Physical Changes

- **Physical Properties** of a substance are those characteristic of a substance that describes its physical nature.
- For Example colour, density, shape, size and volume are some physical properties.
- **Physical Change** is a change which occurs when there is an alteration in the physical properties of a substance.
- The physical change does not result in the formation of any new substance but can alter the shape and size of the existing substance.

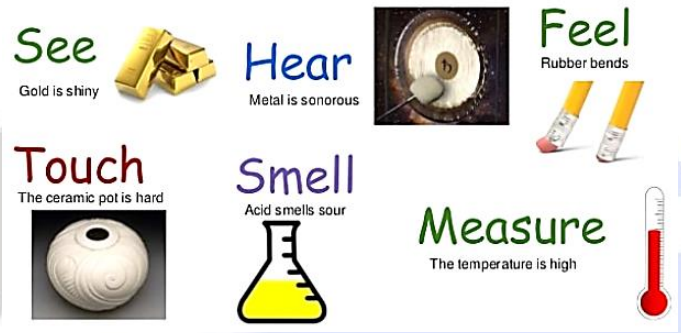

Figure 1: Physical Properties

Figure 2: Physical Changes

Chemical Changes

- The **chemical property** of a substance are those characteristic of a substance that describes its chemical nature.
- For Example toxicity of a substance or how a substance reacts with other substances is its chemical property.
- A **chemical change** or chemical reaction is any change in the chemical properties of a substance.
- Whenever a substance undergoes a chemical change, a new substance is formed.
- Examples of Chemical Changes:

- Rusting of iron occurs when iron gets in contact with moisture
- When a magnesium ribbon is burnt it radiates white light and converts into ashes
- Formation of Medicines
- Extracting of iron from the iron ore
- Formation of plastic

Figure 3: Chemical Properties

A chemical change is always accompanied by any one or all of the following way:

- Radiation or absorption of heat
- Production of sound
- Change in the colour of the substance
- Change in the smell of the substance
- Formation of a gas
- Formation of a solid as residue

Change in Property	Example
Radiation or absorption of heat	• Burning of a substance such as coal, wood or candle results in production of heat and hence is a chemical change • Similarly, melting of ice results in absorption of heat and therefore it is a chemical change.
Production of sound	• Bursting of fireworks is a chemical change. It results in production of sound, heat, radiation as well as gas.
Change in the colour of the substance	• Raw fruits and vegetables when cut and left in open air start acquiring brown color due to a chemical change. • Similarly, rusting of iron results in change of color of iron to reddish brown is also a chemical change.

Formation of a gas	• When antacids are mixed in water bubbles are formed indicating the production of a gas and therefore it is a chemical change.
Change in the smell of the substance	• When food gets spoiled, it produces foul smell. This is because of a chemical change in food. • Rotten eggs often produce a bad odour due to production of sulphur.
Formation of Solids	• Two liquids combine with each other and form a solid called precipitate. For Example, shells of animals are precipitates formed by chemical changes.

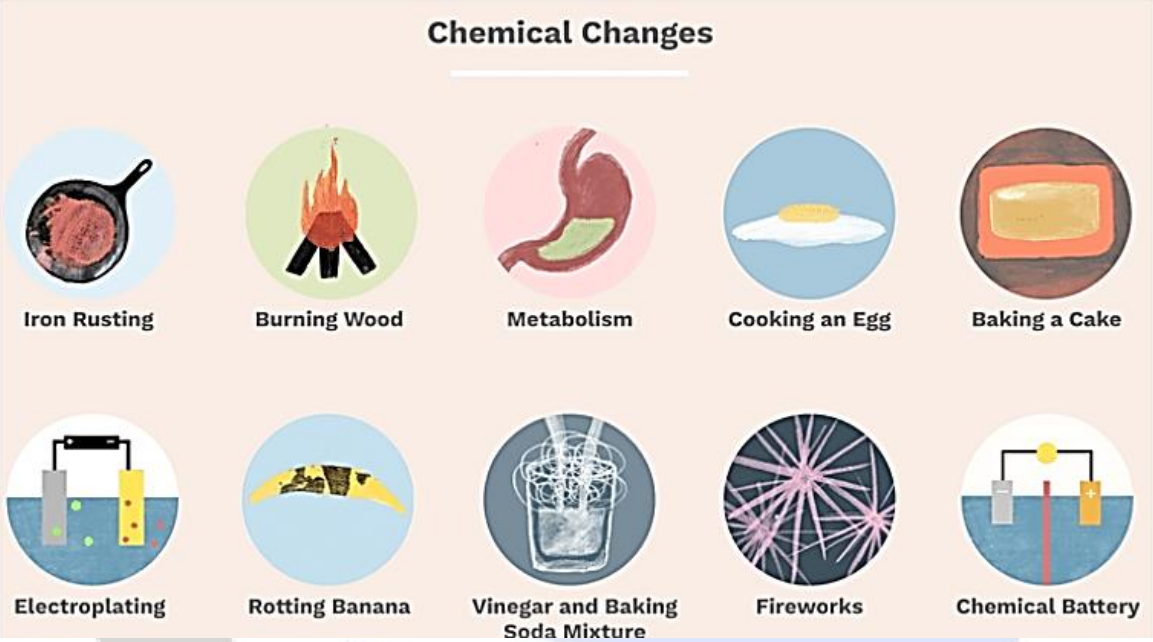

Figure 4: Chemical Changes

Rusting of Iron

When the iron comes in contact with oxygen and water, reacts and forms a red colored substance over it. It is called **Rust**.

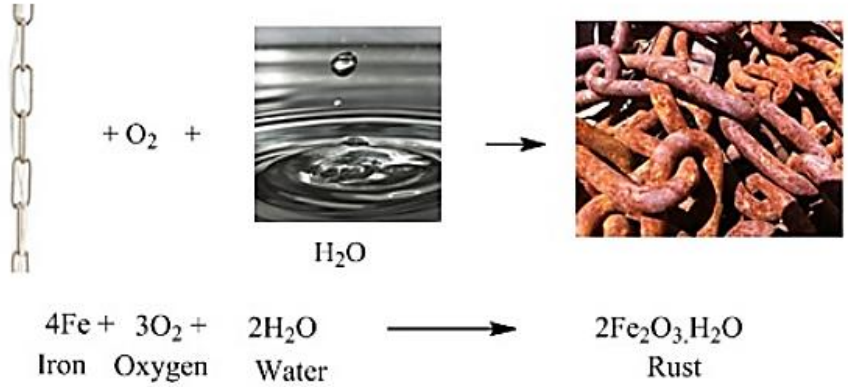

Figure 5: Formation of Rust

How to prevent rusting of iron

- By applying paint on iron objects so that they cannot come in contact with oxygen and moisture in the environment
- **Galvanization** of iron which means applying a layer of zinc or chromium metals on the iron

Crystallization

It is a process of obtaining crystals of a pure substance from its solution. For Example, we can obtain the crystals of copper sulphate by boiling copper sulphate solution.

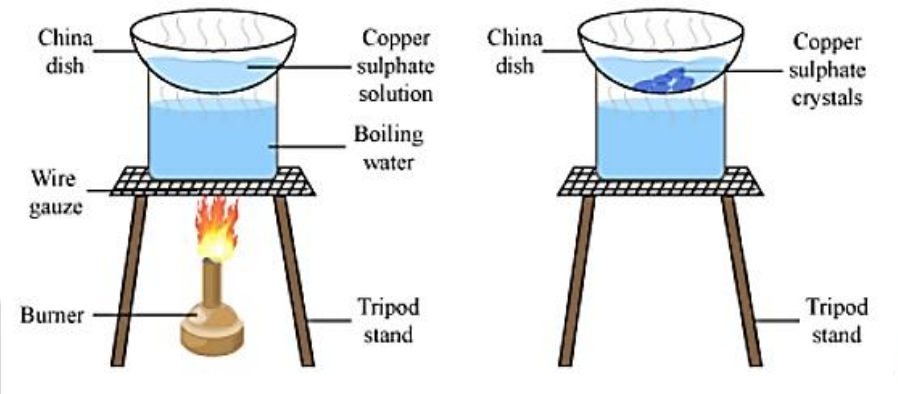

Figure 7: Crystallization of Copper Sulphate