

Student Name: _____



Science Test Booklet Grade 5

Paper-Based Item Sampler

Alaska Department of Education & Early Development



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Part 1 Directions

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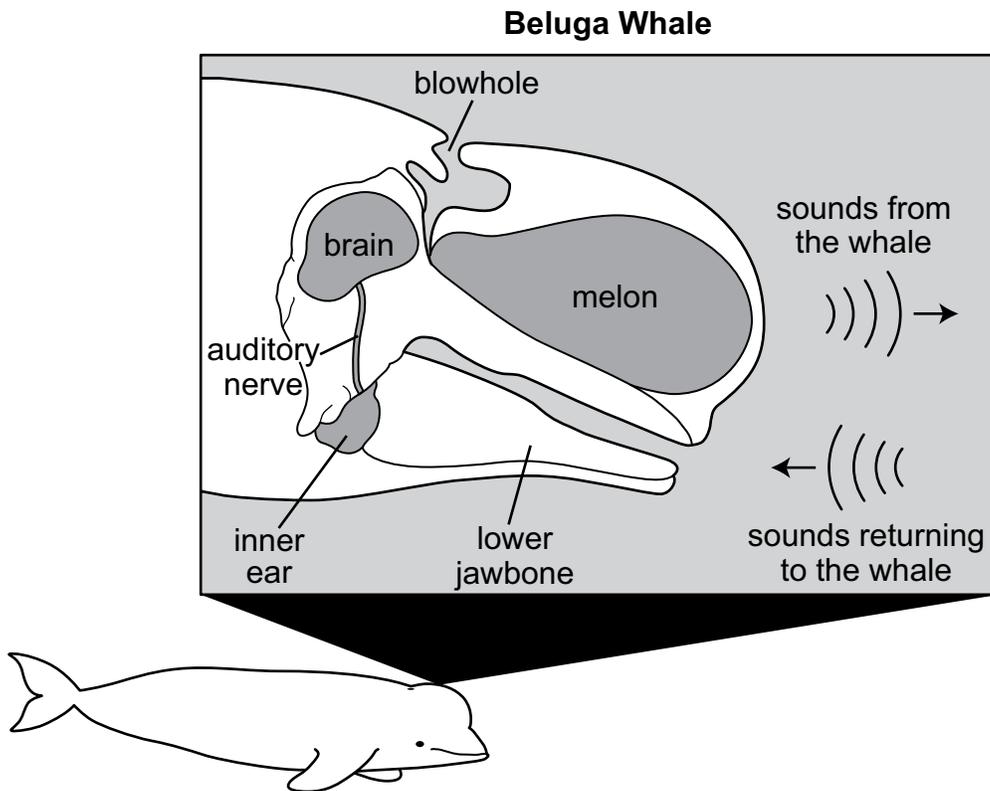
Use the following information to answer questions 1–3.

Beluga Whales

There are five groups of beluga whales that live in the waters near Alaska. Beluga whales have shiny, white skin. Each summer, most beluga whales shed their skin. The whales rub their bodies against rough sand or gravel to help remove the old skin.

Under its skin, a beluga whale has 4–6 inches of blubber. The blubber layer changes thickness with the seasons.

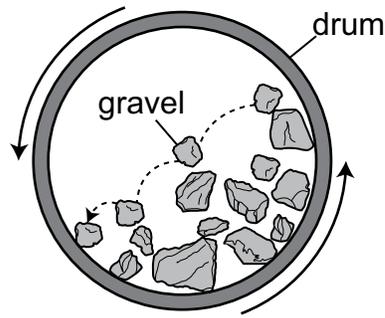
A beluga whale can move and twist its head. Its head has a large, rounded area called the melon. The melon helps the whale make and direct sounds in water.



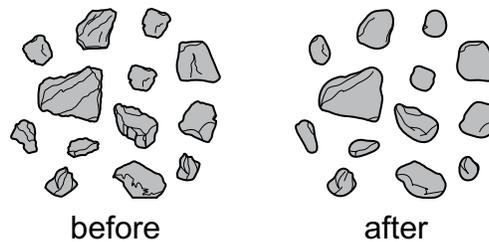
Beluga whales make clicking sounds in their air passages. The melon projects these sounds into the water. Objects in the water reflect these sounds. The whales can sense sounds through their jawbones.

1. Gravel is used by beluga whales to remove old skin. A student wants to investigate how weathering can change gravel. The student sets up an experiment using a rock tumbler. A rock tumbler is a machine with a spinning container called a drum. The student places some gravel, sand, and water into a rock tumbler. The student observes the gravel before and after the gravel is in the rock tumbler for one week.

**Processes inside
a Rock Tumbler**



Observations of Gravel



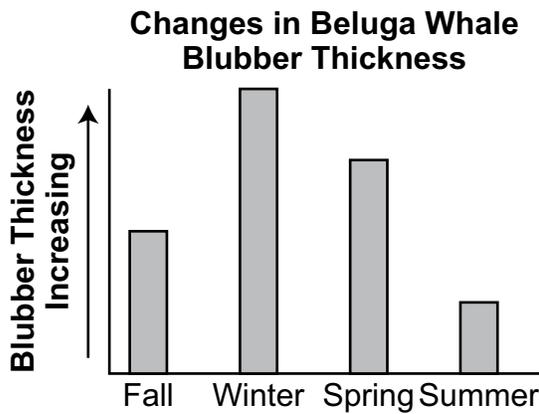
Select the two observations that provide the best evidence of the effects of weathering on the gravel.

- (A) The gravel pieces became smaller.
- (B) The drum turned the gravel for one week.
- (C) Rough edges of the gravel appear smooth.
- (D) The drum turned the gravel at a constant speed.
- (E) Water and sand stayed inside the drum with the gravel.

2. Which description best explains how beluga whales receive sound information?
- Ⓐ Sound information is received by the beluga whale’s lower jawbone. Next, the information moves through the ear, where it is sent by the auditory nerve to the brain for processing.
 - Ⓑ Sound information is received by the beluga whale’s air passages. Next, the information moves through the ear, where it is sent by the auditory nerve to the melon for processing.
 - Ⓒ Sound information is received by the beluga whale’s brain. Next, the information moves through the ear, where it is sent by the auditory nerve to the air passages for processing.
 - Ⓓ Sound information is received by the beluga whale’s melon. Next, the information moves through the ear, where it is sent by the auditory nerve to the lower jawbone for processing.

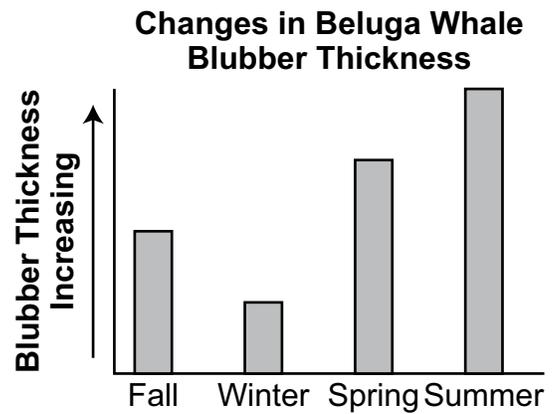
3. Which graph and argument best describe how a beluga whale’s blubber thickness changes during the year?

(A)



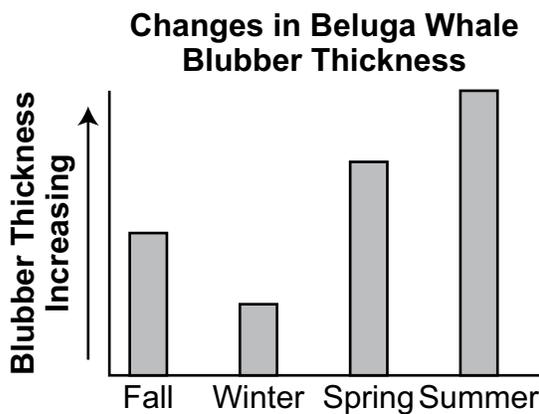
The thickest blubber is during the summer because the whale can find food more easily.

(B)



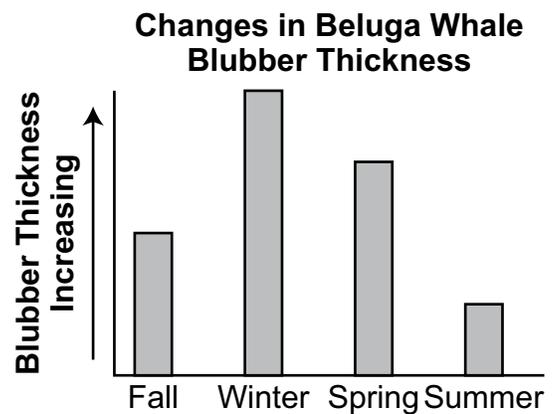
The thickest blubber is during the summer because it helps the whale survive cold water temperatures.

(C)



The thickest blubber is during the winter because the whale can find food more easily.

(D)



The thickest blubber is during the winter because it helps the whale survive cold water temperatures.

4. A student is given vinegar in a plastic bag and some baking soda. The student records observations of each substance.

Student Observations

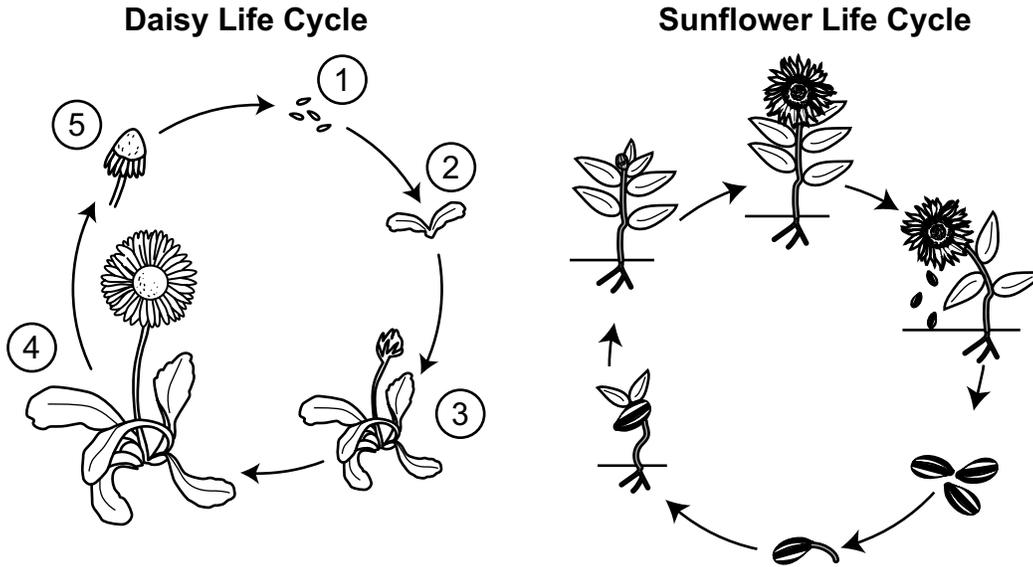
Properties	Vinegar in Plastic Bag	Baking Soda
Weight (grams)	25	5
State of Matter	liquid	solid
Color	clear	white

The student pours the baking soda into the plastic bag with the vinegar. The student seals the bag. Inside the bag, bubbles appear and the liquid remains clear. The student places the bag on a scale.

Which statement most likely describes the weight of the bag with vinegar and baking soda after they are combined?

- Ⓐ The weight is 25 grams because the solid disappears.
- Ⓑ The weight is less than 25 grams because bubbles form.
- Ⓒ The weight is 30 grams because the weight stays the same.
- Ⓓ The weight is more than 30 grams because a new substance forms.

5. The models below show the life cycles of two plants.



Based on the models, which life cycle step do the two plants share that is necessary for new plants to grow?

- Ⓐ release of seeds from seed head of flower
- Ⓑ growth of many petals from a single seed head
- Ⓒ growth of leaves at the base of multiple flowers
- Ⓓ visits from insects to pass pollen to other flowers



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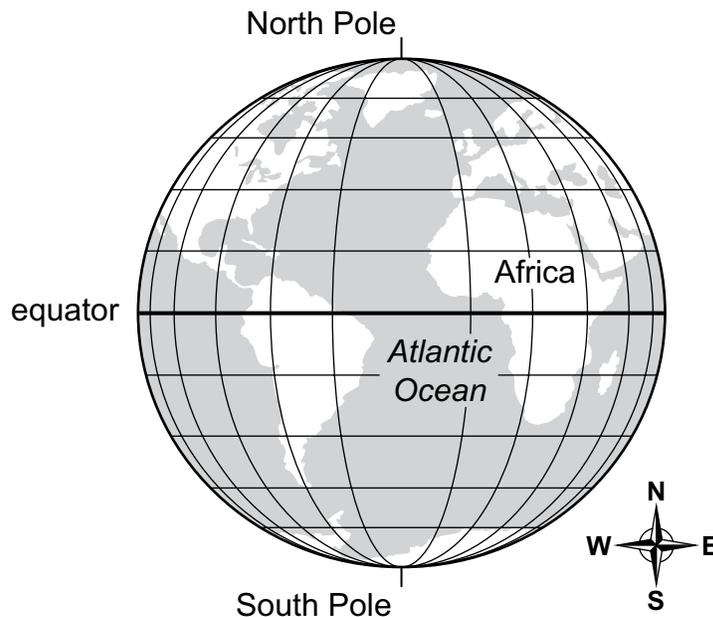
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Use the following information to answer questions 6–9.

Deserts

Not all deserts are hot, but they are all dry. Deserts do not get much water—usually less than 26 centimeters of precipitation per year!

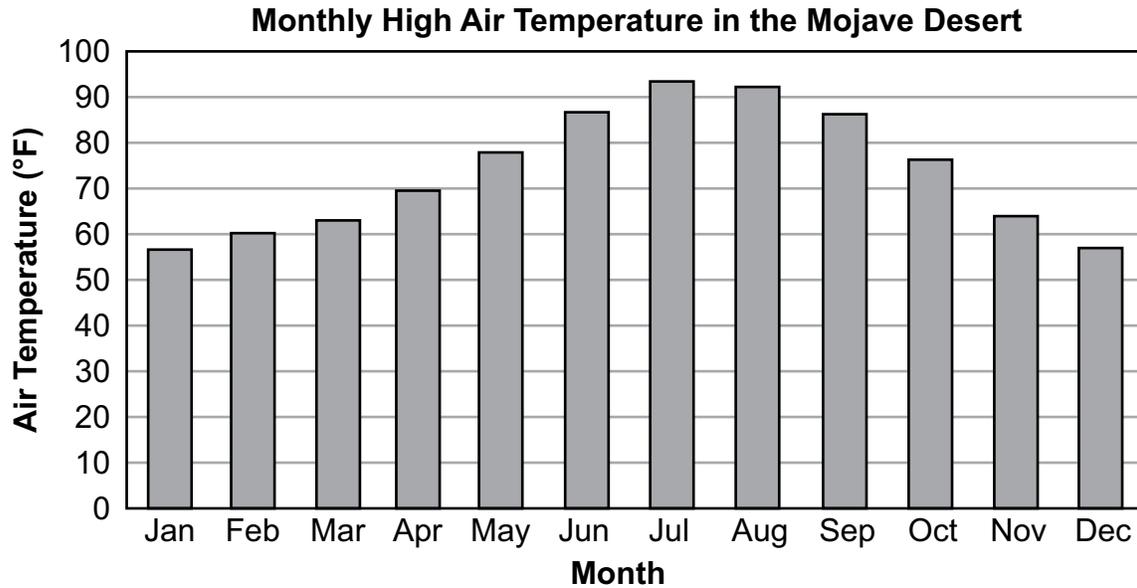
Some deserts are cold. The Arctic at the North Pole and Antarctica at the South Pole are both desert environments. Polar bears live in the Arctic. They have white, waterproof fur and thick layers of body fat. These bears have large paws and five long claws. In Antarctica, penguins live close together in large groups. In cold deserts, algae and grasses are common. The plants in cold deserts do not grow tall because the winds can be very strong.



Plants in hot deserts have special ways to survive in a dry environment. Cactus plants are well known for being able to survive with very little water. Some animals in hot deserts are snakes, lizards, and insects. The animals in hot deserts often look for food when it is cool. They rest during the hottest times of the day.

A famous hot desert is the Sahara in Africa. This desert is known for its tall sand dunes that are moved by wind. The Namib is a very strange desert. This desert is on the southern coast of Africa, along the Atlantic Ocean. Most areas along a coast get a lot of rain. The direction of the wind in the Namib prevents it from getting much rain. The rainfall in this desert is less than two centimeters per year!

6. The Mojave Desert is a hot desert in the southwestern United States. The graph represents the high air temperatures throughout the year in the Mojave Desert.



Which statement is best supported by the data?

- Ⓐ The coolest temperatures occur during the summer months of June, July, and August.
- Ⓑ The temperatures during the spring months are warmer than the temperatures during the fall months.
- Ⓒ The morning temperatures are about 20 degrees cooler than the afternoon temperatures during every month.
- Ⓓ The temperatures during the summer months are about 30 degrees warmer than the temperatures during the winter months.

7. A student is looking at information about two different regions.

Climate Information about Two Regions

Region	Precipitation per Year	High Air Temperature in Summer	High Air Temperature in Winter
1	94 centimeters	90°F	39°F
2	25 centimeters	104°F	64°F

Which region is most likely a desert region and why?

- Ⓐ Region 1 is most likely a desert because it is dry.
 - Ⓑ Region 2 is most likely a desert because it is dry.
 - Ⓒ Region 1 is most likely a desert because it is warmer than region 2.
 - Ⓓ Region 2 is most likely a desert because it is warmer than region 1.
8. Many cactus plants produce colorful flowers. A teacher brought a cactus plant to school so students could watch it bloom. The cactus was placed in good soil in a sunny location in the classroom. The teacher watered the plant once a week. After three weeks, the cactus was soft and unhealthy.

Which statement best describes why the cactus was unhealthy?

- Ⓐ The cactus had traits to help it survive in dry places and got too much water in the classroom.
- Ⓑ The cactus had traits to help it survive in dark places and got too much sunlight in the classroom.
- Ⓒ The cactus had traits to help it survive in wet places and did not get enough water in the classroom.
- Ⓓ The cactus had traits to help it survive in sunny places and did not get enough sunlight in the classroom.

9. **This question has two parts.**

In the Arctic desert, polar bears hunt seals from the edge of sea ice. Sometimes polar bears swim in the cold water for miles between pieces of sea ice.

Part A

Polar bears have clear fur that appears white in their snowy habitat. Select the statement that describes how having white fur most helps polar bears survive.

- Ⓐ White fur lets polar bears swim long distances.
- Ⓑ White fur keeps polar bears warm in cold water.
- Ⓒ White fur makes it hard for seals to see polar bears.

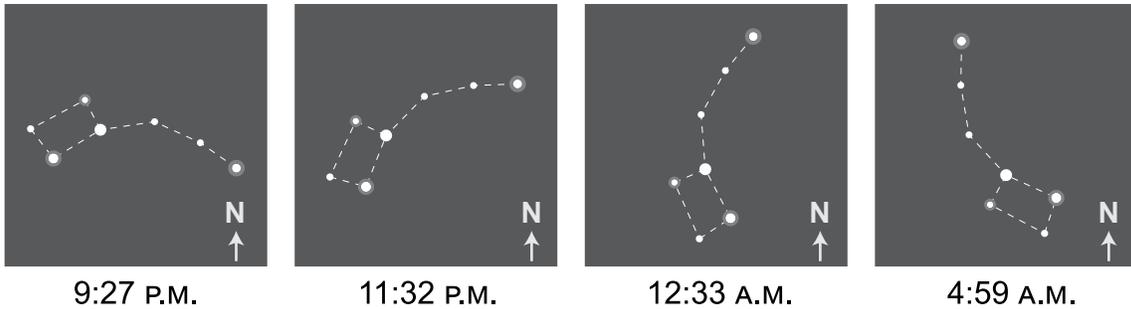
Part B

Select the trait that most helps polar bears catch prey.

- Ⓐ thick fur
- Ⓑ long claws
- Ⓒ layers of body fat

10. The diagrams below show Ursa Minor (the Little Dipper) at different times during a night. The observations were made from the same location on the same evening, looking north.

Observations of the Little Dipper



Which statement best explains the observations?

- Ⓐ Since Earth spins on its axis, the stars appear to move across the night sky.
- Ⓑ Since stars spin on their axes, they appear to change position in the night sky.
- Ⓒ Since stars move away from Earth as the universe expands, they are sometimes visible.
- Ⓓ Since Earth moves in its orbit around the sun, the stars observed at night change positions.



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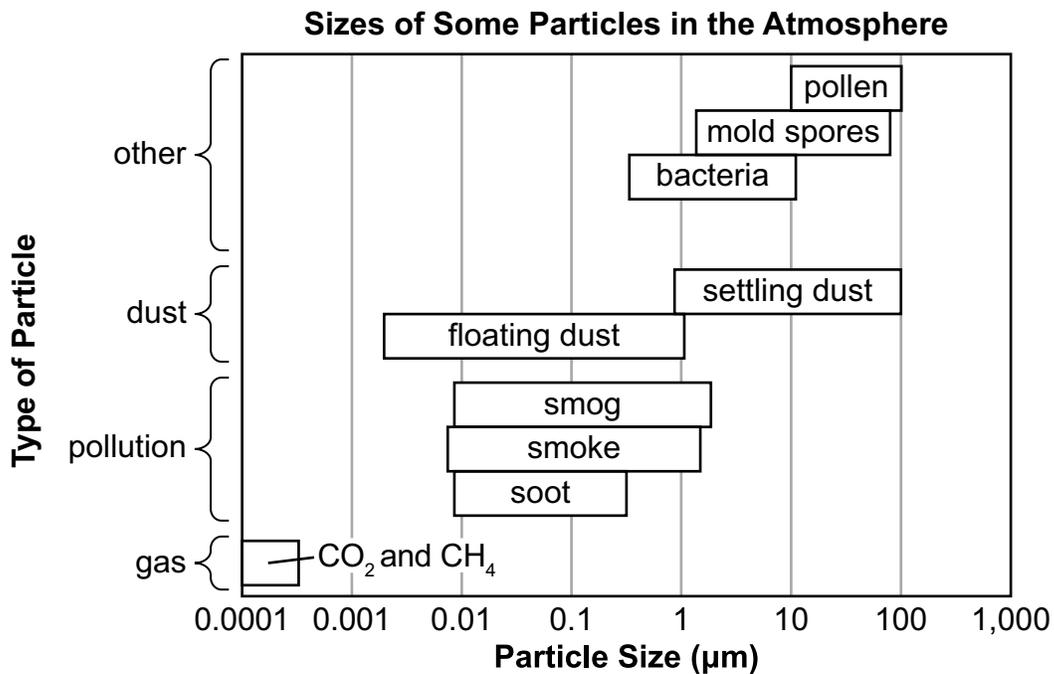
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Use the following information to answer questions 11–13.

What Are We Breathing?

Earth’s atmosphere has many different parts. Some of these parts are solid particles and gas particles. Particles are tiny pieces of matter. Plants and animals need some kinds of tiny pieces of matter to live. Other kinds of tiny pieces of matter can be harmful. An example of harmful matter is air pollution. It can be harmful to living things.

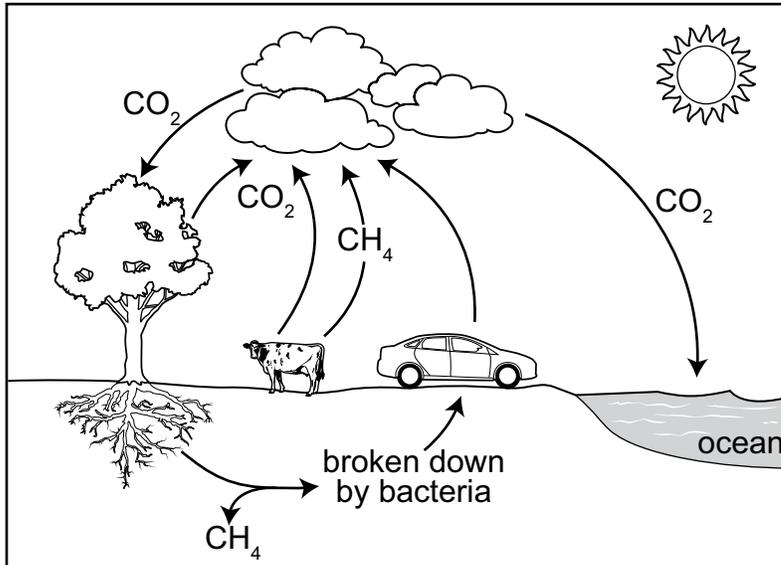
The graph shows the sizes of some types of particles in the atmosphere.



Note: A micrometer (µm) is one-millionth of a meter. For example, the width of a human hair is about 100–150 micrometers.

All matter is made of elements. Carbon (C) is an element. Carbon can join with other elements. New substances can then be made. Carbon can mix with oxygen (O) and hydrogen (H). Carbon cycles in the atmosphere. It can also cycle between oceans, rocks, and living things.

Example of Carbon Dioxide and Methane Cycling



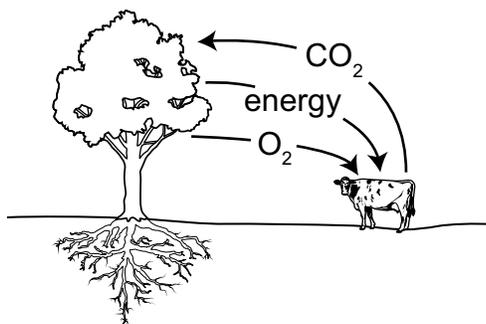
Key
CO_2 = carbon dioxide
CH_4 = methane

11. The model in the scenario shows the cycling of carbon dioxide (CO_2) and methane (CH_4). Which statement best describes some of the interactions of two Earth systems in the model?
- Ⓐ Methane is used and released by plants in the biosphere, and carbon dioxide is stored underground in the geosphere.
 - Ⓑ Carbon dioxide is used and released by plants in the biosphere, and methane is stored underground in the geosphere.
 - Ⓒ Methane is used and released by animals in the atmosphere, and carbon dioxide is stored underground in the hydrosphere.
 - Ⓓ Carbon dioxide is used and released by animals in the atmosphere, and methane is stored underground in the hydrosphere.
12. Select the two claims that are supported by evidence in the particle size comparison graph in the scenario.
- Ⓐ Because particles in the air are made of matter, gravity pulls them downward.
 - Ⓑ Because gases are not made of matter, they do not fall toward the center of Earth.
 - Ⓒ Because gravity pushes upward toward space, pollution stays in the air for a long time.
 - Ⓓ Because tiny particles are too small to be affected by Earth's gravity, they float in the atmosphere.
 - Ⓔ Because large dust particles are pulled toward the center of Earth, they eventually settle to the ground.

13. This question has two parts.

The model shows matter being transferred between a tree and a cow. The model also shows energy being transferred from the tree to the cow.

Interaction between a Tree and a Cow



Part A

The model needs to be revised to show the source of the energy that is transferred from the tree to the cow. Select the addition that should be made to the model.

- (A) The sun should be added to the model, with one arrow pointing from the sun to the tree.
- (B) Earth's core should be added to the model, with one arrow pointing from the core to the tree.
- (C) The sun should be added to the model, with one arrow pointing from the sun to the tree and a second arrow pointing from the sun to the cow.

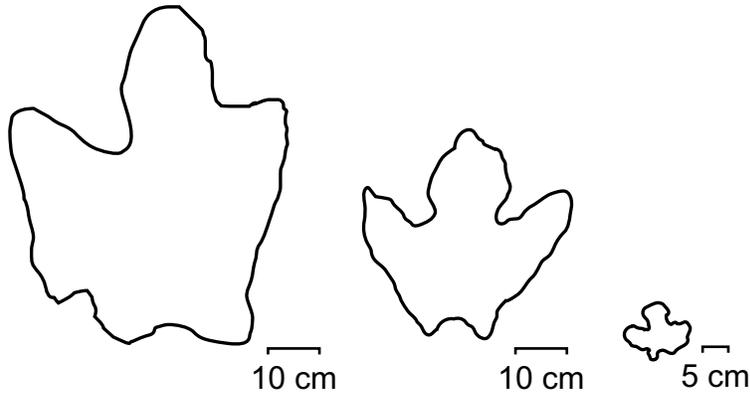
Part B

Select the description that best explains the addition to the model.

- (A) The tree and the cow use the same type of energy for life processes.
- (B) The tree must change the energy it uses to a form that the cow can use.

14. Many tracks of hadrosaurid dinosaurs were discovered at Denali National Park. The drawing shows some of the tracks observed by scientists.

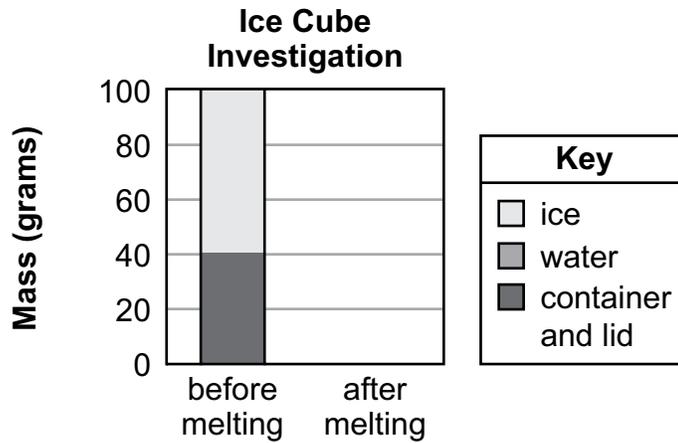
Hadrosaurid Dinosaur Tracks



The scientists claim that these dinosaurs traveled in protective herds. Which observation is the best evidence to support the scientists' claim?

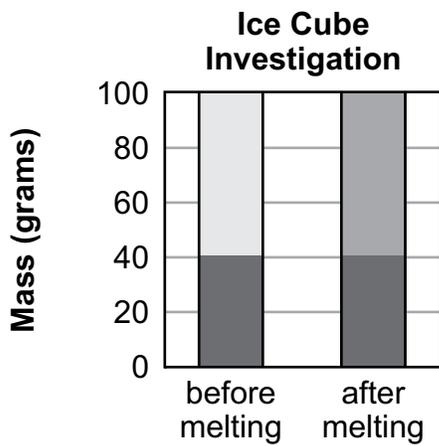
- Ⓐ The fossil tracks have three toes.
- Ⓑ The fossil tracks are different sizes.
- Ⓒ The original tracks formed in mud that dried quickly.
- Ⓓ The original tracks formed at a specific time in history.

15. A student conducted an investigation to find out how mass is affected when ice melts. The student placed ice cubes inside a plastic container with a lid. A graph of the mass of the system before the ice melted is shown below.

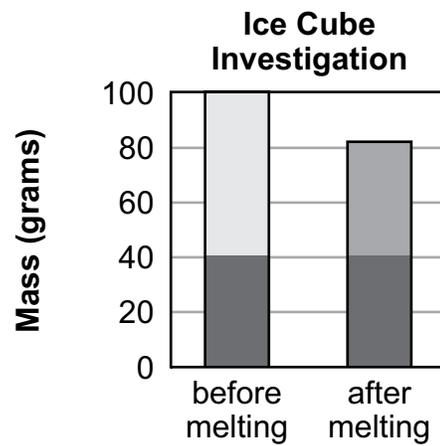


Which graph represents the mass data before and after the ice cubes melt?

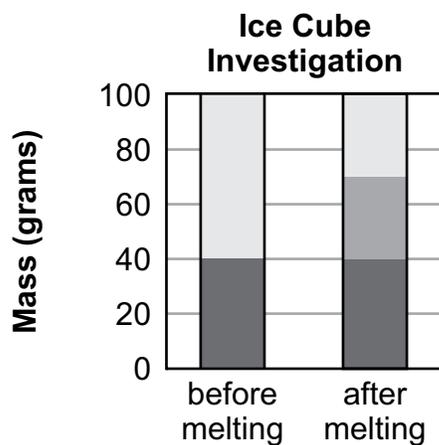
(A)



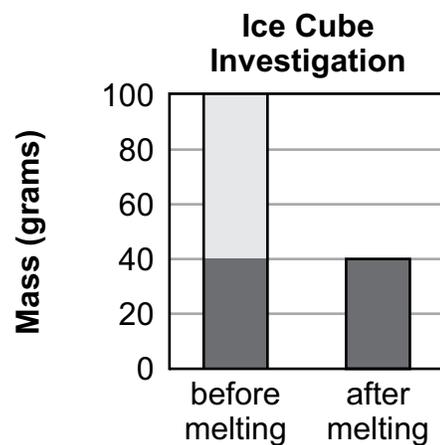
(B)



(C)



(D)





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