

Name: _____

Date: _____

Properties of Matter Student Pre- or Posttest

1. Look at each picture. Circle any pictures of things that are examples of matter.

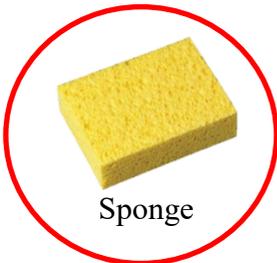
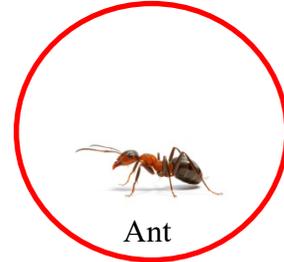


Photo credits: Rock, Robert M. Lavinsky; Ice, BSCS; Idea, Clipartuse.com; Light, Pixnio.com; Water, BSCS; Ant, Pngimg.com; Sponge, Netclipart.com; Happiness, Pexels.com; Dust, Pexels.com

Why did you circle the pictures you did? Write about what you were thinking.

Ideal response:

Matter has mass and takes up space, so I circled the pictures of the rock, the ice, the water, the ant, the sponge, and dust. Matter is the stuff that makes up the entire universe. Anything that's a solid, a liquid, a gas, or plasma is matter. An idea, light, and happiness are not matter because they don't have mass or take up space.

2. What do you think will happen when the liquid water freezes?



Photo courtesy of Derek Jensen



Photo courtesy of BSCS

It will weigh **more**.

It will weigh **less**.

It will weigh **the same**.

What are you thinking?

Ideal response:

I predicted that the water would weigh the same because the only thing that changes when water changes from a liquid to a solid is the arrangement and movement of the molecules.

Since no matter is added or taken away, and water always has the same number of atoms, both kinds of water will weigh the same.

Possible post-assessment answer: When we weighed the bottles of frozen and unfrozen water on a balance, they both weighed the same, so the amount of matter didn't change.

3. Which changes are reversible and can go back and forth?



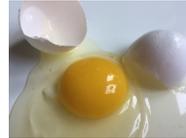
Stick of butter to melted butter

Melted butter to solid butter



Raw egg to hard-boiled egg

Hard-boiled egg to raw egg



Shiny nail to rusty nail

Rusty nail to shiny nail



Crayons to melted crayons

Melted crayons to crayons



Photo credits: Butter, BSCS; Melted Butter, BSCS; Egg, Maxpixel.com; Boiled Eggs, Pixabay.com; Nails, Pixabay.com; Rusted Nails, Weclipart.com; Crayon, BSCS; Melted Crayon, BSCS

What are you thinking?

Ideal response:

The stick of butter and the crayons were the only things that melted. *Melting* means to change something from a solid to a liquid. Some kind of heat melted the butter and crayons. When the heat is taken away and the matter cools down, the molecules will change from a liquid back to a solid. So changes that melt things can go back and forth. A solid can change to a liquid when it's heated, and a liquid can change back to a solid when the heat is taken away.

The egg and the nail can't change back and forth from a solid to a liquid because they're examples of chemical changes. Chemical changes are irreversible and result in a new substance, like the hard-boiled egg or the rust on the nail.

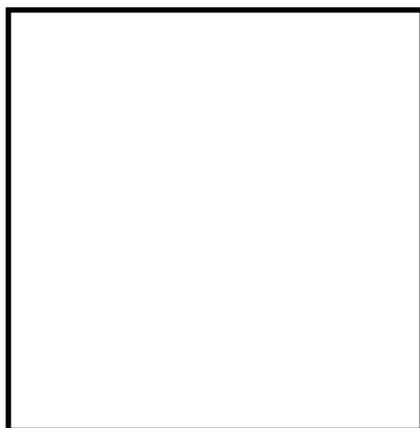
4. Use words and pictures to show what happens to the molecules that make up ice and liquid water when an ice cube melts. What changes take place?



Photos courtesy of BSCS



Photo courtesy of BSCS



Molecules in Frozen Water



Molecules in Liquid Water

Ideal illustrations:

For both illustrations, students should use dots to represent the water molecules. They may use a three-part molecular representation (H_2O) instead, but that isn't essential. For the molecules in frozen water, students should indicate in some way that they're moving, such as using wavy lines or arrows to show the particles generally staying in place but vibrating. For the molecules in liquid water, students should show them still relatively close together but moving around more freely and sliding past one another.

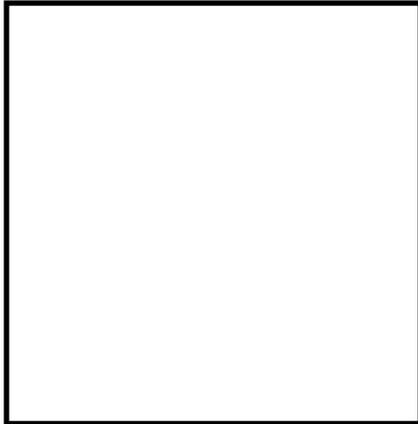
Ideal written response:

Molecules in frozen water vibrate tightly in place and can't move around very much. When ice cubes melt, the molecules heat up and change to liquid water. The liquid molecules aren't as close together as the frozen molecules, so they can move around more and slide past each other.

5. Use words and pictures to show what happens to the molecules that make up paper before and after it burns. What changes take place?



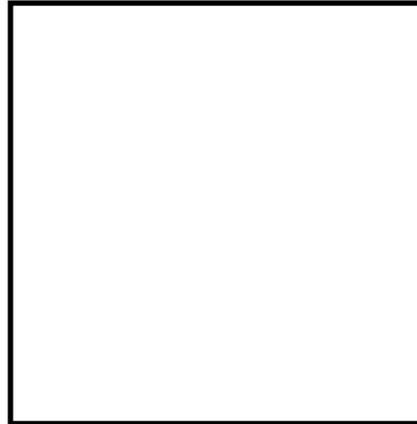
Photo courtesy of Pixabay.com



Molecules in Paper



Photo courtesy of Deviantart.com



Molecules in Burned Paper

Ideal response:

When paper is burned, two atoms or molecules will combine and release energy in the form of heat and light. When the atoms or molecules combine, a new substance (ash) is created.
