

The Mystery of the Three States

Understanding how matter behaves depends on knowing how particles move and arrange themselves ([Knowledge](#)). In this brain teaser, you will use what you know about solids, liquids, and gases to solve a puzzle about particles and their spaces.



Figure 1: Three clear containers side by side on a table

The puzzle

Three mystery containers sit on a shelf. Each container has matter in a different state. Read the clues and figure out which state of matter is in each container.

Container A: The particles are very close together and vibrate in place. They do not slide past each other. The attractive forces between particles are very strong.

Container B: The particles are separated by large spaces. They move constantly in all directions. The attractive forces between particles are very weak.

Container C: The particles are separated by spaces, but not as many as in Container B. The particles can slide past each other. But they stay together as a group.

Your task: Name the state of matter in each container. Use solid, liquid, or gas. Then explain which container has the strongest attractive forces between its particles. Also explain which has the weakest.

Hints

Hint 1: In a solid, particles vibrate but stay in the same spot. In a liquid, particles can move around but stay together. In a gas, particles spread out and move freely in all directions.

Hint 2: Think about attractive forces. They are strongest when particles are close together. They are weakest when particles are far apart.

Hint 3: Container A describes particles that vibrate in place and do not slide. Container B describes particles moving in all directions with large spaces. Container C describes particles that can move but stay close enough to slide past each other.

Answer key

Container A = Solid

Container B = Gas

Container C = Liquid

Strongest attractive forces: Container A (solid) has the strongest attractive forces. The particles are closest together and held firmly in place ([Knowledge](#)).

Weakest attractive forces: Container B (gas) has the weakest attractive forces. The particles are separated by large spaces and move freely in all directions ([Knowledge](#)).

The key to solving this puzzle is remembering that the arrangement and movement of particles change with each state of matter. Solids have particles tightly packed and vibrating in place. Liquids have particles with more space between them. They can slide past each other. Gases have particles far apart. They move constantly in every direction ([Outcome](#), [Knowledge](#)). The closer the particles are, the stronger the attractive forces between them ([Knowledge](#)).