

Chemistry

Physical and Chemical Properties
Physical & Chemical Changes

• Particle Theory of Matter

- Matter is anything that has **mass** and takes up **space**.
- Chemistry is the study of matter and the changes it undergoes.
- 1. Matter is made up of tiny particles (Atoms & Molecules)
- 2. Particles of Matter are in constant motion.
- 3. Particles of Matter are held together by very strong electric forces
- 4. There are empty spaces between the particles of matter that are very large compared to the particles themselves.
- 5. Each substance has unique particles that are different from the particles of other substances.

• Kinetic Molecular Theory

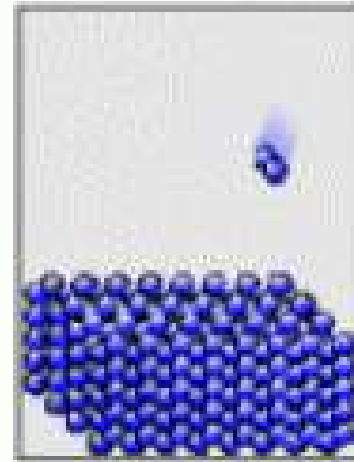
- Gases are highly energetic. They move quickly and the particles are far apart.
- Liquids are less energetic. The particles slide past each other and are closer together.
- Solids have the least amount of energy. They are bunched in tightly together and vibrate in place.



gas



liquid



solid

•Classification of Matter

- Pure substances is any single type of material.
 - Elements cannot be broken down any further.
 - Compounds are made up of elements.



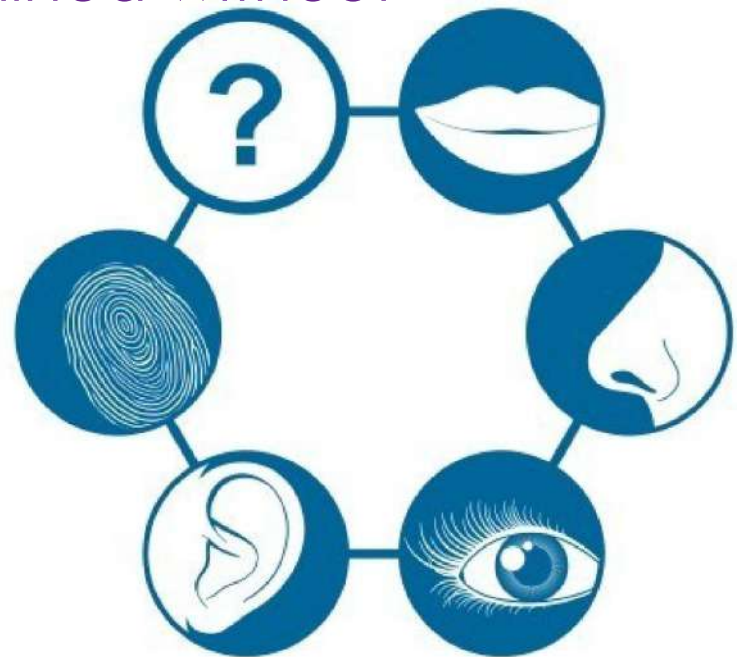
•Classification of Matter

- A mixture is a type of matter that contains more than one kind of particle.
 - Solutions have multiple types of particles, but you cannot see the different parts.
 - Mechanical Mixtures have multiple types of particles and you can see each type.



•Physical Properties

- A **property** is a characteristic or description of a substance that may help identify it.
- Physical properties are observed using the **senses** (sight, smell, taste, touch and hearing) and measuring devices.
- Physical properties can be determined without destroying the substance.



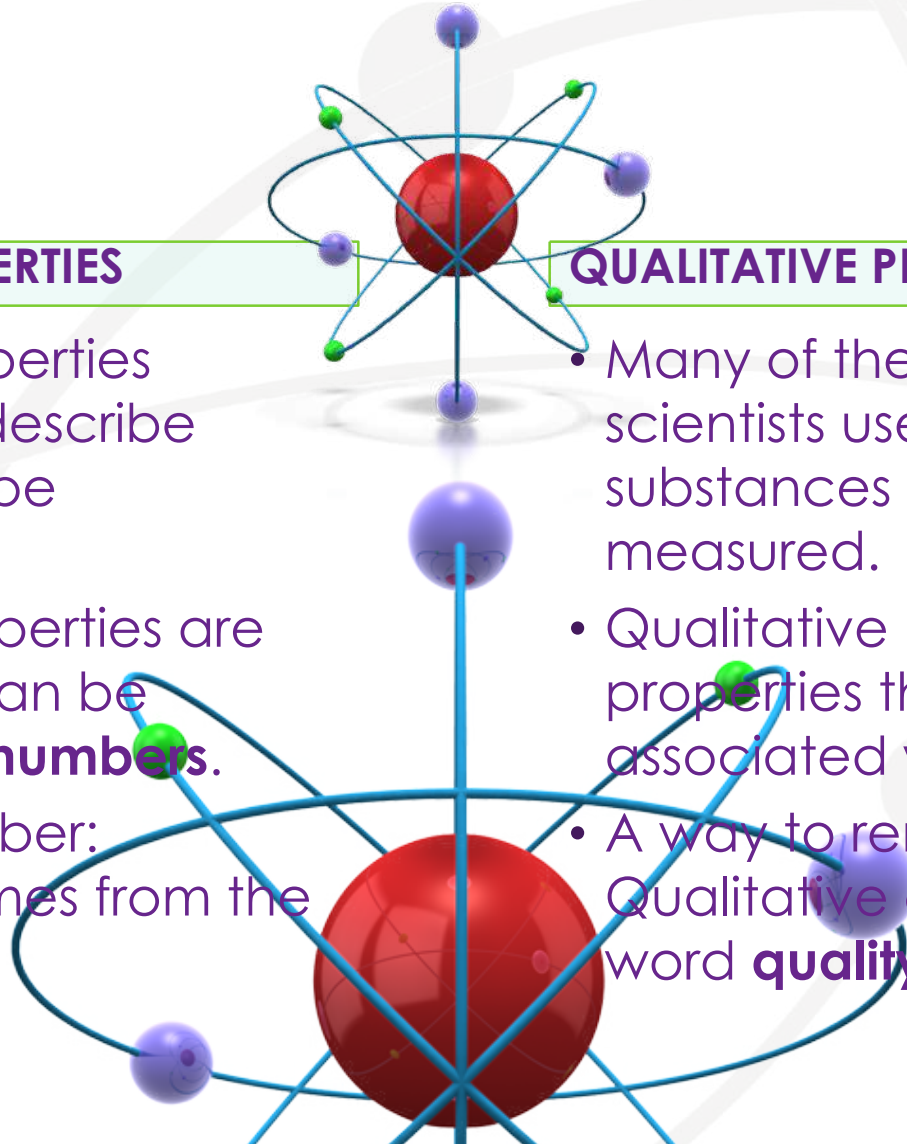
Quantitative vs. Qualitative Properties

QUANTITATIVE PROPERTIES

- Some of the properties scientists use to describe substances can be measured.
- Quantitative properties are properties that can be associated with **numbers**.
- A way to remember: Quantitative comes from the word **quantity**.

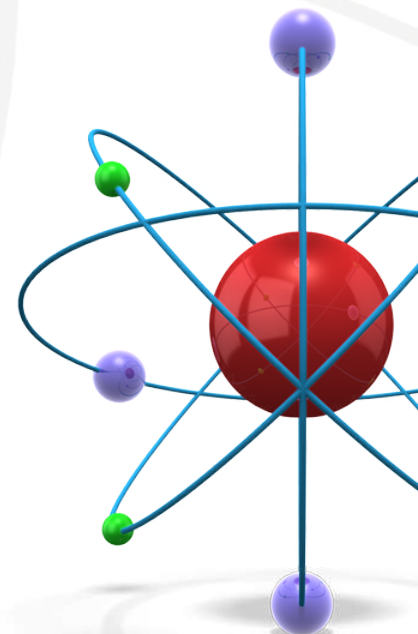
QUALITATIVE PROPERTIES

- Many of the properties scientists use to describe substances cannot be measured.
- Qualitative properties are properties that can be associated with **words**.
- A way to remember: Qualitative comes from the word **quality**.



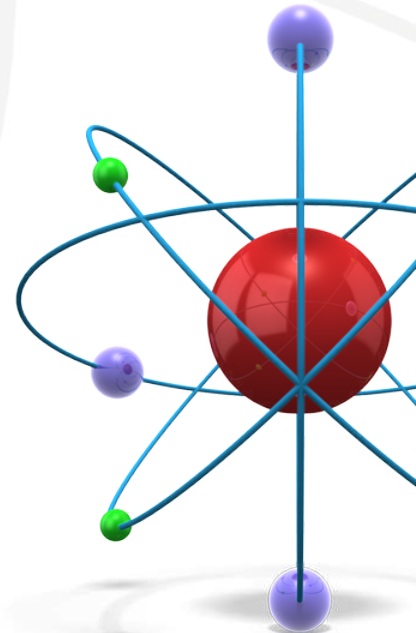
•Quantitative Physical Properties

Property	Description
Temperature	The measure of heat energy of a substance. e.g. The highest temperature ever recorded was 56.7°C in Death Valley, California



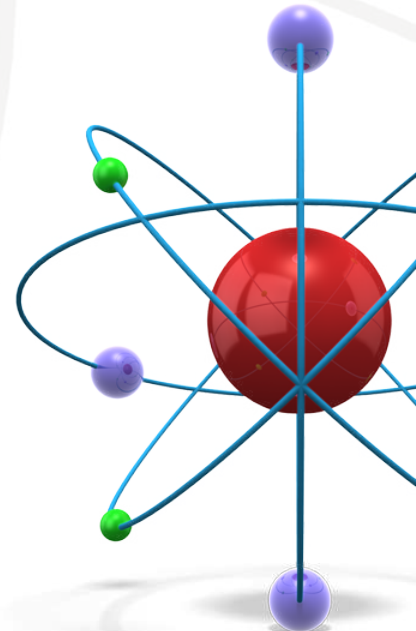
Quantitative Physical Properties

Property	Description
Mass	The amount of matter in a substance. e.g. The heaviest dog in the world has a mass of 282 pounds.



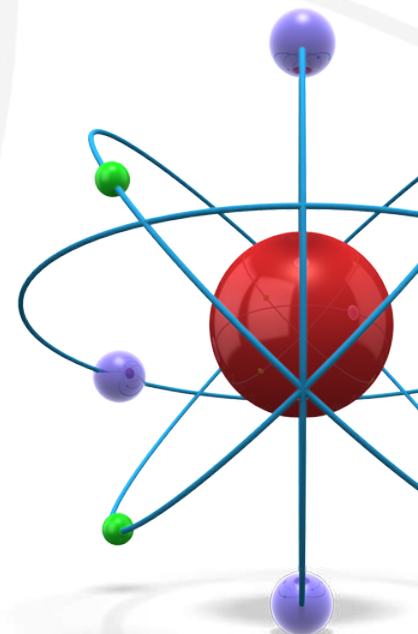
Quantitative Physical Properties

Property	Description
Dimensions	The measure of the size of something in a particular direction, such as the length, width, height, or diameter. e.g. The longest finger nail measures 1.3 meters.



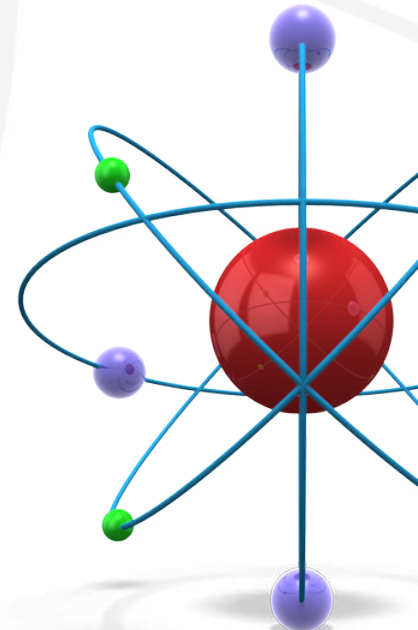
•Qualitative Physical Properties

Property	Description
color	Black, white, red, etc. e.g. Copper (II) sulphate pentahydrate is a bright blue powder.



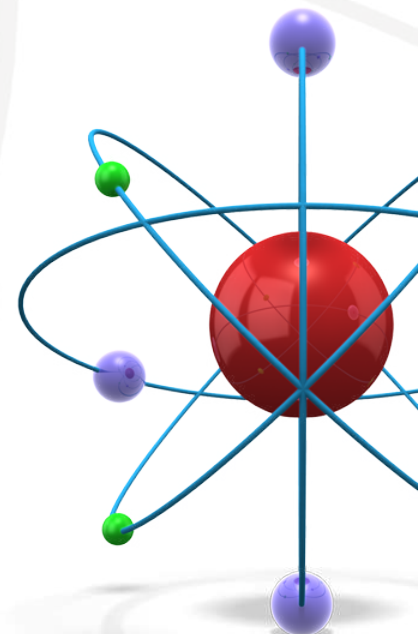
•Qualitative Physical Properties

Property	Description
Texture	Fine, coarse, smooth, gritty, etc. e.g. Sandpaper has a gritty texture.



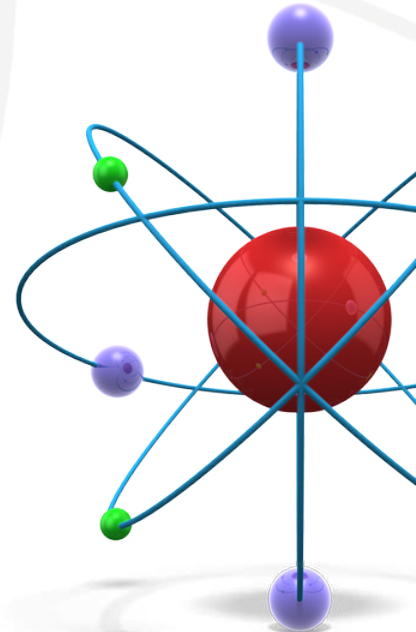
•Qualitative Physical Properties

Property	Description
Odor	Odorless, spicy, sharp, burnt, etc. e.g. Skunks emit an odour that can be described as a combination of rotten eggs, garlic, and burnt rubber.



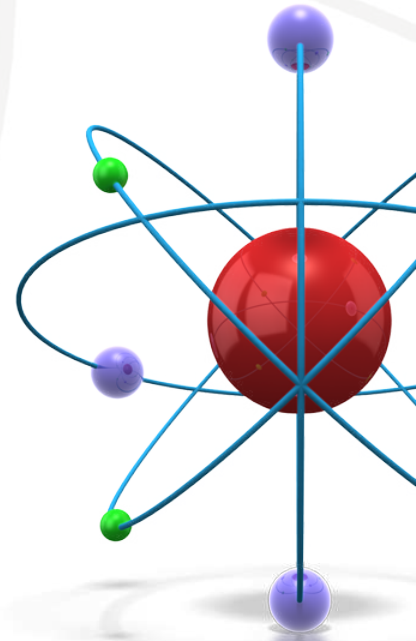
•Qualitative Physical Properties

Property	Description
Lustre	Shiny, dull, etc. e.g. Pyrite is a shiny mineral commonly known as Fool's Gold.



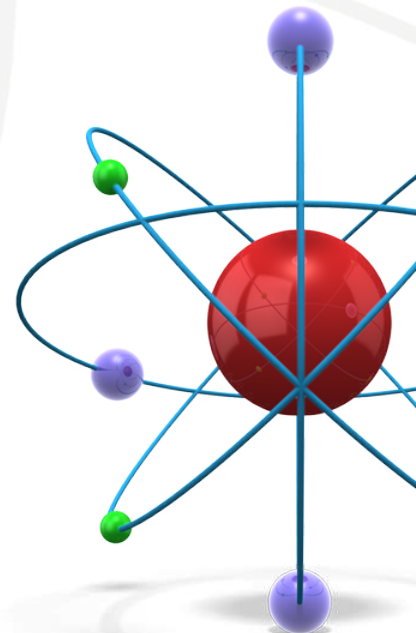
•Qualitative Physical Properties

Property	Description
Clarity	Clear, cloudy, opaque, etc. e.g. Milk is an opaque white liquid.



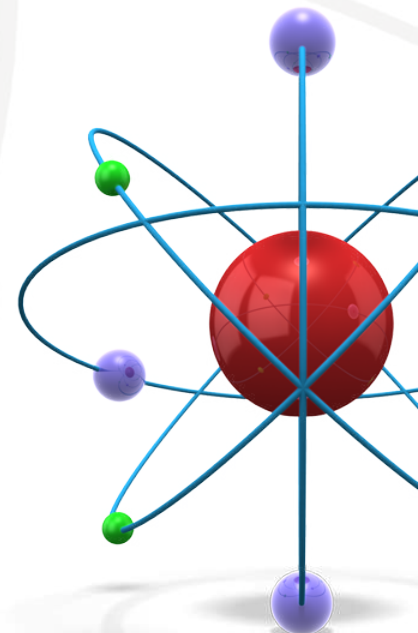
•Qualitative Physical Properties

Property	Description
Taste	Sweet, sour, salty, bitter, etc. e.g. Grapefruit has a bitter, tangy and sweet taste.



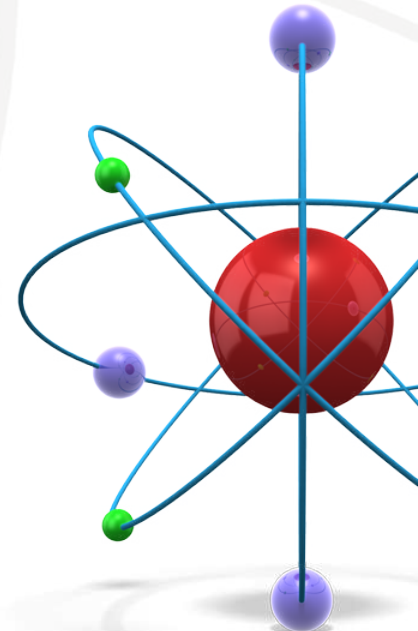
•Qualitative Physical Properties

Property	Description
State	Solid, liquid, gas. e.g. Mercury is one of two elements that is liquid at room temperature.



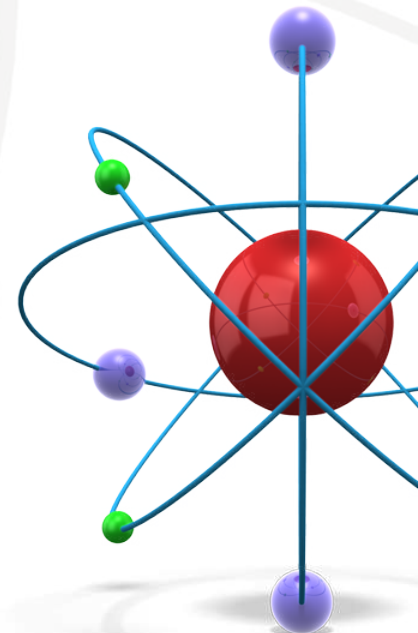
•Qualitative Physical Properties

Property	Description
Hardness	Resistance of a solid to being scratched or dented. e.g. Diamond is the hardest known natural material.



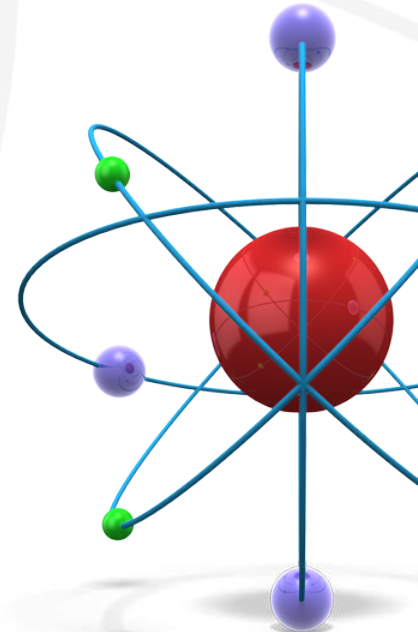
•Qualitative Physical Properties

Property	Description
Solubility	Ability of a substance to dissolve in a solvent such as water. e.g. Pepper does not dissolve in water, therefore it is insoluble.



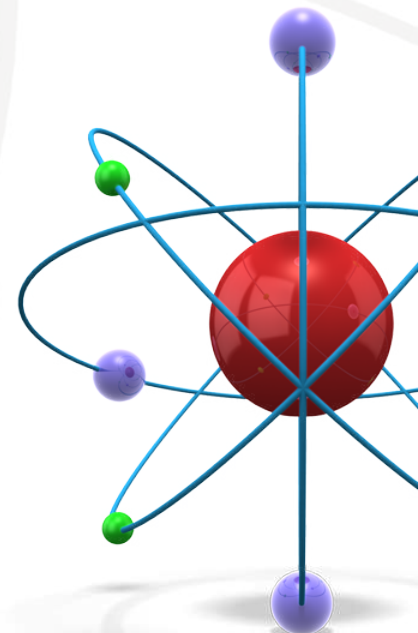
•Qualitative Physical Properties

Property	Description
Ductility	The ability of a solid to be pulled into wires. e.g. Copper is a ductile metal used in electrical wiring.



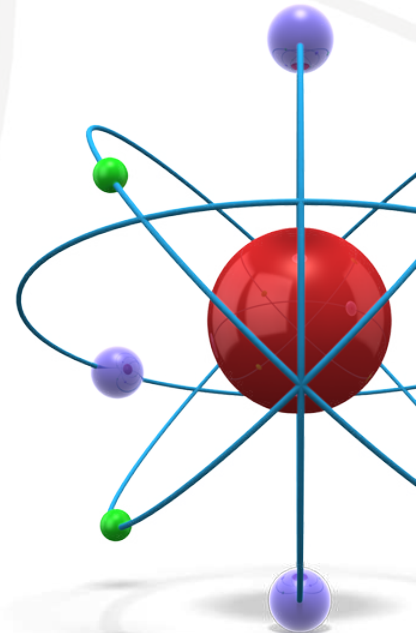
•Qualitative Physical Properties

Property	Description
Malleability	The ability of a solid to be bent or hammered into other shapes without breaking. e.g. Aluminum is a malleable metal because it can be hammered into thin sheets.



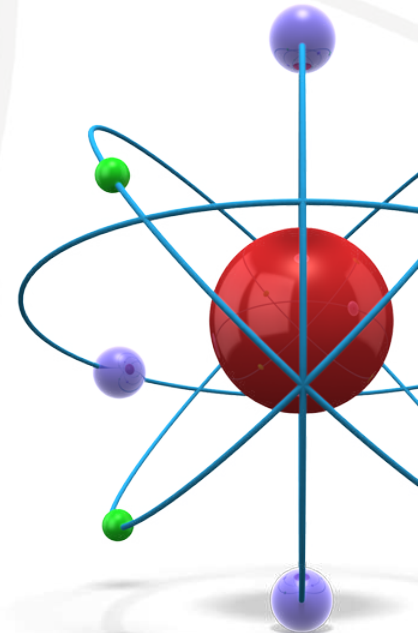
•Qualitative Physical Properties

Property	Description
Viscosity	How easily a liquid pours or the thickness of a liquid. e.g. Honey is a viscous liquid because it pours slowly.



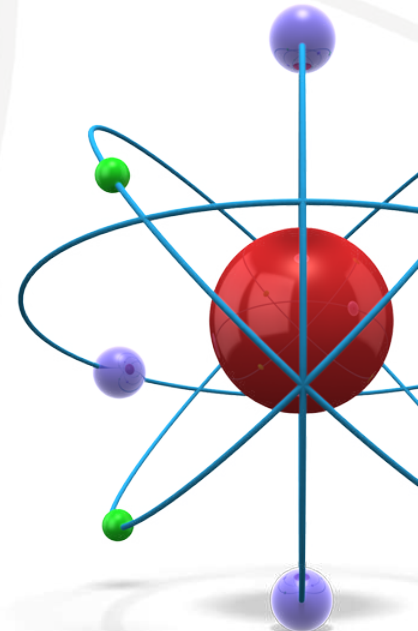
•Qualitative Physical Properties

Property	Description
Conductivity	The ability of a material to conduct heat or an electric current. e.g. Gold is a good conductor of electricity.



•Qualitative Physical Properties

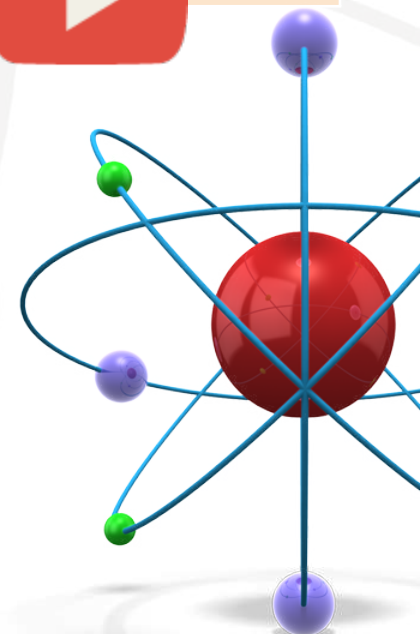
Property	Description
Brittleness	A material is brittle if it breaks without significant strain. e.g. Glass is brittle because it will break instead of bend.



•Chemical Properties

- A chemical property describes the behavior of a substance as it becomes a new substance.

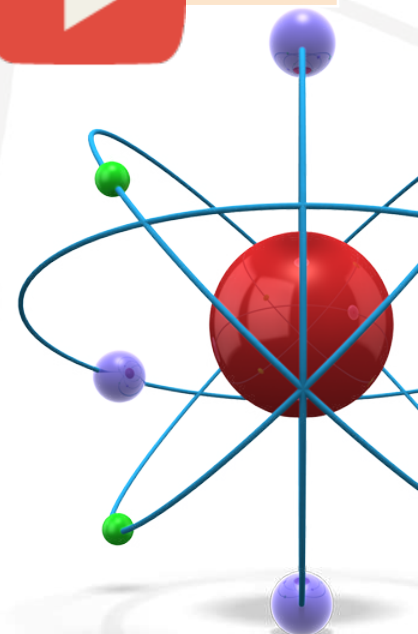
Chemical Property	Description
Reaction of an acid with a base	Acids and bases will combine in a neutralization reaction. e.g. Vinegar reacts with baking soda to produce carbon dioxide gas.



•Chemical Properties

- A chemical property describes the behavior of a substance as it becomes a new substance.

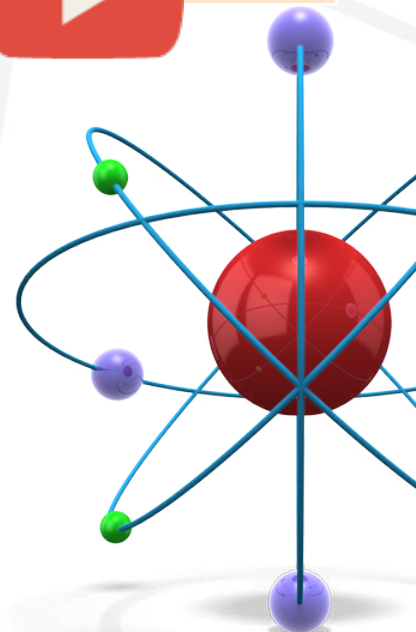
Chemical Property	Description
Flammability	How easily a substance will burn if ignited. e.g. Gasoline burns easily if ignited.



•Chemical Properties

- A chemical property describes the behavior of a substance as it becomes a new substance.

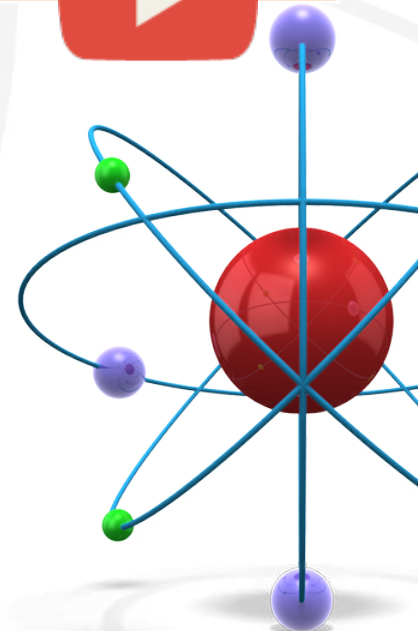
Chemical Property	Description
Bleaching ability	The ability to break down pigment. e.g. Hydrogen peroxide breaks down the pigment (color) in hair.



•Chemical Properties

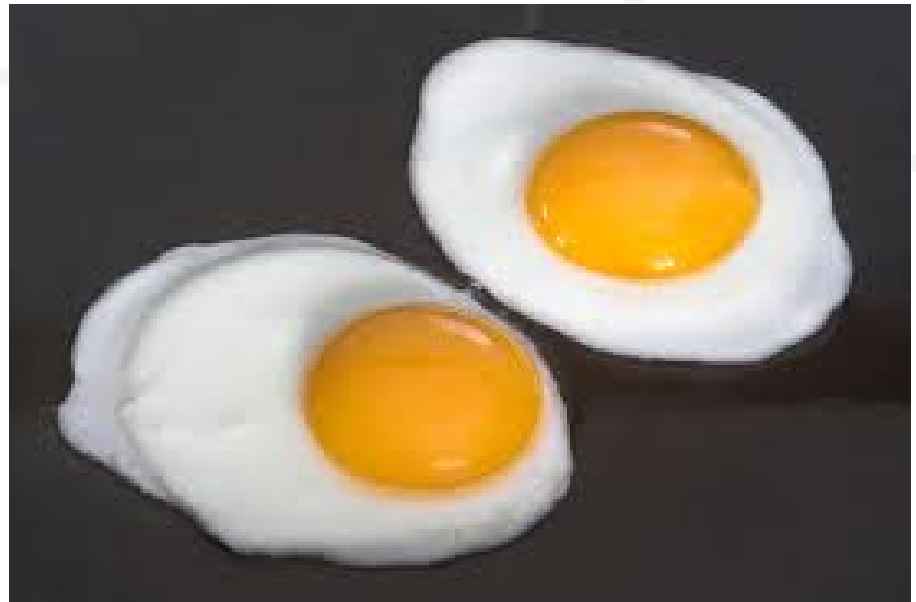
- A chemical property describes the behavior of a substance as it becomes a new substance.

Chemical Property	Description
Corrosion	The ability of a chemical to corrode or rust. e.g. Discarded batteries in landfill sites break down readily when they come in contact with groundwater.



• Physical and Chemical Changes

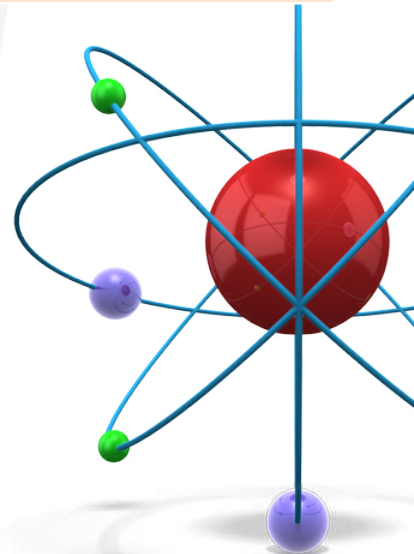
- We experience physical and chemical changes everyday when we cook an egg, burn gasoline in the car, freeze water to make ice cubes or mix vinegar and oil to make salad dressing.



•Physical Change

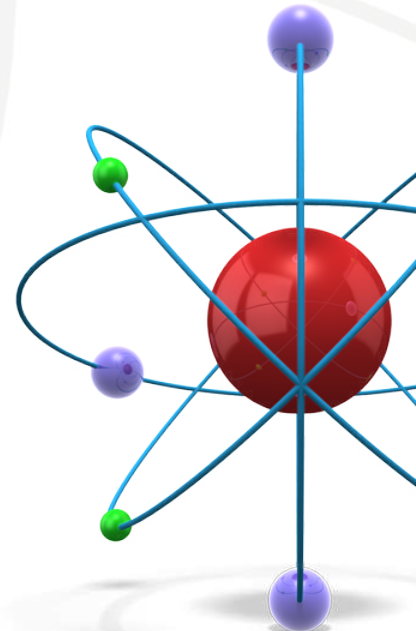
- In a physical change, the substance involved remains the **same**.
- Most physical changes are **easy** to reverse.

Physical Change	Description
Changes of State	e.g. Melting, Freezing, Boiling



• Physical Change

Physical Change	Description
Dissolving solids into liquids	e.g. dissolving salt (solute) into water (solvent), making Kool-Aid



•Chemical Change

- In a chemical change, the original substance is changed into one or more **new** substances.
- The new substances have different properties from the original substance.
- Most chemical changes are **difficult** to reverse.



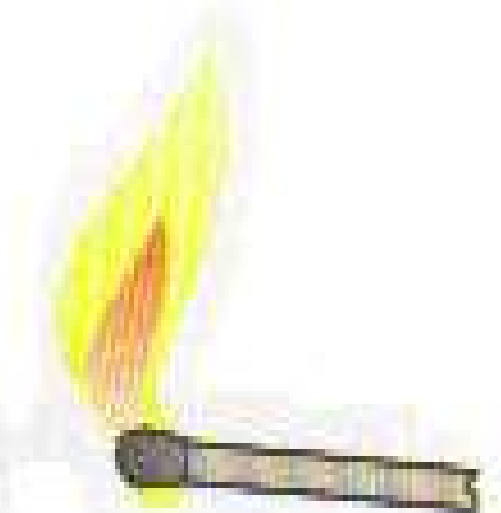
•Clues that a Chemical Change has occurred:

- A new color appears.



•Clues that a Chemical Change has occurred:

- Heat or light is produced or absorbed.



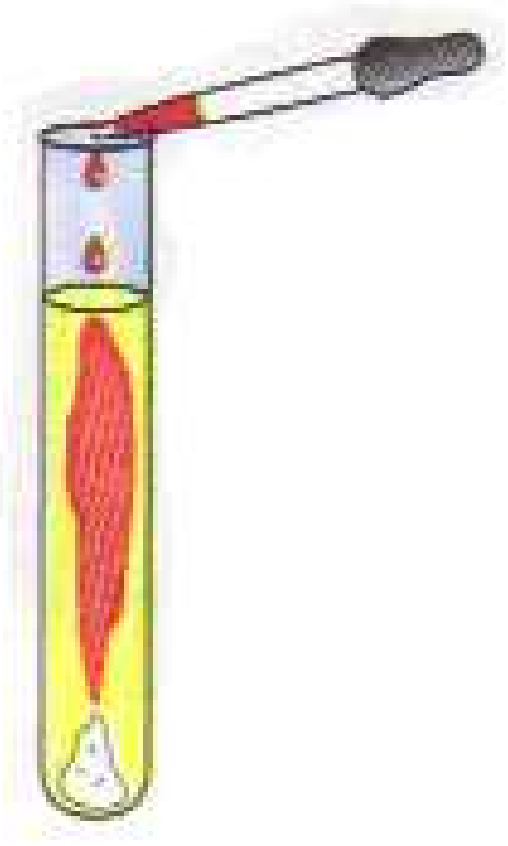
•Clues that a Chemical Change has occurred:

- Bubbles of gas are formed.



•Clues that a Chemical Change has occurred:

- A solid material (a precipitate) forms in a liquid.




•Need more Science Resources?

Naming Compounds
Spinner



Mrs. Brosseau's Binder

Editable Physics
Formula Folder




Mrs. Brosseau's Binder

Scientific Inquiry
Graphic Organizers




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Ecosystems Terms
Domino Puzzle




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Astronomy Terms
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Plant Parts
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Editable Terminal Speed
Coffee Filter Lab



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Organelle
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