2.1.1. Meaning and Properties of Matter

Part I

What is matter? Matter is anything that has mass and occupies space. The term mass refers to the amount of matter present in a sample. Matter includes all things both living and nonliving that can be seen (such as plants, water, soil, rocks, table and even this book), as well as things that cannot be seen by our naked eye (such as air and bacteria). Unlike matter, energy is known and recognized by its effect. It cannot be seen, touched, smelt or weighed. Therefore, various forms of energy such as heat, light, and sound are not considered to be matter.

More explanations

Matter is anything that has mass and occupies space. Everything around us—whether it's the air we breathe, the water we drink, or the food we eat—is made of matter. Matter exists in different forms and can be solid, liquid, or gas depending on how its particles are arranged and how they move. All matter is composed of tiny particles that are too small to see with the naked eye, and these particles are always in motion. This idea is explained by the **particle model of matter**, which helps us understand how substances behave in different conditions.

The key properties of matter include **mass, volume, density, and state**. Mass is the amount of matter in an object, while volume is the amount of space it occupies. Density refers to how much mass is packed into a certain volume. Matter also exists in three main physical states—solid, liquid, and gas—each with unique characteristics. Solids have a fixed shape and volume, liquids have a fixed volume but take the shape of their container, and gases have neither a fixed shape nor volume, spreading to fill any space available.

The behaviour of particles in matter determines how it reacts to heat, pressure, or other changes. When matter is heated, its particles move faster and farther apart, often causing a change of state (e.g., solid to liquid or liquid to gas). In solids, particles are tightly packed and only vibrate in place. In liquids, particles are close but can slide past one another, and in gases, particles move freely and quickly in all directions. Understanding these particle behaviours helps explain many everyday phenomena, such as melting, boiling, evaporation, and diffusion.

1. What is matter?

a) Anything that moves

b) Anything that has color

c) Anything that has mass and occupies space

d) Anything that produces light

2. Which of the following is NOT a form of matter?

a) Water b) Air c) Sound d) Wood

3. What does the particle model of matter explain?

a) How animals grow b) How light travels

c) How matter behaves and changes d) How time works

4. What are the three main states of matter?

a) Cold, hot, warm b) Mass, volume, density

c) Solid, liquid, gas d) Water, oil, air

5. What property of matter is measured in kilograms or grams?

a) Volume b) Density

c) Temperature d) Mass

6. Which property tells us how much space an object takes up?

a) Mass b) Volume c) Density d) Shape

7. What is density?

a) The weight of an object
b) The amount of water displaced
c) The ratio of mass to volume
d) The temperature of a substance

8. Which state of matter has a fixed shape and volume?

a) Liquid
b) Gas
c) Solid
d) Plasma

9. Which state of matter takes the shape of its container but has a fixed volume?

a) Gas
b) Liquid
c) Solid
d) Vapor

10. Why do gases spread out to fill the entire space?

a) Their particles are stuck together
b) Their particles are tightly packed
c) Their particles move freely in all directions
d) Gases have no particles

11. What happens to particles when heat is added?

a) They shrink
b) They disappear
c) They move faster and farther apart
d) They stop moving.

12. In solids, particles:

a) Move freely in all directions

b) Slide past each other

c) Vibrate in fixed positions

d) Stay still and silent

13. In which state of matter can particles slide past one another?

a) Solid

b) Liquid

c) Gas

d) Plasma

14. What explains the ability of matter to melt, boil, or evaporate?

a) Movement of particles

b) Change in color

c) Increase in size

d) Chemical reactions only

15. Why can gases be compressed easily?

a) They have high mass

b) They contain water

c) Their particles are very close together

d) There are large spaces between their particles