

Name:

Date:

## Science Morning Work

### Physical properties & changes

Different types of matter have different characteristics. They melt and boil at different temperatures. They might be different colors or have different odors. Some can stretch without breaking, while others shatter easily. These and other properties help us distinguish one kind of matter from another. These physical properties help us choose which kind of material to use for a specific purpose.

Physical properties can be *intrinsic* or *extrinsic*. Intrinsic properties are properties that do not depend on the amount of matter present. For example, color is an intrinsic property. A scrap of blue construction paper and a whole sheet of blue construction paper are the same color. How matter reacts to a magnet is another intrinsic physical property. A small iron filing and a bar of iron are both equally magnetic. Other properties that are intrinsic include: Elasticity, melting point, freezing point, and boiling point.

Extrinsic physical properties are dependent on the amount of matter present. Mass, weight, volume and length are all extrinsic physical properties. With those properties, a change in the amount of matter CAN impact the property.

### Physical properties

Characteristics that can you can see through direct observation are called **physical properties**. Physical properties include color, texture (how it feels), density (mass/volume), luster (ability to reflect light), brittleness (easily broken), solubility (ability to be dissolved), polarity (state of attraction to an item, i.e. like metal to a magnet) and state (solid, liquid, or gas). Substances can often be identified by their physical properties. For example, water is a colorless, odorless substance that exists as a liquid at room temperature. Gold is shiny, exists as a solid at room temperature, and can be pounded into very thin sheets.

**Density** is the ratio of mass to volume. Density is a property of solids, liquids, and gases. To find the density of a material, you divide its mass by its volume. You can calculate volume if you know density and mass. You can calculate mass if you know density and volume.

If you pull on a rubber band, its shape changes. If you let it go, the rubber band returns to its original shape. Rubber bands can stretch many times their original length before breaking, a property called **elasticity**. Elasticity describes a solid's ability to be stretched and then return to its original size. This property also gives objects the ability to bounce and to withstand impact without breaking. Materials that do not return to their original shape are *inelastic*. Clay and soft metals like lead are inelastic. Clay or lead objects do not return to their original shape once they are squashed or bent convenient to use units of grams per cubic centimeter.

### Physical changes

A *physical change* is any change in the size, shape, or phase of matter in which the identity of a substance does not change. Physical changes are reversible. For example, when water is frozen, it changes from a liquid to a solid. This does not change the water into a new substance. It is still water, only in solid form. The change can easily be reversed by melting the water. Bending a steel bar is another physical change.

The texture of a substance can differ with a physical change. For example, if a piece of wood was sanded, waxed, and polished, it would have a very different texture than it initially had as a rough piece of wood. Those changes do not impact what the item is, wood.

The shape of an object can be changed and the object will still remain true to its chemical composition. The change of state is likewise a physical change. As ice turns into water, it doesn't retain a solid shape and now becomes a viscous fluid.

Solid→Liquid	Melting
Liquid→Gas	Vaporization
Liquid→Solid	Freezing
Gas→Liquid	Condensation
Solid→Gas	Sublimation

If heat is added to a substance, such as in melting, vaporization, and sublimation, the process is endothermic. In this instance, heat is increasing the speed of the molecules causing them move faster.

If heat is removed from a substance, such as in freezing and condensation, then process is exothermic. In this instance, heat is decreasing the speed of the molecules causing them move slower.

1. Complete the table below to demonstrate physical properties.

Physical property	What is it (explain)	Real-life example
Color		
Texture		
Density		
Polarity		
Luster		
Solubility		
State of matter		

2. After matter has gone through a physical change is it able to return back to its original state? Explain and give an example.
3. Create a Venn diagram that demonstrates the differences between endothermic and exothermic reactions.

4. In six sentences, summarize the article, making sure to USE and CAPITALIZE key vocabulary such as PHYSICAL PROPERTY, PHYSICAL CHANGE, DENSITY, SOLUBILITY and POLARITY.