

Observing Physical Properties

Ideally scientists would like to see the composition of matter. However, this is often not possible, so they rely on properties (characteristics) to infer composition. Physical properties may be **quantitative** (measurable) such as mass or density or they may be **qualitative** (not measurable) such as colour or odour. Some physical properties are also **extensive** (dependent upon the amount of matter present such that as the amount of matter changes so does its properties) such as mass or volume or they can be **intensive** (independent of the amount of matter present which makes the property constant) such as colour or density. Intensive properties are more useful for identifying substances since they reflect unchanging qualities of that substance. The more properties you observe, the easier it is to identify the substance because substances often share some identical properties. For example, water and battery acid are clear, colourless solutions, but only one is safe to taste.

The following table identifies some of the more common intensive physical properties.

Property	Description
Physical State	solid, liquid or gas
Clarity	transparent (clear), translucent (cloudy) or opaque (no light can pass through)
Colour	colourless, mixed or pure
Odour	odourless, burnt, flowery, putrid (rotten flesh), spicy (cinnamon), sharp (vinegar), choking (ammonia), nauseating, suffocating, etc.
Taste	sour (lemon), salty, bitter (coffee) or sweet (all others are a combination of these four and odour)
Lustre	ability to reflect light, ranging from high lustre (shiny or reflects light well) to low lustre (dull or does not reflect light)
Form	ranges from crystalline (regular shape) to amorphous (irregular shape)
Texture	the feel of a substance (eg. gritty, smooth, etc.)
Hardness	resistance to being scratched, ranging from 1 (soft) to 10 (very hard)
Brittleness	ranging from brittle (breaks or shatters) to flexible (bends without breaking)
Malleability	a measure of its ability to be hammered into a sheet
Ductility	a measure of its ability to be stretched without breaking into a wire shape
Viscosity	resistance to flow ranging from high viscosity (flows very slowly) to low viscosity (flows well)
Density	a measure of the amount of matter in a volume, ranging from very dense (high mass in a small volume) to not very dense (very little mass in a large volume)
Solubility	a measure of how well something dissolves in something else ranging from high solubility (dissolves well) to insoluble (does not dissolve)

