

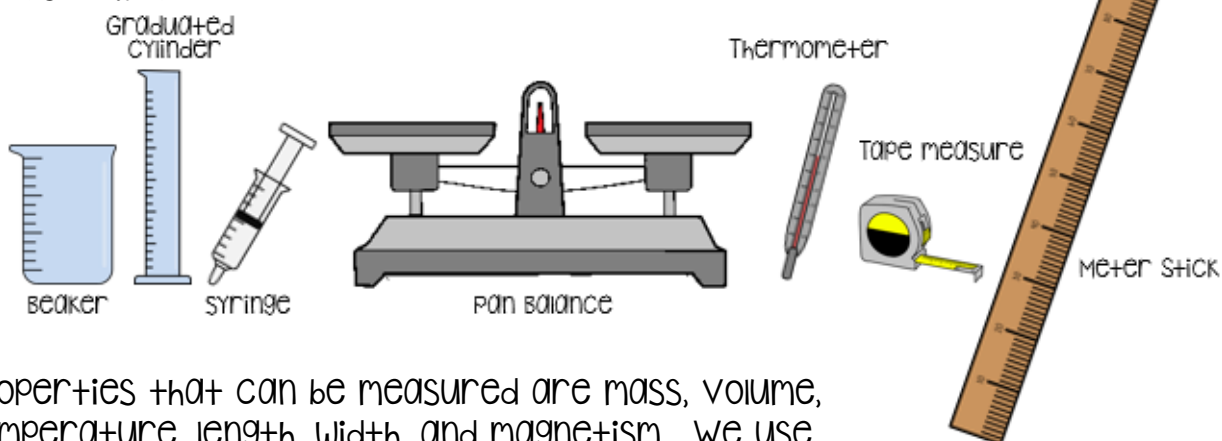
# All About Matter



Matter is everywhere around you. Everything you see and some things you can't see. Matter is anything that has mass and takes up space. Mass is the amount of matter that something has and the amount of space it takes up is called volume.

We describe matter using properties. A property is something about matter that you can observe with your 5 senses (observable properties) or measure with a tool (measurable properties).

The 5 senses are sight, hearing, taste, smell, and touch. Using our sense of sight, we can observe the color, size, shape, and luster of matter. Texture or hotness and coldness can be observed by touch. We use our sense of smell to observe the odor of matter. Another observable property is density, which describes whether or not matter sinks or floats in water.

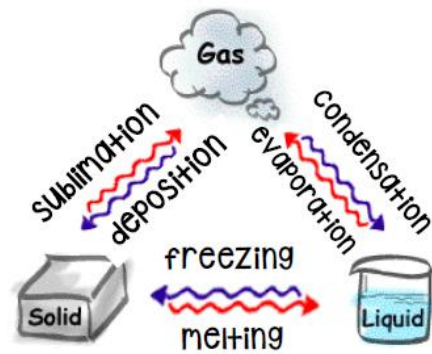


Properties that can be measured are mass, volume, temperature, length, width, and magnetism. We use beakers, syringes, and graduated cylinders to measure volume.

A balance scale can be used to measure the mass of matter. We can use a meter stick or measuring tape to measure the length or width of an object. Thermometers can be used to measure the temperature of an object. Another measurable property is magnetism. To measure magnetism, you would hold a magnet close to the matter to determine if the matter attracts or repels the magnet or does nothing. If it attracts or repels, we would say that the matter is magnetic.

An object's state of matter is also a property of that matter. There are three states of matter: solid, liquid, and gas. Solids have a definite size and definite shape, while liquids only have a definite size (no definite shape). Gases do not have a definite size, nor a definite shape because they move freely.

Matter can change state by adding or removing heat. Water is a great example of matter that can be found as a solid, liquid, and a gas. The solid form of water is called ice. If we add heat to ice, it will change states from a solid to a liquid. Water begins to melt at  $0^{\circ}\text{C}$  or  $32^{\circ}\text{F}$  if heat is being added.



If the water is changing from liquid to solid, it also melts at  $0^{\circ}\text{C}$  or  $32^{\circ}\text{F}$  if heat is being removed. If water is changing from a gas to a liquid, we call this condensing. A good example of this is the steam from a hot shower forming water droplets on the mirror in your bathroom. This process does not occur at a certain temperature. Water can also change from a liquid to a gas by adding heat. If we add the heat rapidly, such as putting a pot of water on a hot stove, the water will begin to boil, or bubble at  $100^{\circ}\text{C}$  or  $212^{\circ}\text{F}$ . This process causes the liquid water to turn to a gas, water vapor.

Another process that causes liquids to change to a gas is evaporation. This process does not occur at a certain temperature, but does require heat to be added over time. An example of evaporation is a rain puddle disappearing after time. The puddle did not have to boil to evaporate and change to water vapor. Water can also change from a gas directly to a solid. This process is called deposition. Frost is an example of deposition. A solid can also turn directly into a gas, called sublimation. Dry ice, which is solid carbon dioxide, is an example of a substance that sublimates.