

The Mystery of the Three Containers

The particle model of matter explains how states of matter and other physical properties work. This model explains how tiny particles behave in solids, liquids, and gases ([Guiding question](#), [Understanding](#)). You will think about how particles move. You will think about how far apart they are. You will think about how strongly they pull on each other. These things decide whether matter is a solid, a liquid, or a gas ([Knowledge](#), [Understanding](#)).



Figure 1: A bright, tidy classroom science corner with three clear labeled containers sitting on a wooden table, one holding an ice cube, one holding

The puzzle

Three sealed containers, A, B, and C, each hold matter. The particles in each container behave differently. Use the four clues to figure out which container holds a solid, which holds a liquid, and which holds a gas.

Clue 1: In Container A, the particles are packed close together. They only vibrate in place. They do not slide around or spread out ([Knowledge](#)).

Clue 2: In Container B, the particles have large spaces between them. They zoom around in every direction. They bump the walls of the container ([Knowledge](#)).

Clue 3: The particles in Container C can slide past one another. They stay close enough together that the container feels "full" when you shake it ([Knowledge](#)).

Clue 4: The attractive forces pulling the particles together are strongest in one container. They are weakest in another container. The container with the strongest attractive forces is not B. Gases have the weakest attractive forces between particles([Knowledge](#)).

Question: Which container is the solid, which is the liquid, and which is the gas? Which container has the weakest attractive forces between its particles?

Write your answer as three matches. Match A, B, and C to solid, liquid, and gas. Also write the name of the container with the weakest attractive forces.

Hints

Hint 1: Think about which state of matter has particles that only vibrate without moving from their spot. Match that to one clue ([Knowledge](#)).

Hint 2: Attractive forces are strongest in solids. They are weakest in gases ([Knowledge](#)). Use that rule together with Clue 4 to check your matches.

Hint 3: Container A vibrates in place, so it must be the solid. Container B has particles spreading in all directions with large spaces, so it must be the gas. That leaves Container C, where particles slide past each other, as the liquid. Now decide which container has the weakest attractive forces using the rule from Hint 2.

Answer key

Container A is the solid. Container B is the gas. Container C is the liquid. Container B has the weakest attractive forces.

Reasoning: Container A's particles vibrate in place without sliding or spreading. This matches a solid, where particles sit close together ([Knowledge](#)). Container B's particles have large spaces between them. They move constantly in all directions. This matches a gas ([Knowledge](#)). Container C's particles slide past one another while staying close together. This matches a liquid ([Knowledge](#)). Attractive forces are strongest in solids and weakest in gases ([Knowledge](#)). Container B is the gas, so Container B has the weakest attractive forces. This also fits Clue 4, since the weakest forces are not in A or C.