6th – Sorting Materials into Groups

Anything that we can see or touch is called an object. All objects differ in shape, size, colour and other aspects also. Grouping different objects on the basis of certain similarities and dissimilarities is called classification.

Importance of classification: classification has the following advantages:

1. It helps in systematic study of objects
2. It helps in identifying and locating things
3. It helps to study the properties of objects of one category and also observe pattern in these properties.

Materials: a substance which is used in making different objects is called material. **Example**: steel is used to make knives, utensils, cars, buildings, bridges and chair is a material made from wood. **Types of material:**

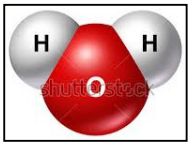
1. Natural material: those materials which are obtained from nature like cotton, silk, coal.
2. Human made material: Those materials which are made by humans in factories by combining two or more materials are called human made material like plastic, glass etc.

Important points:

- An object may be made up of different material, for example chair is made up of wood, plastic, iron.
- Different types of objects can be made up of same material like plastic
- An object can be made up of combinations of material like cakes, biscuits etc.

Matter: anything that occupies space and has mass is called matter. Everything in this universe is made up of matter. Matter is made up of extremely small particles called atoms. For example, smallest piece of copper, gold or silver or any other element is called atom. An atom cannot be broken down into simpler substances by any physical or chemical methods.

Case of water: water is made up of hydrogen and oxygen. Water consists of atoms of hydrogen and oxygen. The smallest particle of water is one molecule of water. It contains two atoms of hydrogen and one atom of oxygen.



A substance which is made up of two or more elements combined chemically in fixed proportion is called compound. Compound exist as molecules like water, carbon dioxide etc.

Grouping: placing or sorting similar things together is called grouping.

Grouping on the basis of common properties: Objects are made of different materials. One material can be used to make different objects. This is because different types of materials have different properties. Materials have different properties like:

1. **Appearance:** materials look different from each other. Paper looks different from cloths. Wood looks different from iron. Iron looks different from copper and aluminum. At, the same, there are similarities between iron, copper and aluminum. Materials can be classified on the basis of their appearance.
2. **Lustre:** Lustre is the shine of a material. All metals in pure state are shiny and said to posses lustre. This property of metals is widely used for making jewellery and other decorative articles. Examples are gold, silver and bronze.
3. **Texture:** when we touch different materials, we find that some are rough and some are smooth. Rough materials have bumps or ridges on their surface, which

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can be felt by touching them, for example rocks, sandpaper and bark of a tree. Smooth surfaces have no bumps or ridges and have a plain surface for example glass sheet and flower petals etc.

4. **Hardness:** we can easily compress sponge but an iron rod cannot be compressed. Materials that can be compressed are called soft materials like foam, melted wax. Materials that cannot be compressed are called hard material like aluminium, copper etc.

5. **State:** most of the materials are grouped on the basis of their physical state i.e. solid, liquid or gas.

Parameters	Solid	Liquid	Gas
Shape	Definite shape	No definite shape	No definite shape
Volume	Fixed volume	Fixed volume	Not fixed volume
Compressibility	Cannot be compressed	Can be compressed to a small extent	Highly compressible
Packing	Particles are closely packed	Particles are less closely packed	Particles are loosely packed.

• **Soluble or insoluble**: On the basis of solubility, materials can be soluble, insoluble, miscible or immiscible. Solid materials that dissolve in water are said to be soluble in water for e.g.: common salt and sugar. Solid materials that do not dissolve in water are said to be insoluble in water. For e.g. sand, wood, stone, chalk, powder and wax.

• Liquids that dissolve in water are said to be miscible in water for e.g.: alcohol, vinegar, lemon and honey. Liquid that do not dissolve in water are said to be immiscible in water. For e.g.: kerosene, coconut oil.

• Some gases dissolved in water like carbon dioxide in soft drinks and oxygen in water.

6. **Flotation**: some materials float on water where as other sink. This property of a material to float on water is called flotation. E.g.: wood, leaf, float on water whereas rock and metal sink.

7. **Transparency:** Different materials allow different amount of light to pass through them depending on a property called transparency. Three types of transparency are:

a) Transparent: Materials that allow all the light to pass through them e.g. glass, water.

b) Translucent: Materials that allow some light to pass them. E.g.: oiled paper and coloured glass.

c) Opaque: Materials that do not allow light to pass through them. E.g.: wood, stone, metal and cardboard

8. **Attraction towards a Magnet**: materials that are attached to a magnet are called magnetic materials. This property is called magnetism. E.g.: iron, nickel are attracted to a magnet.

9. **Conduction of Heat and electricity**: materials that allow heat or electricity to flow through them are called conductors of heat whereas those do not allow heat or electricity to flow are called insulators.

Conductors: materials that conduct electricity are called conductors. **For ex**- metals. **Insulators:** materials that do not conduct electricity are called insulators. For ex: wood, air, plastic.

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