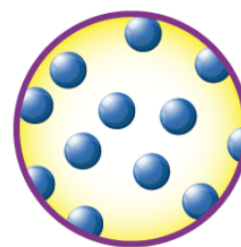


# State of Matter:

## Gases

Information sourced from [TechTarget](#).



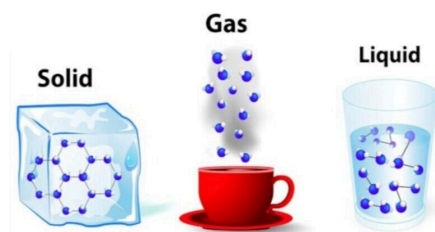
Intermolecular structure of gas

### What is a gas?

A gas is a substance that is airlike (gaseous). Gas is one of three natural states of matter, along with liquid and solid.

A gas has no fixed shape or volume. The atoms or molecules that make up the gas fill the container that holds them. The gas expands until there are equal amounts in equal space throughout the container, even when there is gravity. If not kept in a container, a gas goes out into space.

The atoms or molecules of matter in the gaseous state are always moving. They move freely around each other and continuously bang into each other and the wall of the container that holds them. Usually, the atoms or molecules are packed more loosely than they are if the substance is in the solid or liquid state.



### What are the characteristics of gases?

Examples of gases are oxygen at room temperature - approximately 20 degrees Celsius, hydrogen at room temperature and water when it exceeds 100 degrees Celsius at standard atmospheric pressure (sea level). These and other gases are characterised by four physical properties:

- Volume: The amount of space the gas occupies.
- Density: The amount of mass in a specific volume, i.e., how tightly the particles are packed together.
- Temperature: The absolute temperature of the gas.
- Pressure: The amount of force the gas exerts on the container holding it.

All four properties play a vital role in how a gas behaves under different circumstances:

- When a gas is heated, the atoms or molecules gain kinetic energy and move at a faster pace.
- When a gas is cooled, the atoms or molecules lose kinetic energy and move more slowly.
- If a gas is in a sealed container and heated, the pressure increases.
- If a gas is in a sealed container and cooled, the pressure drops.
- If a gas is in a sealed container and the container's volume is reduced, the compression heats the gas.
- If a gas is in a sealed container and the container's volume is increased, the decompression cools the gas.

Most gases transition to the liquid or solid state if their temperatures drop low enough. For example, if nitrogen is chilled to a temperature below -196 degrees C, it liquefies. Liquid nitrogen is used in medicine to destroy minor skin lesions, such as warts, keloids or keratoses. Another gas, carbon dioxide, skips the liquid phase and becomes a solid known as dry ice when cooled to below -78 degrees C.