

Name: _____

Matter Is...

Look at some different objects around you. You might see a desk, a pencil, and the girl who is sitting in front of you. Each of these objects is very different from the others. Yet all the objects are alike in some ways.

These objects are all alike because they all take up space. The pencil takes up only a small amount of space. The desk takes up more, and the girl probably takes up more space than the desk. The amount of space an object takes up is its **volume**.

All these objects are alike in another way. They all have mass. An object's **mass** is the measure of how much material makes up the object. You can find how much mass an object has using a balance. The units used to measure mass are usually grams or kilograms.

Everything that takes up space and has mass is called **matter**. All the objects you see around you are made of matter. Even you! You take up space and have mass. Matter is the "stuff" that everything on Earth is made of.

Think about what you'd like to do when you get home from school. Would you like to have a snack? Would you like to go outside to play? A thought does not take up space. It does not have mass. A thought is not matter.

Let's go back to the pencil, desk, and girl. Think about how you might describe these things. The desk is smaller than the girl. The pencil is much smaller. The girl's skin and hair feel soft. The desk and pencil feel hard. The desk is brown. The pencil is red.

When you describe an object, you tell about its **properties**. A property tells exactly what an object is like. You can describe matter by naming its properties. Suppose you wanted to describe a lemon. You could tell about its size, shape, and color. You also might describe its smell and sour taste. Size, shape, color, smell, and taste are properties of the lemon.

Matter usually comes in three forms on Earth. The three forms are solid, liquid, and gas. These forms are called the **states of matter**. A rock is a solid. Water is a liquid. Air is a gas.

Everything that takes up space and has mass is matter. Matter can be described by its properties. The three most common states of matter are solid, liquid, and gas.

Name: _____

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Matter Is...

Questions

_____ 1. What is volume?

- A. the amount of space an object takes up
- B. the measure of how much material makes up an object

2. Everything that takes up space and has mass is called _____.

_____ 3. What units are usually used to measure mass?

- A. inches and feet
- B. cups and gallons
- C. grams and kilograms

4. An object's _____ is the measure of how much material makes up the object.

5. What is everything on Earth made of?

_____ 6. Matter can be described by its:

- A. color
- B. size
- C. properties
- D. all of the above

7. Color is one _____ of matter.

_____ 8. A balance measures an object's _____.

- A. mass
- B. properties
- C. volume

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Monday, November 26



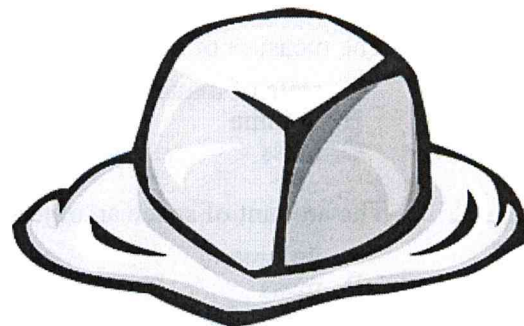
Date _____

States of Matter

By Cindy Grigg

Remember that matter is the "stuff" that everything is made of. Matter has mass. It can be weighed. An object's mass is the measure of how much "stuff" or material makes up the object.

Matter also takes up space. The amount of space an object takes up or fills is its volume. A paper clip takes up only a small amount of space. A book takes up more space. It certainly wouldn't fit in the same space that a paperclip can fill up! And you take up more space than a book. You have a greater volume than the book or the paper clip.



Matter comes in four forms or states on Earth. Matter can be a gas like air. Matter can be a liquid like water. Matter can be a solid like an ice cube. Matter can also be plasma. The plasma state is very hot. It is only found on Earth in lightning. It is also found in stars.

A solid, like an ice cube or a book, keeps a certain shape and has a certain volume. It takes up a certain amount of space.

A liquid doesn't have a certain shape. It takes the shape of the container it is in. Liquids do have a certain volume. Liquids take up the same amount of space no matter what container they are in. If you measure a cup of milk in a measuring cup, the volume is eight ounces or one cup. If you then pour the milk into a drinking glass, it still has the same volume - eight ounces. You could also pour the milk onto the counter top. Its shape would change. But the volume would still be the same- eight ounces.

Air is a gas. When you blow up a balloon, you can see the air making the balloon get bigger. You can see the air's volume. You can see how much space the air takes up. Gases take the shape of their containers. A balloon is one container that can hold a gas. If the balloon pops, what happens to the air? It spreads out into the whole room. But didn't the room already have gas (air) in it? Yes, it did. The room is another container that can hold a gas. The same amount of gas (in the balloon) can spread out to fill another container. Gases do not have a certain volume. A gas can spread out to fill any space.

Water is one of the most commonly found things on Earth. It can easily be seen in three different forms or states of matter. When the water's temperature gets below 32 degrees, liquid water becomes the solid we know as ice. If water's temperature gets above 212 degrees, it turns into a gas we call water vapor.

Everything that takes up space and has mass is matter. The three most common states of matter on Earth are solid, liquid, and gas. Remember that there is a fourth state of matter called plasma. It exists in stars and lightning. It is rare on Earth. Water can be seen in all three forms: solid, liquid, and gas. It can easily change states. We can easily change the state of matter of water by changing the temperature of it.

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States of Matter

Questions

_____ 1. The measure of how much matter makes up an object is called:

- A. state of matter
- B. volume
- C. mass

_____ 2. The amount of space an object takes up or fills is its:

- A. volume
- B. mass
- C. state of matter

_____ 3. Solid, liquid, and gas are the three most common:

- A. volumes
- B. states of matter
- C. masses

4. A gas has no certain _____ and no certain _____.

_____ 5. Water in the solid state of matter is called:

- A. ice
- B. water vapor
- C. liquid water

_____ 6. All the objects around you are made of:

- A. matter
- B. states
- C. mass

_____ 7. Water vapor is water in which state of matter?

- A. solid
- B. gas
- C. liquid

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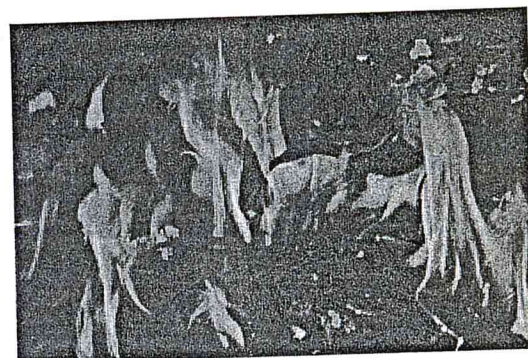
How Matter Changes

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.

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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.

How Matter Changes

Questions

- _____ 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. freezing
 - B. melting

- _____ 3. What is the melting point of ice?
 - A. 212 degrees Fahrenheit
 - B. 32 degrees Fahrenheit
 - C. 100 degrees Celsius

- _____ 4. What is the freezing point of water?
 - A. 32 degrees Fahrenheit
 - B. 212 degrees Fahrenheit
 - C. 100 degrees Celsius

- _____ 5. When a liquid changes to a gas, we say it:
 - A. condenses
 - B. freezes
 - C. evaporates

- _____ 6. When a gas changes to a liquid, we say it:
 - A. condenses
 - B. freezes
 - C. evaporates

- _____ 7. What kind of change happens when matter changes into a different kind of matter?
 - A. chemical change
 - B. physical change
 - C. change in states of matter