

Three States of Matter: Solid, Liquid and Gas

Matter typically exists in these three states.

Kinetic Molecular Theory explains which state a substance exists in at a given **temperature**.

This says that all matter is in constant random motion based on its **internal energy**, and that the state is determined by the comparison between the internal energy and the **energy of attraction** between substances.

At **low temperatures**, the **attractions are stronger** than the energy of motion and we have a **solid**. The molecules are vibrating, but are staying in a fixed position. **Solids** have a fixed shape and volume.

At **intermediate temperatures**, the **attractions and the energy of motion are similar** and we have a **liquid**. The molecules may vibrate, rotate and move around, but they still remain in close contact. **Liquids** have a fixed volume but change to the shape of their container.

At **high temperatures**, the **energy of motion is greater** than the attractions. The molecules are no longer in contact, but move in space and vibrate and rotate. **Gases** take the volume and shape of the container.

