

How Matter Changes By Cindy Grigg

Changes in matter happen around you every day. Some changes make matter look different. Other changes make one kind of matter become another kind of matter.

When you scrunch a sheet of paper up into a ball, it is still paper. It only changed shape. You can cut a large, rectangular piece of paper into many small triangles. It changed shape and size, but it is still paper. These kinds of changes are called physical changes.

Physical changes are changes in the way matter looks. Changes in size and shape, like the changes in the cut pieces of paper, are physical changes. Physical changes are changes in the size, shape, state, or appearance of matter.

Another kind of physical change happens when matter changes from one state to another state. When water freezes and makes ice, it is still water. It has only changed its state of matter from a liquid to a solid. It has changed its appearance and shape, but it is still water. You can change the ice back into water by letting it melt. Matter looks different when it changes states, but it stays the same kind of matter.

Solids like ice can change into liquids. Heat speeds up the moving particles in ice. The particles move apart. Heat melts ice and changes it to liquid water. Metals can be changed from a solid to a liquid state also. Metals must be heated to a high temperature to melt.

Melting is changing from a solid state to a liquid state.

Ice melts at 0 degrees Celsius or 32 degrees Fahrenheit. This is the melting point (or freezing point) of water. If the temperature goes above this temperature, the ice will melt. Heat speeds up the moving particles in ice. If the temperature goes below this temperature, water will freeze. At colder temperatures, the moving particles slow down.

You have probably seen a puddle of water that disappears after a time. The water in the puddle changed into a gas. Matter **evaporates** when it changes from a liquid to a gas. Water in the form of gas is called water vapor.

Water changes quickly into a gas when water is heated to a temperature of 100 degrees Celsius or 212 degrees Fahrenheit. This temperature is the boiling point of water. Heat makes water particles move fast.

Cooling air causes water vapor to change to a liquid. Matter **condenses** when it changes from a gas to a liquid.

Have you ever had a glass of lemonade with ice on a hot summer day? Did you notice the water that beaded up on the outside of the glass? The cold glass cooled the air around it. Then water vapor in the air condensed to small drops of water on the outside of the glass.

Another way matter can change is a chemical change. A **chemical change** takes place when matter changes into a different kind of matter. An example of a chemical change is burning wood. The wood changes into smoke and ash. This chemical change produces heat and light.

Have you ever seen a nail or other piece of metal that was rusted? Rusting is a chemical change, too. The metal in the nails mixes with the air to form a different kind of matter, rust.

Have you ever seen an old piece of silverware that has turned black? This is another kind of chemical change. A gas in the air causes a black covering called tarnish to form on silver. The tarnish is a different kind of matter from the air or the silver.

Signs of a chemical change are a change in color or temperature or the production of heat or light. Bubbling, fizzing, or making a noise or smell are some more signs. Not all of these things happen during a chemical change. But usually at least one of them does happen.

Changes in the way matter looks are physical changes. A physical change happens when matter changes from one state into another. A chemical change takes place when matter changes to a different kind of matter.

Name _____

1. A physical change is a change in the:
 - A. size and shape
 - B. state of matter
 - C. appearance
 - D. all of the above
2. Changing from a solid state to a liquid state is called:
 - A. melting
 - B. freezing
3. What is the melting point of ice?
 - A. 32 degrees Fahrenheit
 - B. 212 degrees Fahrenheit
 - C. 100 degrees Celsius
4. What is the freezing point of water?
 - A. 100 degrees Celsius
 - B. 32 degrees Fahrenheit
 - C. 212 degrees Fahrenheit
5. When a liquid changes to a gas, we say it:
 - A. freezes
 - B. condenses
 - C. evaporates

6. What is the genre of this piece of literature? How do you know?

7. When a gas changes to a liquid, we say it:

- A. condenses
- B. freezes
- C. evaporates

8. What kind of change happens when matter changes into a different kind of matter?

- A. physical change
- B. chemical change
- C. change in states of matter

9. Give two examples of a chemical change and EXPLAIN why they are a chemical change.

10. Which of these is NOT a sign that a chemical change has happened?

- A. change in color
- B. bubbling
- C. change in state of matter

11. What kind of change has taken place when you sharpen a pencil? How do you know?

12. What kind of change has taken place when paper is burned? How do you know?

13. Use the Venn Diagram to compare/contrast physical and chemical changes.

