

SECTION 1.1 MATTER HAS MASS AND VOLUME.

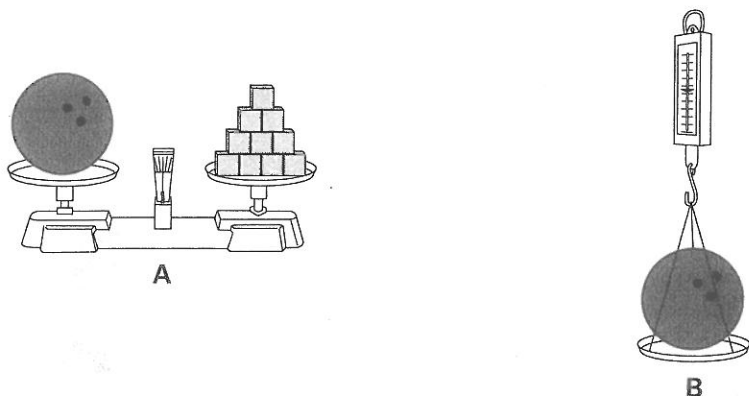
1.1 Reinforcing Key Concepts

BIG IDEA Everything that has mass and takes up space has matter.

KEY CONCEPT Matter has mass and volume.

1. **All objects are made of matter.** Matter is what makes up all of the objects and living organisms in the universe. Matter is anything that has mass and takes up space. What is matter made of? Name two things that are not made of matter.

2. **Mass is a measure of the amount of matter.** When you measure mass, you compare the mass of the object with a standard amount, or unit of mass. When you measure weight, you are measuring the downward pull on an object due to gravity. Look at the two pictures below showing a bowling ball being measured for weight and for mass. In which picture is the bowling ball's mass being measured? How can you tell?



3. **Volume is a measure of the space matter occupies.** The amount of space that matter in an object occupies is called an object's volume. A bowling ball and a basket ball take up approximately the same amount of space, therefore, the two balls have about the same volume. Volume is calculated by multiplying the length, width, and height of an object. You would like to calculate the volume of a brick. The brick is 32 cm long, 20 cm high, and 15 cm wide. Use the formula $V = lwh$ to calculate the volume of the brick. If you used the displacement method to determine volume, how many milliliters would the brick take up?

SECTION 1.2 | MATTER IS MADE OF ATOMS.

1.2 Reinforcing Key Concepts**BIG IDEA** Everything that has mass and takes up space is matter.**KEY CONCEPT** Matter is made of atoms.

1. **Atoms are extremely small.** When two or more atoms bond together, or combine, they make a particle called a molecule. Some molecules are made of more than one kind of atom, while other molecules contain just a single type of atom. In the examples below, tell how many different kinds of atoms are contained in each substance.

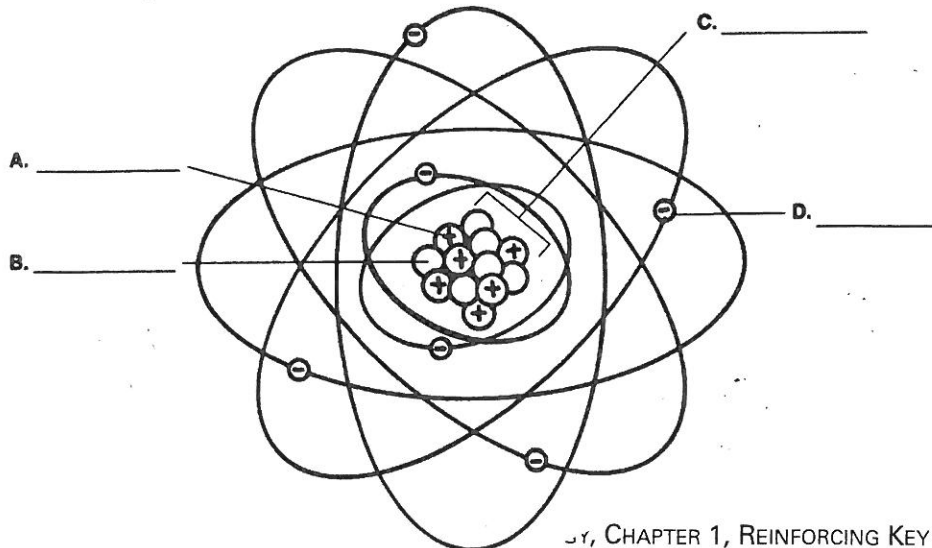


- a. glass of water

- b. container of oxygen gas

2. **Atoms and molecules are always in motion.** Sometimes this motion is easy to observe, and sometimes it is not. Give two examples that demonstrate that atoms and molecules are always in motion. What are two objects in which the constant motion of atoms and molecules is not so obvious?

3. Label the diagram below:



SECTION

MATTER COMBINES TO FORM DIFFERENT SUBSTANCES.

1.3 Reinforcing Key Concepts**BIG IDEA** Everything that has mass and takes up space is matter.**KEY CONCEPT** Matter combines to form different substances.

- 1. Matter can be pure or mixed.** A substance with only a single type of atom in it is called an element. A compound is a substance that results when two or more different types of atoms bond together. A mixture is a combination of different substances that remain the same individual substances and can be separated by physical means. Identify each of the substances shown below as an *element*, *mixture*, or *compound*.



cake batter



pure gold jewelry



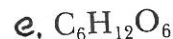
salt

- a. _____
- b. _____
- c. _____

- 2. Parts of mixtures can be the same or vary throughout.** In heterogeneous mixtures, you can see the individual substances contained in the mixture. In homogenous mixtures, you cannot see the individual substances because they are evenly spread throughout. Give two examples of a homogenous mixture and one example of a heterogeneous mixture.

- a. **Heterogeneous Mixture:** _____
- b. **Homogenous Mixture:** _____

Calculate how many atoms of each element are present in the following compounds.



SECTION | MATTER EXISTS IN DIFFERENT PHYSICAL STATES.

1.4 Reinforcing Key Concepts**BIG IDEA** Everything that has mass and takes up space is matter.**KEY CONCEPT** Matter exists in different physical states.

- 1. Particle arrangement and motion determine the state of matter.** Three familiar states are solid, liquid, and gas. When a substance changes its state, the molecules in the substance do not change. Think of something that uses or contains a solid, a liquid, and a gas.

- 2. Solid, liquid, and gas are common states of matter.** Which state a substance is in depends on the space between its particles and on the way in which the particles move. Fill in the chart below that describes the differences between solids, liquids, and gases.

State of Matter	Particle Movement	Space Between Particles
a.	free to slide over one another and can move from place to place	close together, but not fixed in one place
b. gas	can move easily in any direction	
c. solid		

- 3. Solids have a definite volume and shape.** The molecules in a solid are fixed in place and are close together. You can physically change the shape and volume of a solid. For example, a boulder is broken into smaller chunks of rock. Each chunk of rock is broken into pieces of gravel. Explain why all of these substances are still solid.

- 4. Liquids have a definite volume but no definite shape.** A handful of sand has a definite volume but no definite shape. Sand takes on the shape of the container it is in. Why is the sand not considered to be a liquid?

- 5. Gases have no definite volume or shape.** The amount of space between gas particles depends on how many particles are in the container. As the molecules bounce off one another and the surface of the container, they apply a pressure against the container. Read the following descriptions and write *increase* or *decrease* in the space provided.

Changes in temperature, pressure, and volume	Effect
The volume of a gas stays the same. The temperature of the gas is increased.	Pressure will _____.
The temperature of a gas stays the same. The pressure of the gas increases.	Volume will _____.