Physical Properties

"Matter" is the word used to describe everything that exists; everything that exists is matter. Matter has properties. A **property** is a characteristic that identifies something. Examples of properties of matter are color, size, weight, taste, texture, smell, sound, density, hardness, softness, boiling point, and melting point. For example, the properties of a painting are different from those of a sculpture, even though both are works of art.

The five properties of matter studied in this unit of physical science are **mass**, **volume**, **density**, **weight**, and **buoyancy.**

Mass is how much matter an object has. Mass is measured in grams or kilograms, depending on the object's mass. A kilogram is equal to 1,000 grams, so kilograms measure bigger objects, and grams measure smaller objects. A paper clip weighs about one gram.

The **volume** of an object is how much space the object takes up or how much matter (water, for example) it would take to fill up the object. Regularly shaped objects can be measured with a ruler to find their volume, but most irregularly shaped figures cannot be measured with a ruler. Geometry explains the volume of regularly shaped objects by multiplying length, width, and height, but

the volume of irregular objects can be found by determining how much water the object displaces when the object is placed in water. Since volume is three-dimensional
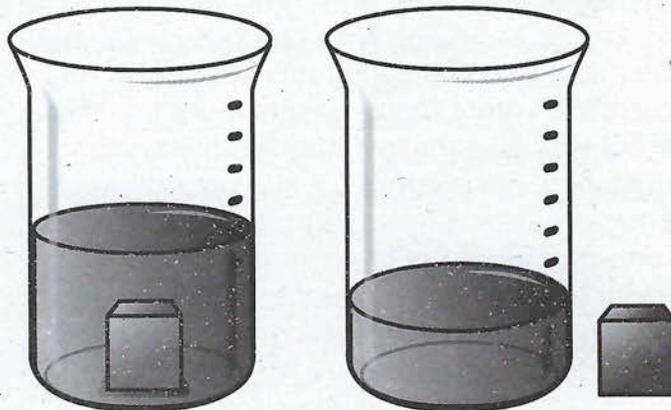
(two-dimensional, like the area of a rectangle, has only length and height), it is measured in $units^3$. Scientists measure liquids by milliliters (mL), and solids usually are measured by cubic centimeters (cm^3).

Density is related to both mass and volume. The **density** of an object is the amount of mass of the object for each cubed centimeter (cm^3) of that object. Cubic centimeters are used in measuring volume, so to figure out the density of an object, use the following formula:

$$\text{density} = \text{mass} + \text{volume}$$

Exercise

1. What is mass?_____

2. What is volume? _____

3. How is the volume of a regularly shaped object found?_____
_____

4. How is the volume of an irregularly shaped object found?_____
_____

5. How are mass and density related? _____
_____