

Name _____

My Book About Matter

Chapter One - What is Matter?

Key Ideas:

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

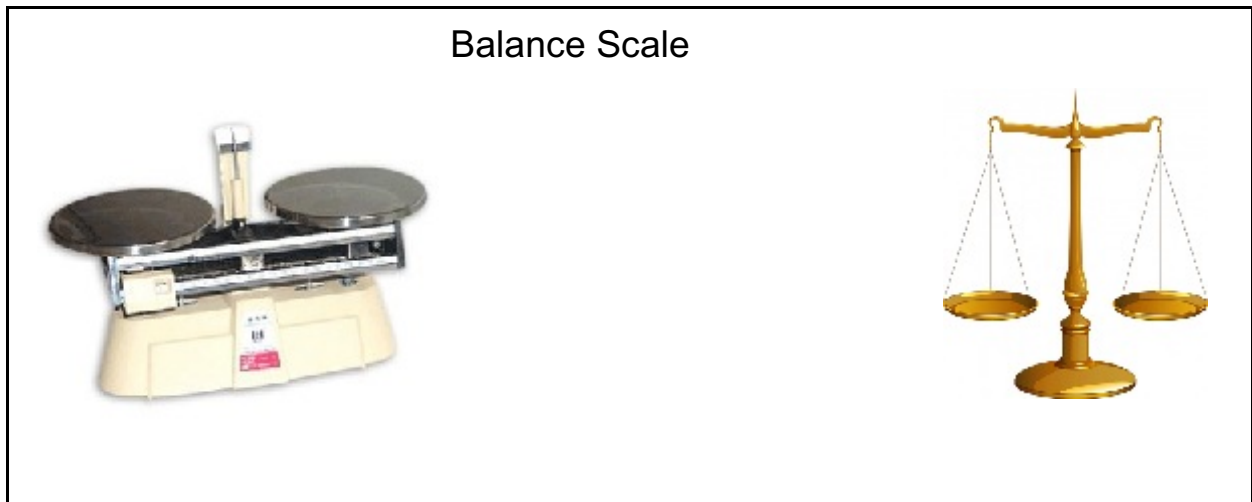


Mass and Matter



All objects, no matter what their size, shape, or color, are alike in one important way. They take up space. **Volume** describes the amount of space an object takes up. Look at objects around you. Name an object in your classroom that has a large volume. What object has a small volume?

All 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 measure mass on a balance. A balance is a type of scale used to measure mass.



Everything that takes up space and has mass is called matter. All objects around you are made of matter. You take up space and have mass. You are made of matter.

Imagine dreaming about your classroom. A dream does not take up space and have mass. A dream is not made up of matter.

Properties of Matter

Think about how you might describe a delicious dinner. The dinner plate is large. The fruit is sliced into small and juicy bits. The napkin is pink and soft. How can you describe the flowers? 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 slice of lemon. You probably would 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.



States of Matter

Matter comes in three forms – solid, liquid, and gas. These forms are called the states of matter.

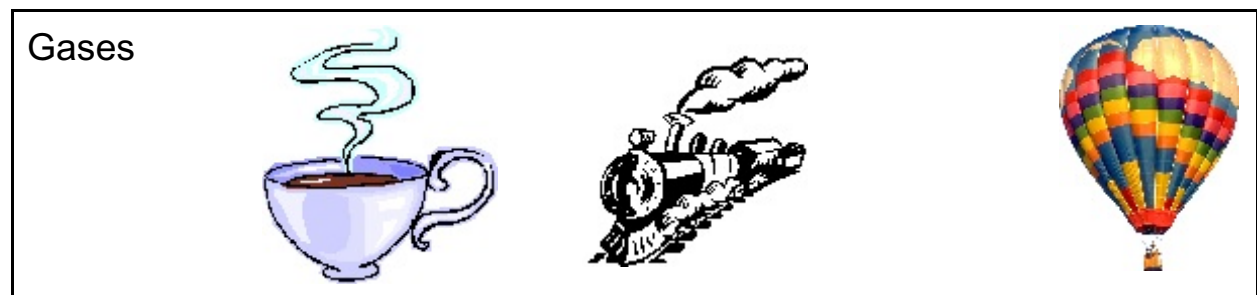
A solid keeps a certain shape and has a certain volume. Find some objects in your classroom that are solid.



Suppose you poured water into a glass. The water would take the shape of the glass. A liquid takes the shape of its container. A liquid keeps its volume when it changes shape. Imagine pouring water from a glass into a bowl. The volume of the water would stay the same. How would the shape change?



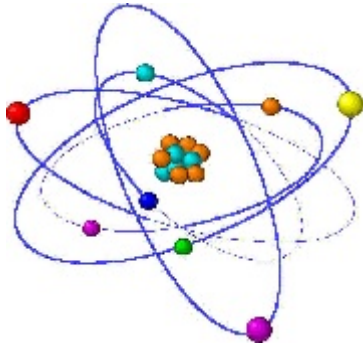
Gas, like a liquid, takes the same shape as its container. Imagine a balloon filled with air. Now imagine that the balloon pops. The air that was in the balloon spreads out into the whole room. the same amount of gas can spread out to fill a larger volume.



Chapter Two - What Makes Up Matter?

Key Ideas

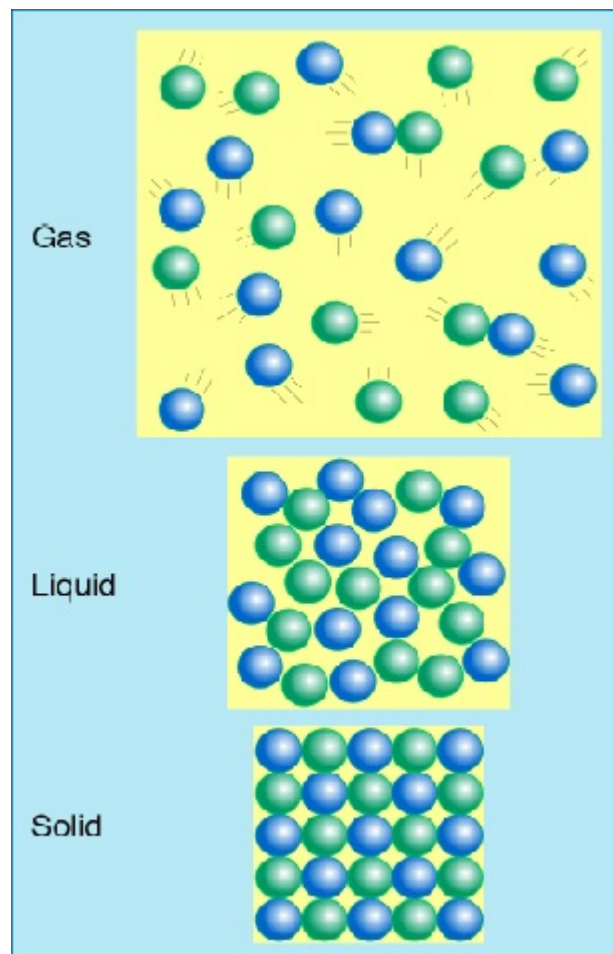
- All matter is made of atoms.
- Particles in solids are close together and move back and forth.
- The particles in liquids can move around each other.
- The particles in gases are far apart and move around freely.



The particles that make up matter are called atoms. You cannot see atoms because they are so small. Two or more atoms can join together to form larger particles of matter. Then many of these larger particles can join together to form the matter you see.

Scientists know about many kinds of atoms. These atoms can join together in different ways to make different kinds of matter.

How Particles of Matter Move



Particles in matter are different in different states of matter. The particles in solids pull toward each other. A solid keeps a certain shape because its particles stay close together. The particles in matter are always moving. Particles in solids move back and forth, but they do not exchange places.

The particles in liquids are farther apart than those in solids. The pull between particles is weaker in liquids than in solids. Liquids change shape because the particles can move around each other.

The particles in gases do not pull together strongly. Gas particles move around more than particles in liquids and solids. A gas can spread out to fill any space because its particles move around freely.

Chapter Three - How Can Matter Change?

Key Ideas

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

Physical Changes

Physical changes are changes in the way matter looks. Changes in size and shape are physical changes. If you take a sheet of paper and cut it, you are making a physical change.



Another kind of physical change happens when matter changes from one state to another state. Matter looks different when it changes state, but it stays the same kind of matter.



If you take water, a liquid, and put it in the freezer, the water will change to a solid, called ice. This happens at the freezing point of water, which is 0° Celsius (0°C). How do particles in ice move differently than those in liquid water?

Solids also can change to liquids. Heat speeds up the moving particles in ice. The particles move apart. Heat melts ice and changes it to liquid water.

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



Heat makes water particles move fast. Water quickly changes to a gas when water heats to a temperature of 100° Celsius. This temperature is the boiling point of water. As the water heats, you will see small bubbles in it. The gas in the bubbles is water vapor.

Cooling air causes water vapor to change to a liquid. Matter condenses when it changes from a gas to a liquid. A cold pitcher in warm air cools the air surrounding the pitcher, and the water vapor in the air condenses to small drops of water on the outside of the container.

Chemical Changes

If you carve a piece of wood, the wood does not change into a different material. What kind of change happens to wood when carving changes its shape?

If you put a log into a burning fire, the fire changes the wood into ashes and smoke. The wood becomes a different kind of matter. a chemical change takes place when matter changes to a different kind of matter.



Another example of a chemical change is when nails rust. the material that makes up the nails mixes with the air to form rust. Rust is a chemical change.

A third example of a chemical change is when a silver spoon becomes tarnished. A gas in the air causes a place covering called tarnish to form on silver. A chemic change takes place because tarnish has different properties from the material that form it.



Multiple Choice Review

Write the letter of the best answer.

1. A balance measures an object's
a. volume b. mass c. properties. d. atoms
2. A chemical change can take place when matter
a. evaporates b. condenses c. burns d. melts
3. Which object has particles that move around the most?
a. a brick b. water c. air d. a pencil
4. What makes up matter?
a. atoms b. states c. volume d. properties
5. A physical change takes place when matter
a. rusts b. tarnishes c. burns d. condenses
6. When you tell about an object's length, you describe a
a. volume b. property c. state d. mass

Interpreting What You Learned

Write a short answer for each question or statement.

7. How are a flower and a book alike?
8. How is the shape of a gas different from the shape of a solid?
9. How can matter be described?

Extend Your Thinking

Think about these:

10. Suppose a snowstorm covers the grass with snow. A week later, all of the snow is gone. Explain how this can happen.
11. When sugar is heated for a long time, it forms a solid black substance. What kind of change takes place. Explain your answer.
12. Two puddles have the same amount of water. One puddle is small and deep. The other puddle is wide and shallow. Which puddle will evaporate first, and why?

Glossary

atom	a small particle that makes up matter
chemical change	a change that causes matter to become a new kind of matter (such as a piece of wood in a fire becoming ash.)
condense	to change from a gas to a liquid state
evaporate	to change from a liquid state to a gas
mass	the measure of how much matter an object contains
matter	anything that takes up space and has mass
physical change	a change in the size, shape, state, or appearance of matter (such as melting ice becomes water, or cutting a piece of paper makes smaller pieces of paper.)
property	something about an object that can be observed, such as size, shape, color, or sound.
states of matter	the three forms of matter – solid, liquid, and gas.
volume	the amount of space an object takes up
water vapor	water in the form of gas