

### **2.1.5 Properties of Solids, Liquids and Gases**

According to Kinetic (particle) theory, all matter is composed of tiny particles (atoms, molecule, and ions). These particles are arranged differently in solids, liquids and gases.

#### **Solids**

In solids, the particles are arranged in fixed pattern. The particles held together strongly and are tightly packed. Particles in solid can vibrate, but, they stay in the same place. Solids have definite shape and definite volume. Examples of Solids are Stones, wood, metals etc.

#### **Liquids**

The particles in a liquid are separated by spaces that are large enough to allow the particles to slide past each other. It takes the shape of its container because the particles can move around more freely than they can in a solid. At room temperature water, ethanol, benzene, oil are liquids.

## **Gases**

Student Textbook Grade 7 The particles in a gas are separated by much larger spaces than the particles in a liquid or a solid. Therefore, a gas is mostly empty space. For example, air, hydrogen, oxygen, carbon dioxide and nitrogen are gases.

### **1. According to the Kinetic Theory, what are all forms of matter made up of?**

- |                               |                      |
|-------------------------------|----------------------|
| a) Light and sound            | b) Energy and force  |
| c) Atoms, molecules, and ions | d) Liquids and gases |

### **2. How are the particles arranged in a solid?**

- |                                     |                                    |
|-------------------------------------|------------------------------------|
| a) Random and far apart             | b) Loosely connected and flowing   |
| c) Fixed pattern and tightly packed | d) Moving freely in all directions |

### **3. Why do solids have a definite shape and volume?**

- a) Because their particles move freely
- b) Because their particles are loosely packed
- c) Because their particles vibrate randomly
- d) Because their particles are tightly packed and held together strongly

**4. Which of the following allows a liquid to take the shape of its container?**

- a) Particles are held in a fixed position
- b) Particles are completely still
- c) Particles can slide past each other
- d) Particles are far apart and do not interact

**5. What is a correct example of a liquid at room temperature?**

- a) Stone
- b) Hydrogen
- c) Water
- d) Iron

**6. Why are gases mostly made up of empty space?**

- a) Their particles are very tiny
- b) Their particles are very close together
- c) Their particles are tightly packed
- d) Their particles are far apart

**7. Which of the following is not a property of gases?**

- a) Definite volume
- b) Particles are far apart
- c) Mostly empty space
- d) Can fill any container

**8. Which of the following states of matter has a definite shape and volume?**

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

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

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

**10. Which state of matter can be compressed easily?**

- a) Solid                      b) Liquid                      c) Gas                      d) Both a and b

**11. In which state of matter are particles tightly packed and vibrate in fixed positions?**

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

**12. Which of the following best describes the movement of particles in a gas?**

- a) Slow and fixed                      b) Vibrating in place  
c) Freely and rapidly in all directions                      d) Sliding past each other

**13. What happens to most solids when heated?**

- a) They melt                      b) They evaporate  
c) They contract                      d) They condense

**14. Which of the following is an example of a liquid?**

- a) Ice                      b) Steam                      c) Water                      d) Carbon dioxide

**15. What property do solids, liquids, and gases all share?**

- a) Definite shape                      b) Fixed volume  
c) Mass                      d) High density

**16. Which of the following changes in state involves a gas becoming a liquid?**

- a) Freezing
- b) Melting
- c) Condensation
- d) Evaporation

**17. Why are gases easily compressible compared to solids and liquids?**

- a) They are heavier
- b) They have larger particles
- c) Their particles are far apart
- d) They move slowly

**18. Which state of matter does not have a definite shape or volume?**

- a) Solid
- b) Liquid
- c) Gas
- d) Both b and c

**19. Which state of matter has the least kinetic energy?**

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

**20. Which property of solids allows them to be compressed the least compared to liquids and gases ?**

- a) High intermolecular spaces
- b) The ability to diffuse into other solids
- c) Strong intermolecular forces and close packing of particles
- d) High kinetic energy of particles