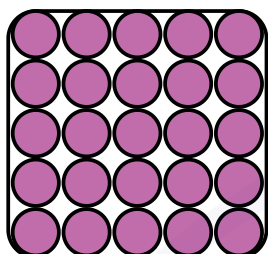


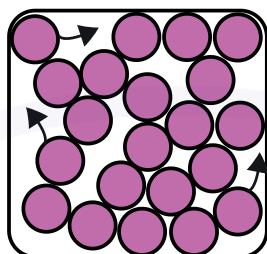
# THE PARTICLE MODEL

## Key Concepts

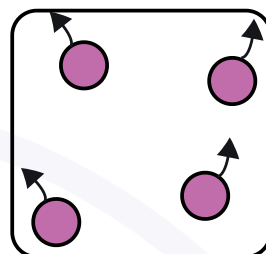
- Matter is made of particles (atoms or molecules).
- The arrangement and movement of particles explain states of matter and changes of state.



**SOLID**



**LIQUID**



**GAS**

## Key Facts to Remember

- Particles in a solid are fixed in a regular, closely packed arrangement, vibrating in place but not moving freely.
- Liquids have particles that are close together but can slide past one another, allowing them to flow while maintaining a fixed volume.
- Gas particles move rapidly and randomly, widely spaced apart, and they fill the shape and volume of their container.
- The energy of particles increases as a substance moves from solid to liquid to gas (melting, boiling).
- When a substance cools, its particles lose energy, leading to condensation (gas to liquid) or freezing (liquid to solid).
- Sublimation occurs when a solid turns directly into a gas without becoming a liquid first, as seen in dry ice (solid  $\text{CO}_2$ ).

## Quick Questions

1. What state of matter has particles tightly packed?
2. How do particles in a gas behave?
3. Why do solids have fixed shapes?
4. Which state of matter flows but has a fixed volume?
5. How do particles behave during condensation?
6. What happens to particle energy during freezing?
7. What process allows a gas to turn into a liquid?
8. What is the difference between sublimation and evaporation?

## Fun Fact

**A single drop of water contains about 1.67 sextillion water molecules!**  
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