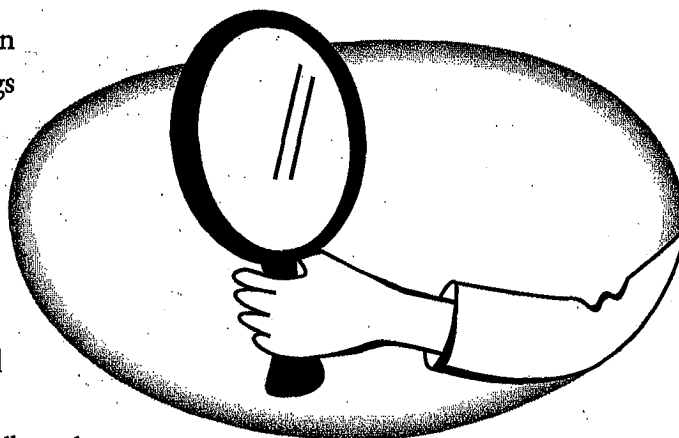


Can It Reflect Light?

What types of objects or materials can reflect light? Put an X next to the things you think can reflect light.



- | | | |
|---|--|--|
| <input type="checkbox"/> water | <input type="checkbox"/> dull metal | |
| <input type="checkbox"/> gray rock | <input type="checkbox"/> red apple | |
| <input type="checkbox"/> leaf | <input type="checkbox"/> rough cardboard | |
| <input type="checkbox"/> mirror | <input type="checkbox"/> the Moon | <input type="checkbox"/> milk |
| <input type="checkbox"/> glass | <input type="checkbox"/> rusty nail | <input type="checkbox"/> bedsheet |
| <input type="checkbox"/> sand | <input type="checkbox"/> clouds | <input type="checkbox"/> brand new penny |
| <input type="checkbox"/> potato skin | <input type="checkbox"/> soil | <input type="checkbox"/> old tarnished penny |
| <input type="checkbox"/> wax paper | <input type="checkbox"/> wood | <input type="checkbox"/> smooth sheet of aluminum foil |
| <input type="checkbox"/> tomato soup | | |
| <input type="checkbox"/> crumpled paper | | |
| <input type="checkbox"/> shiny metal | | |

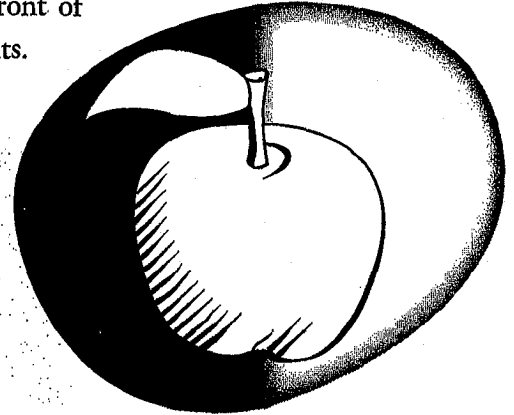
Explain your thinking. Describe the "rule" or the reasoning you used to decide if something can reflect light.

Apple in the Dark

Imagine you are sitting at a table with a red apple in front of you. Your friend closes the door and turns off all the lights. It is totally dark in the room. There are no windows in the room or cracks around the door. No light can enter the room.

Circle the statement you believe best describes how you would see the apple in the dark:

- A** You will not see the red apple, regardless of how long you are in the room.
- B** You will see the red apple after your eyes have had time to adjust to the darkness.
- C** You will see the apple after your eyes have had time to adjust to the darkness, but you will not see the red color.
- D** You will see only the shadow of the apple after your eyes have had time to adjust to the darkness.
- E** You will see only a faint outline of the apple after your eyes have had time to adjust to the darkness.



Describe your thinking. Provide an explanation for your answer.

Making Sound

All of the objects listed below make sounds. Put an X next to the objects you think involve vibrations in producing sound.

guitar strings

drum

dripping faucet

barking dog

piano

screeching brakes

radio speaker

crumpled paper

car engine

chirping cricket

singer

popped balloon

drum

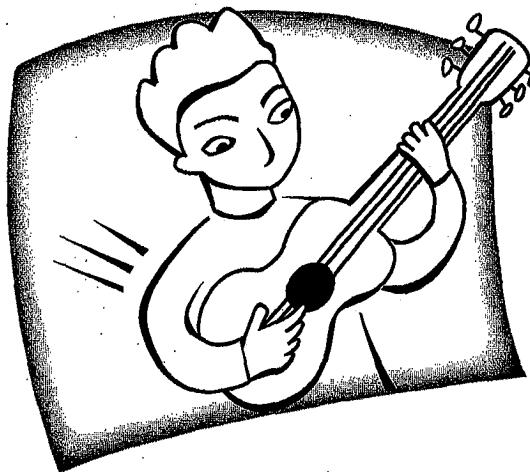
wind

wood saw

clapped hands

bubbling water

rustling leaves



hammer

flute

thunderstorm

two stones rubbed together

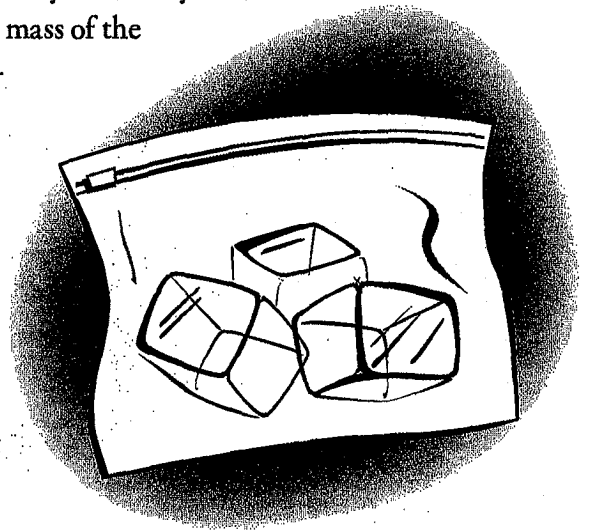
snapped fingers

Explain your thinking. What "rule" or reasoning did you use to decide which objects involve vibrations in producing sound?

Ice Cubes in a Bag

You are having an argument with your friend about what happens to the mass when matter changes from one form to another. To prove your idea, you put three ice cubes in a sealed bag and record the mass of the ice in the bag. You let the ice cubes melt completely. Ten minutes later you record the mass of the water in the bag. Which of the following best describes the result? Circle your prediction.

- A** The mass of the water in the bag will be less than the mass of the ice in the bag.
- B** The mass of the water in the bag will be more than the mass of the ice in the bag.
- C** The mass of the water in the bag will be the same as the mass of the ice cubes in the bag.



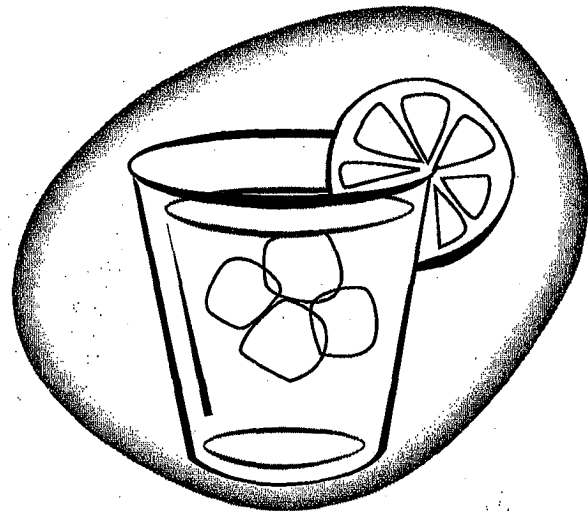
Describe your thinking. Provide an explanation for your answer.

Lemonade

A glass of unsweetened lemonade weighs 255 grams. A spoonful of sugar is weighed before stirring it into the lemonade. The sugar weighs 25 grams. Predict how much you think the sweetened lemonade will weigh after you stir in the sugar.

Please circle the best answer.

- A** It will weigh slightly less than 255 grams but more than 230 grams.
- B** It will weigh slightly more than 255 grams but less than 280 grams.
- C** It will weigh 230 grams.
- D** It will weigh 280 grams.
- E** It will weigh the same: 255 grams.

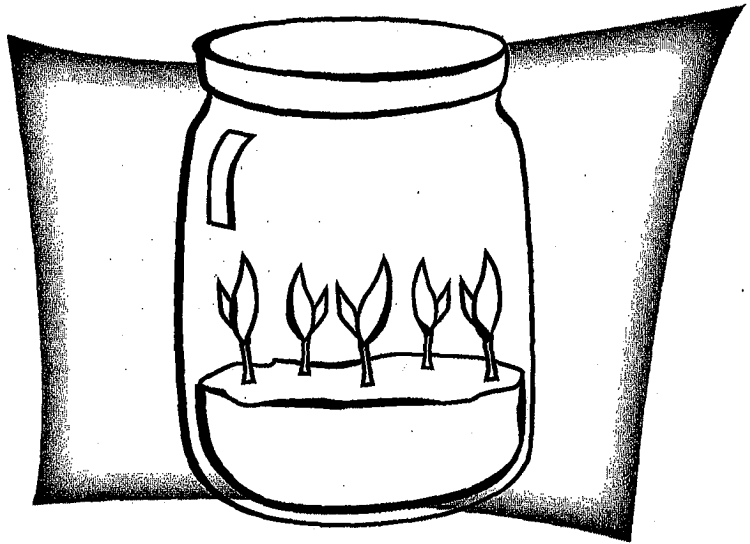


Describe your thinking. Provide an explanation for your answer.

Seedlings in a Jar

Imagine you have a sealed jar containing five bean seeds, air, and a moist paper towel. Nothing can get in or out of the jar. The total mass of the jar and its contents is 500 grams.

Imagine the same jar with its contents 12 days later. During that time the jar remained sealed. Nothing could get in or out of the jar. The seeds have germinated to form 6-centimeter seedlings. The total mass of the jar and its contents after the 12 days is recorded.



Circle the statement that is the best comparison of the total mass of the jar and its contents before and after the seeds sprouted to form seedlings:

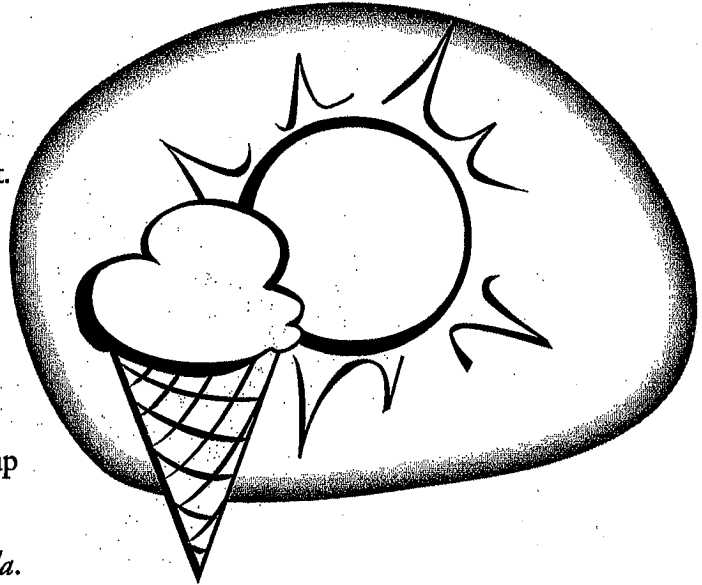
- A** The total mass of the original jar with seeds will be more than the total mass of the jar with the seedlings.
- B** The total mass of the original jar with seeds will be less than the total mass of the jar with the seedlings.
- C** There will be no change in the total mass of the jar with seedlings after 12 days.

Describe your thinking. Provide an explanation for your answer.

Is It Melting?

The list below involves situations that cause changes in materials. The materials are *italicized*. Put an X next to the situations in which the *italicized* materials undergo melting.

- ___ **A** Putting a bowl of frozen *ice cream* in the sun.
- ___ **B** Sawing *wood* to make sawdust.
- ___ **C** Dissolving *salt* in water.
- ___ **D** Adding a *LifeSaver* candy to a glass of warm water.
- ___ **E** *Water* evaporating from a pan.
- ___ **F** Dissolving a *sugar cube* in a cup of hot tea.
- ___ **G** Pouring vinegar on *baking soda*.
- ___ **H** Sucking on a *lollipop* or other *hard candy*.
- ___ **I** Holding an *ice cube* in your hand.

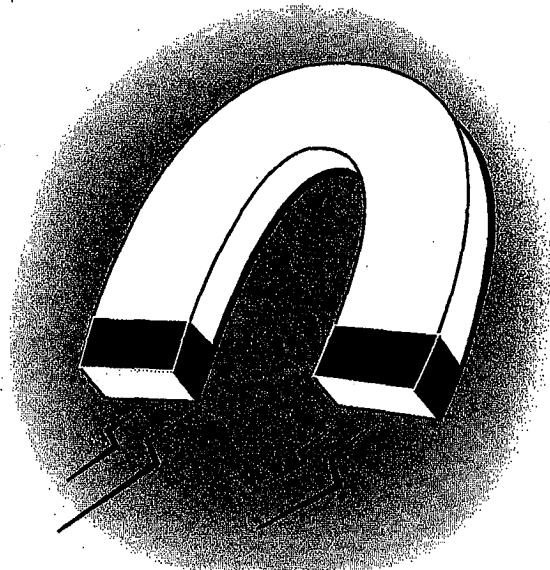


Explain your thinking. Describe the “rule” or reasoning you used to decide if something melts.

Is It Matter?

Listed below is a list of things that are considered matter and things that are not considered matter. Put an X next to each of the things that you consider to be matter.

- | | | | |
|--------------------------------------|--|---|--|
| <input type="checkbox"/> rocks | <input type="checkbox"/> salt | | |
| <input type="checkbox"/> baby powder | <input type="checkbox"/> Mars | | |
| <input type="checkbox"/> milk | <input type="checkbox"/> Jupiter | | |
| <input type="checkbox"/> air | <input type="checkbox"/> steam | | |
| <input type="checkbox"/> light | <input type="checkbox"/> rotten apples | | |
| <input type="checkbox"/> dust | <input type="checkbox"/> heat | | |
| <input type="checkbox"/> love | <input type="checkbox"/> sound waves | | |
| <input type="checkbox"/> cells | <input type="checkbox"/> water | | |
| <input type="checkbox"/> atoms | <input type="checkbox"/> bacteria | | |
| <input type="checkbox"/> fire | <input type="checkbox"/> oxygen | <input type="checkbox"/> gravity | <input type="checkbox"/> dissolved sugar |
| <input type="checkbox"/> smoke | <input type="checkbox"/> stars | <input type="checkbox"/> magnetic force | <input type="checkbox"/> electricity |

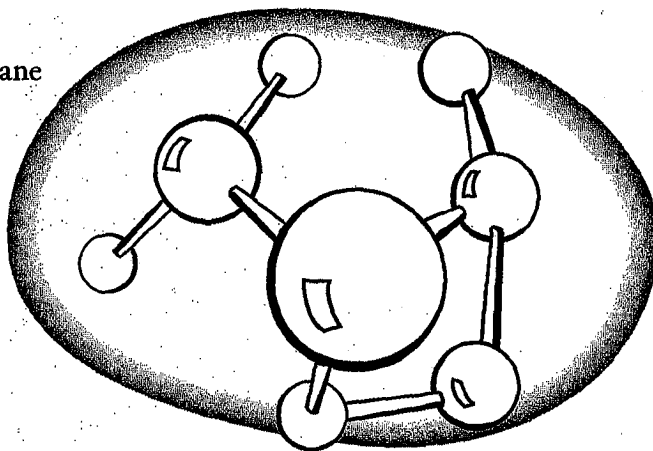


Explain your thinking. Describe the "rule" or reason you used to decide whether something is or is not matter.

Is It Made of Molecules?

Put an X next to the things on the list that are made up of one or more molecules.

- | | | | |
|---|--|---------------------------------------|-----------------------------------|
| <input type="checkbox"/> bread | <input type="checkbox"/> DNA | | |
| <input type="checkbox"/> protons | <input type="checkbox"/> cell membrane | | |
| <input type="checkbox"/> water | <input type="checkbox"/> cloud | | |
| <input type="checkbox"/> atomic nucleus | <input type="checkbox"/> oil | | |
| <input type="checkbox"/> brain cell | <input type="checkbox"/> worm | | |
| <input type="checkbox"/> milk | <input type="checkbox"/> protein | | |
| <input type="checkbox"/> egg | <input type="checkbox"/> sugar | | |
| <input type="checkbox"/> atom | <input type="checkbox"/> flower | | |
| <input type="checkbox"/> seed | <input type="checkbox"/> chromosome | <input type="checkbox"/> blood | |
| <input type="checkbox"/> bacteria | <input type="checkbox"/> leaf | <input type="checkbox"/> air | <input type="checkbox"/> mushroom |
| <input type="checkbox"/> skin | <input type="checkbox"/> electrons | <input type="checkbox"/> cell nucleus | <input type="checkbox"/> fruit |

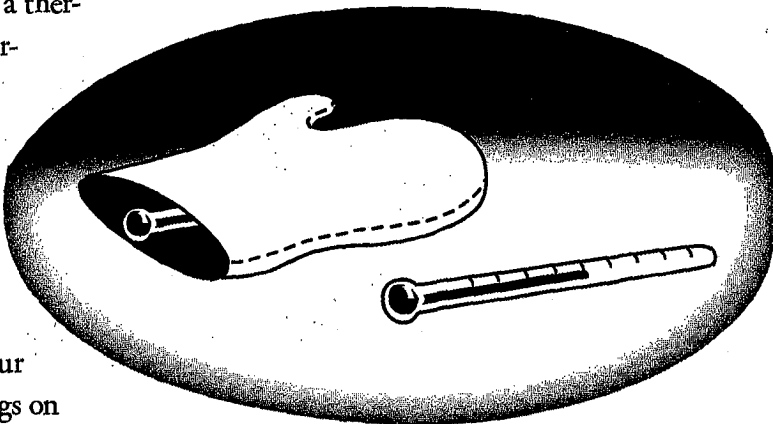


Explain your thinking. Describe the "rule" or reasoning you used to decide if something was made of molecules.

The Mitten Problem

Sarah's science class is investigating heat energy. They wonder what would happen to the temperature reading on a thermometer if they put the thermometer inside a mitten.

Sarah's group obtained two thermometers and a mitten. They put one thermometer inside the mitten and the other thermometer on the table next to the mitten. An hour later they compared the readings on the two thermometers. The temperature inside the room remained the same during their experiment.



What do you think Sarah's group will discover from their investigation? Circle the response that best matches your thinking.

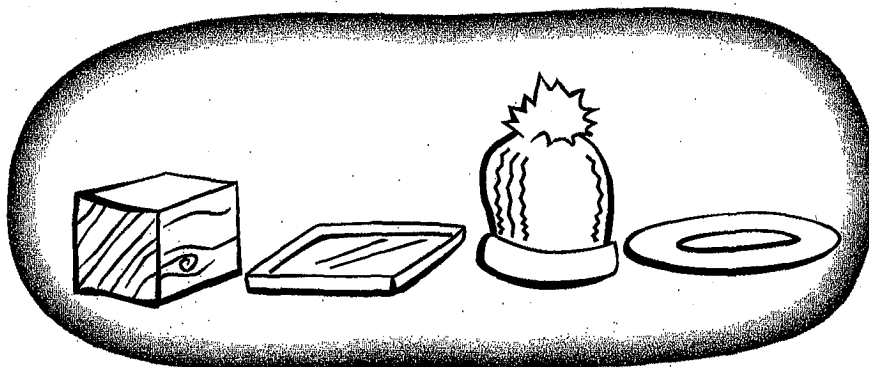
- A** The thermometer inside the mitten will have a lower temperature reading than the thermometer on the table.
- B** The thermometer inside the mitten will have a higher temperature reading than the thermometer on the table.
- C** Both thermometers will have the same temperature reading.

Describe your thinking. Provide an explanation for your answer.

Objects and Temperature

Taz and Kyle are comparing the temperature readings of four different objects:

- block of wood
- metal tray
- wool hat
- glass plate



They place the objects on a table in their science classroom and leave them overnight. A

thermometer is attached to each object. The next day they record the temperature of each object at the same time.

Put an X next to the statement that best describes your prediction about the objects' temperature.

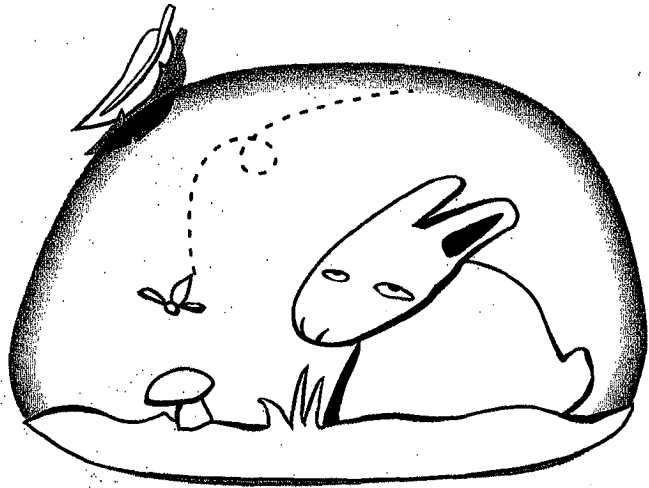
- None of the objects will have the same temperature.
- Two of the objects will have the same temperature.
- Three of the objects will have the same temperature.
- All of the objects will have the same temperature.

Describe your thinking. Provide an explanation for your answer.

Is It an Animal?

Which of the organisms listed are animals? Put an X next to each organism that is considered to be an animal.


- | | | |
|-----------------------------------|----------------------------------|--------------------------------|
| <input type="checkbox"/> cow | <input type="checkbox"/> spider | |
| <input type="checkbox"/> tree | <input type="checkbox"/> snail | |
| <input type="checkbox"/> mushroom | <input type="checkbox"/> flower | |
| <input type="checkbox"/> human | <input type="checkbox"/> monkey | |
| <input type="checkbox"/> worm | <input type="checkbox"/> beetle | |
| <input type="checkbox"/> tiger | <input type="checkbox"/> whale | |
| <input type="checkbox"/> shark | <input type="checkbox"/> frog | <input type="checkbox"/> mold |
| <input type="checkbox"/> starfish | <input type="checkbox"/> chicken | <input type="checkbox"/> snake |



Explain your thinking. Describe the "rule" or reasoning you used to decide if something is an animal.

Is It Living?

Listed below are examples of living (which includes once-living) and nonliving things. Put an X next to the things that could be considered living.

- | | | | | | |
|----------------------------------|------------------------------------|---|--|---|---------------------------------------|
| <input type="checkbox"/> tree | <input type="checkbox"/> egg |  | | | |
| <input type="checkbox"/> rock | <input type="checkbox"/> bacteria | | | | |
| <input type="checkbox"/> fire | <input type="checkbox"/> cell | | | | |
| <input type="checkbox"/> boy | <input type="checkbox"/> molecule | | | | |
| <input type="checkbox"/> wind | <input type="checkbox"/> Sun | | | | |
| <input type="checkbox"/> rabbit | <input type="checkbox"/> mushroom | | | | |
| <input type="checkbox"/> cloud | <input type="checkbox"/> potato | | | | |
| <input type="checkbox"/> feather | <input type="checkbox"/> leaf | | | | |
| <input type="checkbox"/> grass | <input type="checkbox"/> butterfly | | | <input type="checkbox"/> fossil | <input type="checkbox"/> mitochondria |
| <input type="checkbox"/> seed | <input type="checkbox"/> pupae | | | <input type="checkbox"/> hibernating bear | <input type="checkbox"/> river |

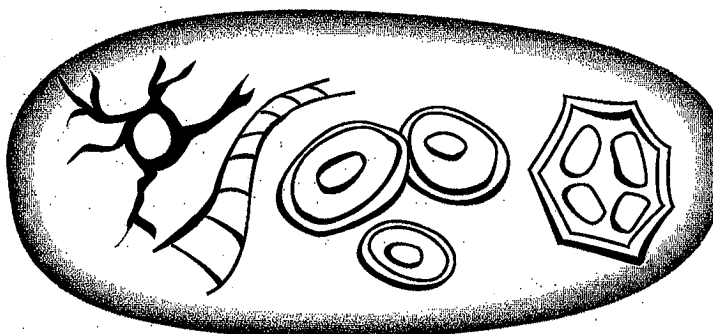
Explain your thinking. What "rule" or reasoning did you use to decide if something could be considered living?

Is It Made of Cells?

Imagine you could examine the objects and materials listed below with a powerful microscope. This powerful microscope will allow you to see evidence of cell structure.

Put an X next to the objects or materials that are made up, or were once made up, of cells.

- flowers
- apples
- skin
- sand
- proteins
- worms
- rocks
- bacteria
- milk
- leaf
- bone
- seeds

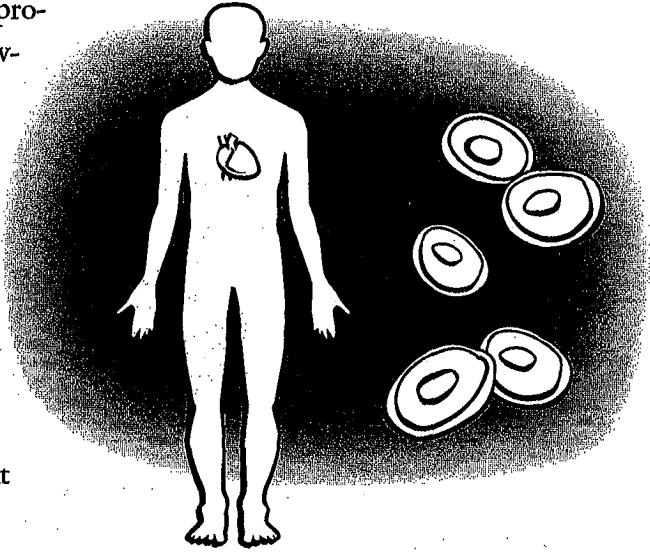


- lungs
- water
- paramecium
- hamburger
- molecules
- blood
- chromosomes
- DNA
- sugar
- cell membrane
- saliva
- calcium
- chlorophyll
- mushrooms
- atoms

Explain your thinking. Describe the "rule" or reason you used to decide whether something is or was once made up of cells.

Human Body Basics

Four students are working on a human body project for their science class. They cannot agree on the basic unit of structure and function in the human body where basic life processes are carried out. These basic processes are getting energy from food, removal of waste molecules, response to stimuli, movement, reproduction, growth, and repair. They debated their ideas as follows:



Paul's argument: Tissues are the basic unit of structure and organs are the basic unit of function.

Tia's argument: Cells are the basic unit of structure and organs are the basic unit of function.

Margy's argument: Cells are the basic unit of structure and function.

Rae's argument: Organs are the basic unit of structure and function.

Which student do you agree with? Describe your thinking. Provide an explanation for your answer.

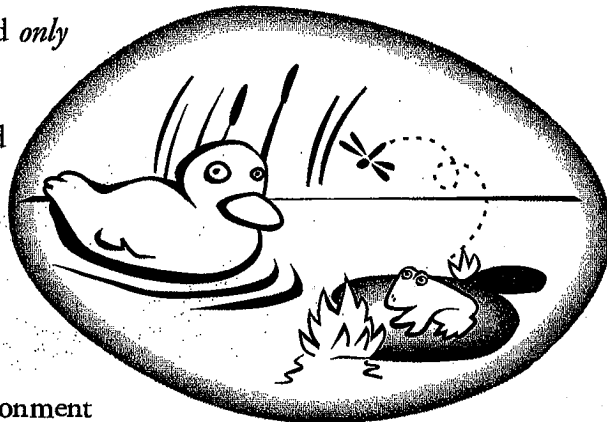
Functions of Living Things

The functions listed below are performed by living organisms. Which functions are performed by plants, animals, or both? Mark each example with a P, A, or B.

Put a **P** in front of the functions performed *only* by plants.

Put an **A** in front of the functions performed *only* by animals

Put a **B** in front of the functions performed by *both* plant and animals.



___ Photosynthesis (make their food)

___ Acquire and take in food from the environment

___ Respiration (release energy from food)

___ Storage of energy

___ Cell division

___ Transport of materials within the organism

___ Reproduction

___ Maintain a stable, internal environment

___ Growth

___ Response to stimuli

___ Elimination of waste products

___ Repair of damaged structures

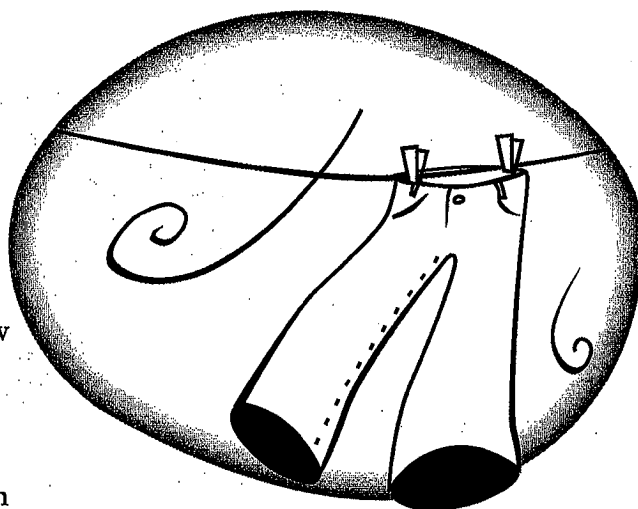
Explain your thinking. What helped you decide whether a function is performed by a plant, animal, or both?

Wet Jeans

Sam washed his favorite pair of jeans. He hung the wet jeans on a clothesline outside. An hour later the jeans were dry.

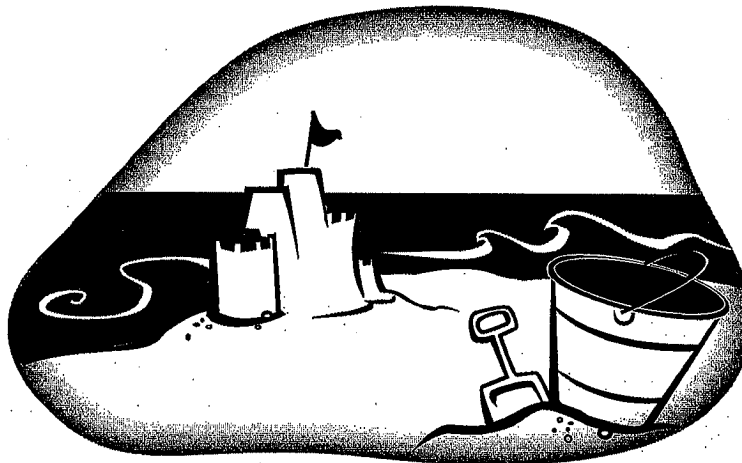
Circle the answer that best describes what happened to the water that was in the wet jeans *an hour later*.

- A** It soaked into the ground.
- B** It disappeared and no longer exists.
- C** It is in the air in an invisible form.
- D** It moved up to the clouds.
- E** It chemically changed into a new substance.
- F** It went up to the Sun.
- G** It broke down into atoms of hydrogen and oxygen.



Describe your thinking. Provide an explanation for your answer.

Beach Sand



Three friends were walking along a beach in New England. They looked closely at the sand and noticed it was made up of tiny particles of rock. They had different ideas about where the sand came from.

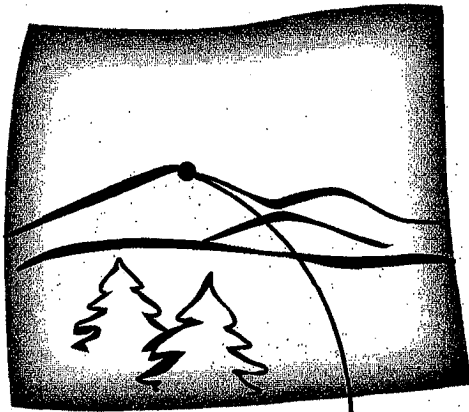
Molly: "I think the sand came from distant mountains and landforms."

Fidel: "I think the sand came from rocks on the ocean floor."

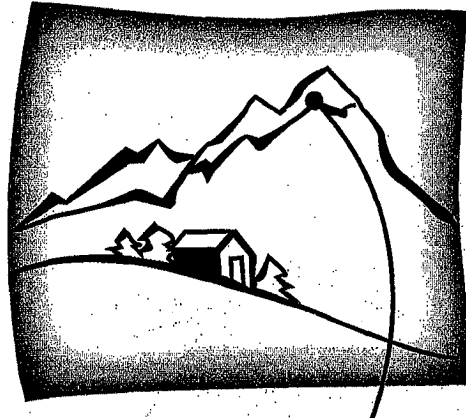
Lynn: "I think the sand came from undersea mountains and sea floor formations."

Which friend do you agree with and why? Explain your thinking about how the sand formed *and* ended up on the beach.

Mountain Age



Mountain A



Mountain B

Mountain A is 4,800 feet tall, looks smooth and rounded, and is located in North America. Mountain B is 19,280 feet tall, looks sharp and jagged, and is located in South America. Both mountains were originally formed by the uplifting of the Earth's crust millions of years ago, are composed of similar material, and are found in similar climate conditions.

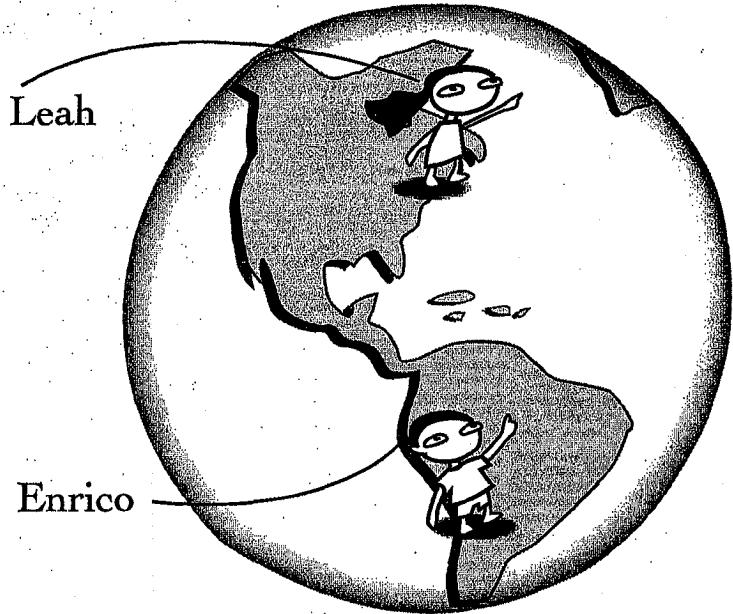
Put an X next to the statement that best describes your thinking about the age of the two different mountains based on their shape and height.

- Mountain A is probably younger than Mountain B.
- Mountain A is probably older than Mountain B.
- Mountains A and B are the same age.

Describe your thinking. Provide an explanation for your answer.

Gazing at the Moon

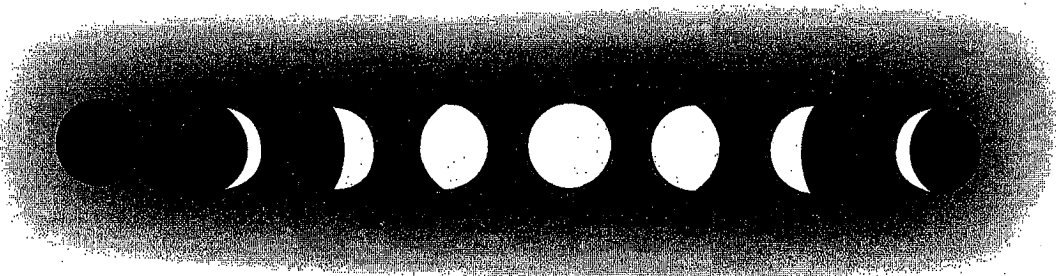
Enrico and Leah live in opposite hemispheres. Enrico lives in Santiago, Chile, which is in the Southern Hemisphere. Leah lives in Boston, Massachusetts, which is in the Northern Hemisphere. They both gazed at the Moon on the same evening. Enrico noticed there was a full Moon when he looked up at the sky from his location (the Southern Hemisphere). What do you predict Leah saw when she looked up in the sky from her location (the Northern Hemisphere)?



- A** New Moon (no part of the Moon is visible)
- B** Crescent Moon (a quarter of the face of the Moon is visible)
- C** Half Moon (half of the face of the Moon is visible)
- D** Gibbous Moon (three-quarters of the face of the Moon is visible)
- E** Full Moon (the entire face of the Moon is visible)

Provide an explanation for your answer. How did you decide what the Moon would look like in the opposite hemisphere?

Going Through a Phase



Mrs. Timmons asked her class to share their ideas about what causes the different phases of the Moon. This is what some of her students said:

Mona: The Moon lights up in different parts at different times of the month.

Jared: The phases of the Moon change according to the season of the year.

Sofia: Parts of the Moon reflect light depending on the position of the Earth in relation to the Sun and Moon.

Drew: The Earth casts a shadow that causes a monthly pattern in how much of the Moon we can see from Earth.

Trey: Different planets cast a shadow on the Moon as they revolve around the Sun.

Oofra: The shadow of the Sun blocks part of the Moon each night causing a pattern of different Moon phases.

Natasha: The clouds cover the parts of the Moon that we can't see.

Raj: The Moon grows a little bit bigger each day until it is full and then it gets smaller again. It repeats this cycle every month.

Which student do you agree with and why? Explain your thinking.

Ice-Cold Lemonade

It was a hot summer day. Mattie poured herself a glass of lemonade. The lemonade was warm, so Mattie put some ice in the glass. After 10 minutes, Mattie noticed that the ice was melting and the lemonade was cold. Mattie wondered what made the lemonade get cold. She had three different ideas. Which idea do you think best explains why the lemonade got cold? Circle your answer.



- A** The coldness from the ice moved into the lemonade.
- B** The heat from the lemonade moved into the ice.
- C** The coldness and the heat moved back and forth until the lemonade cooled off.

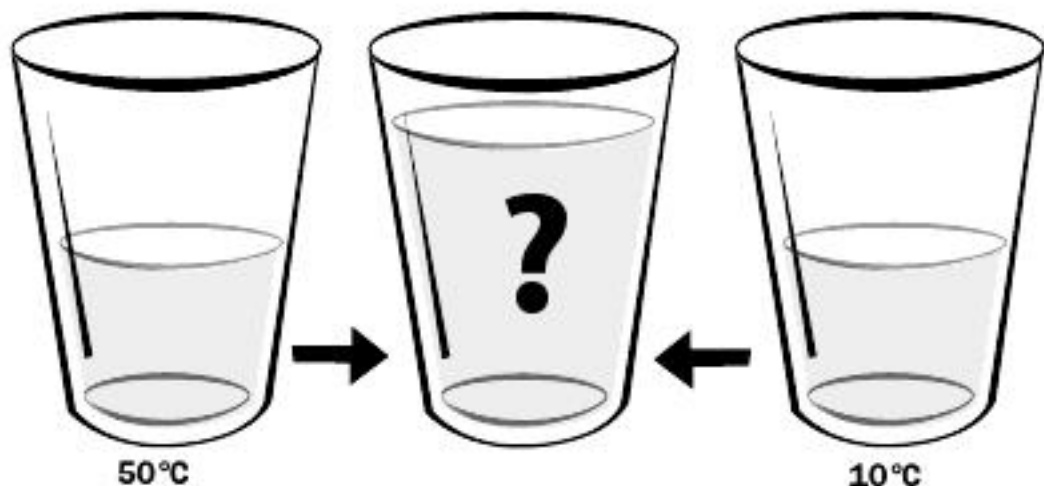
Explain your thinking. Describe the “rule” or reasoning you used for your answer.

Mixing Water

Melinda filled two glasses of equal size half-full with water. The water in one glass was 50 degrees Celsius. The water in the other glass was 10 degrees Celsius. She poured one glass into the other, stirred the liquid, and measured the temperature of the full glass of water.

What do you think the temperature of the full glass of water will be after the water is mixed? Circle your prediction.

- A** 20 degrees Celsius
- B** 30 degrees Celsius
- C** 40 degrees Celsius
- D** 50 degrees Celsius
- E** 60 degrees Celsius



Explain your thinking. Describe the "rule" or reasoning you used for your answer.

Needs of Seeds

Seeds sprout and eventually grow into young plants called seedlings. Put an X next to the things you think a seed needs in order for it to sprout.

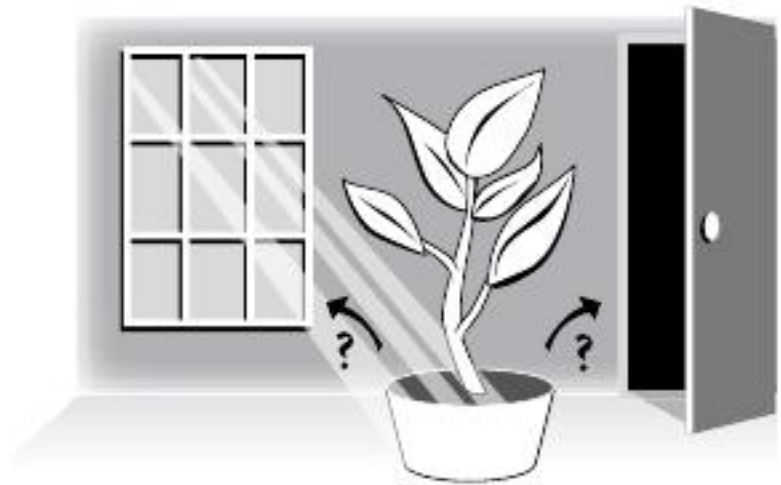
- water
- soil
- air
- food
- sunlight
- darkness
- warmth
- Earth's gravity
- fertilizer



Explain your thinking. Describe the "rule" or reasoning you used to decide what a seed needs in order to sprout.

Plants in the Dark and Light

Four friends wondered how light affected the growth of plants. They decided to test their ideas using young bean plants. One set of plants was put in a dark closet for eight days. The other set of plants was put on a shelf near a sunny window for eight days. The friends then measured the height of the plants after eight days. This is what they predicted:



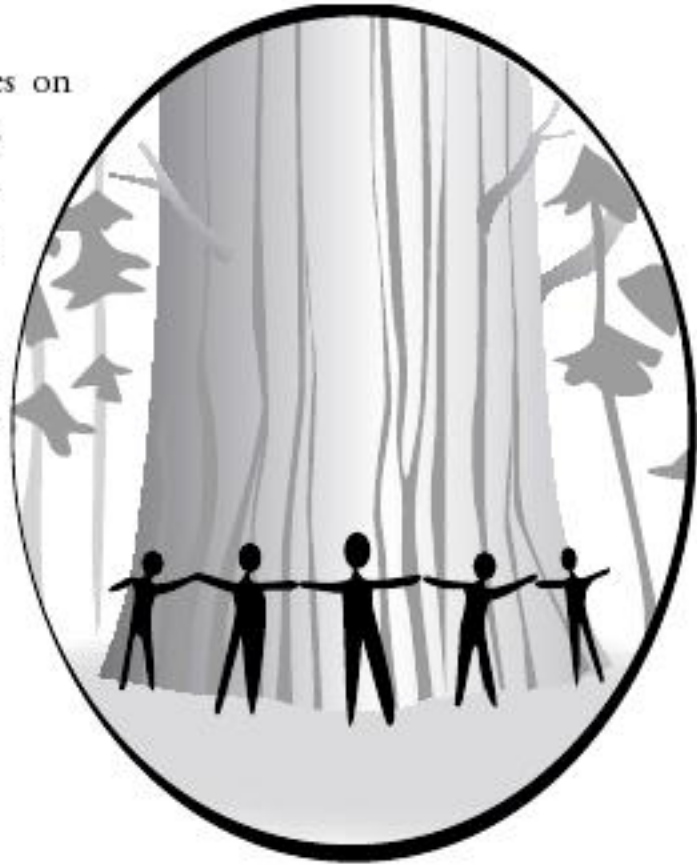
- Carl: "I think the plants in the dark closet will be the tallest."
- Monique: "I think the plants by the sunny window will be the tallest."
- Jasmine: "I think the plants will be about the same height."
- Drew: "I think the plants in the closet will stop growing and die."

Which friend do you agree with and why? Explain your thinking.

Giant Sequoia Tree

The giant sequoia tree is one of the largest trees on earth. It starts as a small seedling and grows into an enormous tree. Five children can stretch their arms across the width of the trunk of one of the large sequoia trees!

Where did most of the matter that makes up the wood and leaves of this huge tree originally come from? Circle the best answer.



- A** sunlight
- B** water
- C** soil
- D** carbon dioxide
- E** oxygen
- F** minerals
- G** chlorophyll

Explain your thinking. How did you decide where most of the matter that makes up this tree came from?
