Describing Matter

The properties of a substance that we can observe with our senses are called physical properties. For example we observe that sugar is sweet because we can taste it. We know the height of a tree because we can measure it. The physical properties of a substance are determined without reference to other substances.

For the purposes of identification, the most useful physical properties are called **characteristic (intensive) properties**. Colour, odour, density, and melting point are examples of characteristic properties. Ice melts at 0°C, no matter whether we observe an ice cube or a glacier. Properties that do depend on sample size are called **extensive properties**. Mass and volume are examples of extensive properties. The larger the amount of matter, the greater will be its mass or volume.

The following list some of the physical properties of matter helps us to tell one thing from another.

Physical State: the condition of being solid, liquid or gas

Colour: A substance can be red, orange, yellow, green, blue, purple, brown, black, white or colourless. If a substance has a mixed colour, describe it as being greenish-blue, reddish-brown, etc.

Odour: A substance can be described as odourless, burnt, flowery, putrid, spicy, sharp, choking, nauseating, and suffocating.
***always waft**

Taste: There are four tastes: sweet, like sugar; sour, like vinegar; salty, like table salt; and bitter, like coffee. All flavours are either combinations of these four tastes, or combinations of tastes and odours.

Clarity: (the transmission of light) Substances are classified as being transparent (clear), translucent (cloudy), or opaque (not allowing light through).

Lustre: (the ability of an object to reflect light) Chrome trim on cars is said to have a high lustre because it is bright and shiny. A flat paint, on the other hand has low lustre.

Form: Substances with a regular shape, such as cube-shaped grains of salt, are said to be **crystalline**. Substances with an irregular form, such as starch are said to be **amorphous**.

Texture: the "feel" of a substance to the fingers: fine, coarse, smooth, gritty, silky, fluffy, waxy, etc.

Hardness: The hardness of substances is rated on a scale from 1 to 10. Resistance to being scratched is used to determine hardness. Talc (talcum powder) is rated at number 1 on the scale, a finger nail at 2.5, window glass at 5, and a diamond at 10.

Brittleness: the ability of an object to break apart or shatter easily. Glass, china, and chalk are brittle substances that cannot be bent. Substances that bend without breaking are said to be **flexible**.

Malleability: the ability of a substance to be hammered into a sheet. Gold and aluminum can be made into very thin sheets or foils, they are called malleable substances.

Ductility: the ability of a substance to be stretched out into a wire-like shape. Because copper, gold, and silver can be drawn out into wires, they are called ductile substances.

Viscosity: the resistance of a liquid to flowing. Liquids may be thin, thick, runny, syrupy, etc. The thicker the liquid, the more viscous it is. Tar is viscous, water is not.

In nature, however, substances often combine, or react, with each other. The properties of a substance that we observe when it reacts or does not react with other substances are called **chemical properties**. For example, iron rusts in moist air, but gold does not. Hydrogen burns in oxygen, but nitrogen does not. Zinc reacts with acid, but glass does not. Chemical properties will be addressed later.