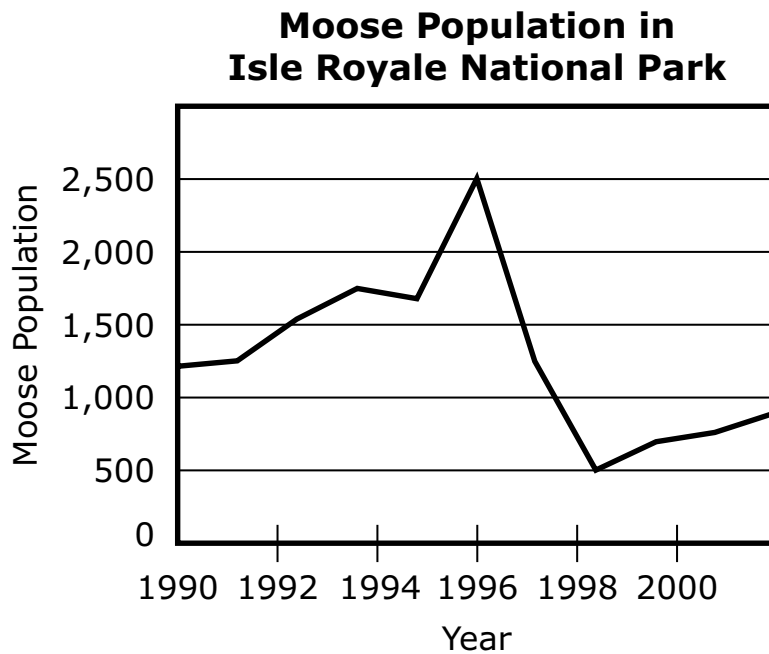
Steps and Observations

	Steps	Student Observations
Step 1	Pour the contents of Beaker 2 into Beaker 1.	The blue solution sank to the bottom of Beaker 1 beneath the clear water.
Step 2	Pour the contents of Beaker 3 into Beaker 1.	The red solution floated above the clear water and the blue water.

Which step models the formation of ocean currents in the polar regions?

- A.** Step 1, because salt helps water sink
- B.** Step 1, because salt helps water rise
- C.** Step 2, because salt helps water sink
- D.** Step 2, because salt helps water rise

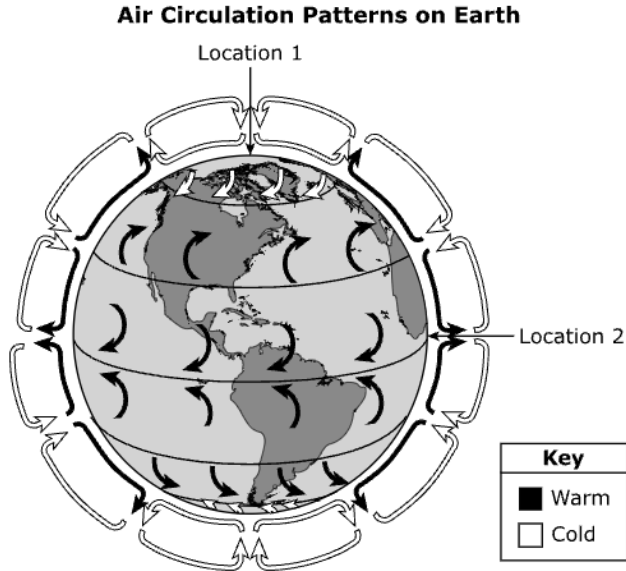
00. The graph shows changes to the moose population in Isle Royale National Park over time.



Which **two** statements **best** describe environmental factors that could have caused a change in the moose population?

- A. The moose population decreased from 1996 to 1998 because of a decrease in hunting by humans in the area.
- B. The moose population decreased from 1996 to 1998 because the temperature and precipitation in those years was close to the annual average for the area.
- C. The moose population decreased from 1996 to 1998 because of an increase in the predator population in the area.
- D. The moose population increased from 1995 to 1996 because the amount of available food in the area increased.
- E. The moose population increased from 1995 to 1996 because the rate of reproduction decreased for moose in the area.

The figure shows a model of the air circulation patterns on Earth.



Complete the sentence to describe how air circulation patterns affect climate on Earth.

Select the correct answer from **each** drop-down menu.

The climate is dry in because the pattern of circulation causes a zone.

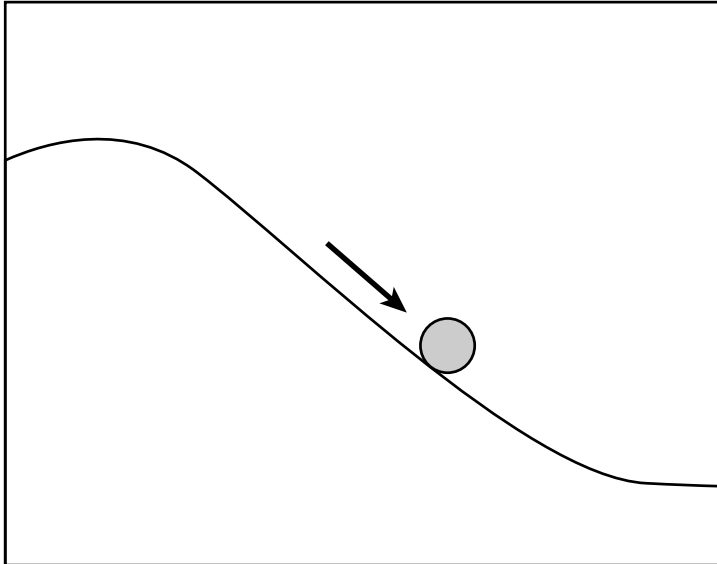
00. A solar panel company wants to investigate the use of a new material in its solar panels. The company plans to create sample solar panels using the new material to test whether this change will increase the energy transfer efficiency of the solar panels. A more efficient solar panel generates more electrical energy from the same amount of sunlight than a less efficient panel.

Which **two** types of data should the company collect in its investigation to determine whether the new material will increase the energy transfer efficiency of the solar panels?

- A.** data on the temperature of each type of solar panel under the same weather conditions
- B.** data on how much electrical energy each type of solar panel generates under the same weather conditions
- C.** data on how much sunlight each type of solar panel absorbs under the same weather conditions
- D.** data on the differences in color between the two types of solar panel to see how they look on homes under the same weather conditions
- E.** data on the weights of the two types of solar panel to see how they rest on homes under the same weather conditions

- 00.** The figure shows a ball rolling down a hill. The ball speeds up as it rolls down the hill.

Ball Rolling Down a Hill



How does the total energy of the ball change as it rolls down the hill?

- A.** The total energy of the ball decreases because potential energy decreases.
- B.** The total energy of the ball increases because kinetic energy increases.
- C.** The total energy of the ball stays the same because kinetic energy and potential energy do not change.
- D.** The total energy of the ball stays the same because kinetic energy increases while potential energy decreases.

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