

## Sorting Materials into Groups Class 6 notes - Chapter 4

The things, which we all use in our daily life are made up of different types of materials. All these materials have mass, shape and are classified based on many criteria, including their physical states, properties of materials, etc.

### Properties of Materials

Based on the different properties, **materials** can be differentiated into their respective groups. Listed below are the properties of materials.

1. The materials can be sorted into their groups based on the 3 states of matter-  
Solids, liquids and gases.
2. Materials can be sorted on the basis of appearance of materials varies in colour, texture, hard, soft and lustre.
3. The solubility depends on soluble and insoluble of materials in water.  
  
For example,- Salt and sugar are soluble in water. Chalk and sand are insoluble in water.
4. Sorting of Materials is based on the metal and non-metals. Iron, copper, gold are examples of metals and coal, chalk, rubber are examples of non-metals.
5. Another criteria used to sort the materials is based on the light transmission through objects, which includes Opaque, Translucent and Transparent.

### Introduction

#### Classification

Materials can be classified based on several properties:

- Transparency
- Hardness
- Soluble and Insoluble
- Float and Sink

#### Need for classification

Classification makes everything easier and orderly for better understanding.

#### How are materials classified?

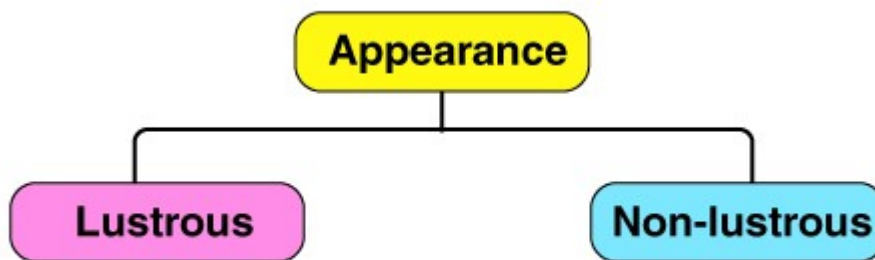
Materials are classified based on similarities in their properties such as appearance, hardness, transparency, solubility or density.

## Appearance

### Polishing

- Metal polishing acts as a protective shield to metal surfaces because it stops oxidation.
- It is a method of improving the durability and texture of metal surfaces as they are much less likely to wear or corrode.

### Classification based on appearance



- Materials can be differentiated from each other based on their looks.
- Some like diamond and gold are shiny and is termed as lustrous materials.
- Some other materials like graphite and wood do not appear shiny and are generally known as non-lustrous materials.

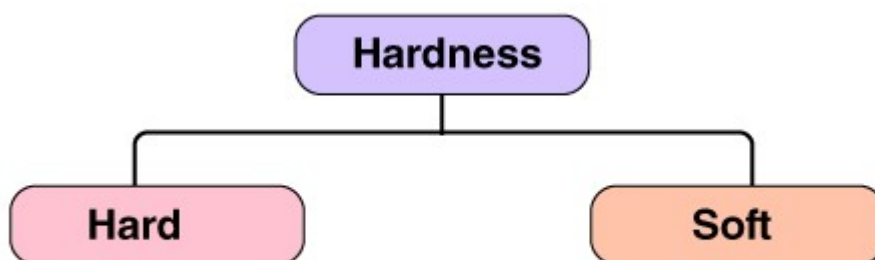
## Hardness

### Toughness

The property of material to withstand stress without breaking is termed as toughness.

A material with high strength and high ductility will have more toughness than a material with low strength and high ductility.

### Classification based on the hardness



- Materials that can be compressed or deformed easily are referred to as soft substances.
- Whereas, materials that are difficult to bend or compress and are termed as hard substances.

## Solubility

### Classification based on solubility

- Some substances completely disappear or dissolve in water. These substances are soluble in water.
- Other substances do not mix with water and do not disappear even after we stir for a long time. These substances are insoluble in water.

## Floatation

### Buoyancy

The upward force applied by the fluid on the object or the body when an object is put in or submerged in the fluid is termed as Buoyancy.

### Classification based on buoyancy

Materials can be classified based on the sinking or floating in water:

- A leaf floats on water
- A metal spoon will sink in water

## Density

Density is defined as mass per volume. You can think of it as the amount of particles of a substance are packed into a certain amount of space.

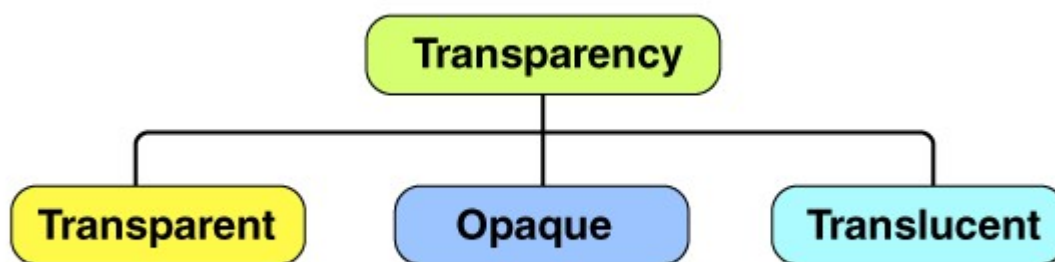
- If the particles are packed tightly together, the density would be greater than if they are loosely packed with a lot of empty space around them.
- This is taken as mass per unit volume of a given object. The SI unit is  $\text{kg/m}^3$ .
- Density is the reason some objects sink and other objects float.

## Transparency

### Transparency

Materials can be grouped into three main categories based on their ability to transmit light.

### Classification based on transparency



- An object, which allows visible light to pass through it is called a transparent object. We can clearly see through a transparent object. E.g.:- glass, fish tank.
- An object, which allows partial passage to light is called a translucent object. E.g.:- plastic bottle, paper cup.
- An object, which does not allow passage to light is called an opaque object. We cannot see through an opaque object. E.g.:-wood, metals.