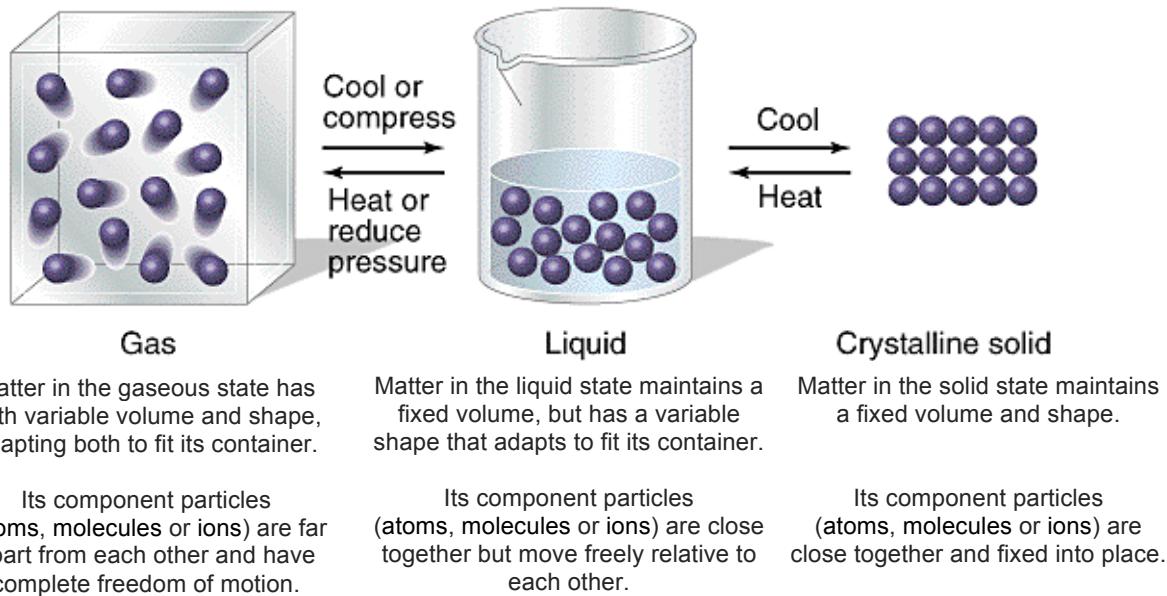


## The Physical States of Matter

Consider these three states of matter: solid, liquid, gas. The distinction is generally made based on qualitative differences in properties, and explained in terms of a particle-level visual:

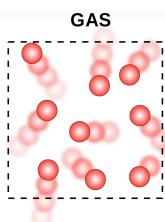


### What factors determine the physical state of matter?

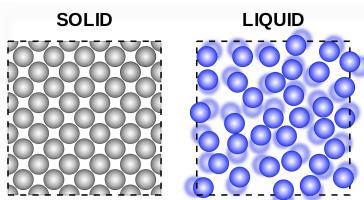
Two opposing factors are at play in determining the physical state of matter:

- The random motions of the component particles (atoms, molecules, or ions), i.e. the kinetic energies of the particles, tend to move the particles away from one another.
- The attractive forces between particles (atoms, molecules, or ions) tend to draw the particles together.

If the average kinetic energy of the particles is greater than the attractive forces between the particles, a substance will not condense to form a liquid (or solid). If the kinetic energy is less than the attractive forces, a liquid (or solid) will form.



*The average kinetic energy of the particles in a gas is great enough to overcome the forces of attraction between them. The molecules of a gas move apart when they collide.*



*The average kinetic energy of the particles in a liquid (or solid) is small enough that the forces of attraction between the particles is sufficient to hold the particles close together. The molecules in a liquid (or solid) do not move apart.*