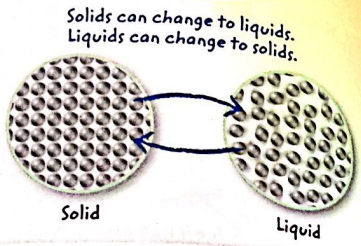
Solid Science!

How do solids and liquids change state?

Remember that the particles in a liquid can slide past one another, while those in a solid can only vibrate. Particles that can slide past one another have more kinetic energy than those that cannot. Therefore, removing energy can cause a liquid to change into a solid. Adding energy can cause a solid to change into a liquid.

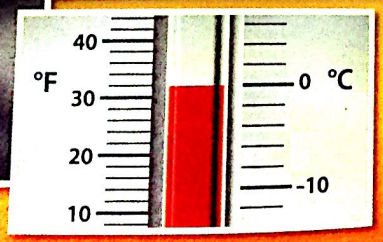


Freezing

When a liquid is cooled, the particles that make it up have less kinetic energy than they did before. The attractive forces between them cause the particles to lock into place, forming a rigid structure. They become packed together in a solid. This process is **freezing**, and the temperature at which it occurs is the *freezing point*. Freezing only occurs once enough kinetic energy has been removed from the system.

The freezing point of water is 0 °C (32 °F). At that temperature, liquid water changes into a solid such as ice or snow.

Active Reading **7 Apply** Which water particles have more kinetic energy, those in a bowl of ice or those in a bowl of water? How do you know?



Melting

When the temperature of a substance is increased, its particles have greater kinetic energy. The particles are able to move faster and overcome some of their attraction to one another. If the distances between particles become great enough, the particles are able to slide past one another and the matter changes from a solid to a liquid. This process is called **melting**. The temperature at which matter changes from a solid to a liquid is the *melting point*.

The melting point of water is 0 °C (32 °F). At that temperature, solid ice melts and forms liquid water. Notice that the freezing point and the melting point of water are the same temperature.

Ice is not the only solid that melts. For example, almost all metals are solid at room temperature, but at very high temperatures, they melt and become liquid. The aluminum used to make soda cans, for example, melts at 660 °C (1221 °F). That fact is useful in manufacturing. Metals like aluminum can be melted into liquid form and poured into the desired shape. When the metal cools, it becomes solid again.

Active Reading **8 Identify** What is the freezing and melting point of water?

9 Infer What is the freezing point of aluminum? How do you know?