

CHANGING STATES (teacher's notes)

About the activities:

Throughout this unit the idea of the importance of the increase or decrease in temperature to change a state is reinforced.

About changing states:

- These changes are physical changes because they don't produce a new substance.
- When we heat a solid the molecules vibrate faster and when they reach melting point the solid melts into liquid.
- Substances have their own melting and boiling points. Pressure and the addition of other substances change the melting and boiling points, for example on a mountain water boils at less than 100° C or salt water boils at a higher temperature than 100° C.
- Not all solids have a melting point, an example could be wood.
- We can say frozen carbon dioxide or dry ice.
- We exhale carbon dioxide (CO₂) when we breathe.
- When water becomes cold it contracts up to 4° C, but if it becomes colder the water begins to expand because the ice molecules increase the distance from each other because they arrange themselves in a hexagonal pattern. So ice is less dense than water and for this reason ice floats. Due to this fact life in lakes... doesn't die when low temperatures freeze the water (the ice is just at the top).

Activity 2: Let's investigate solid and liquid water.

- Ice cube molecules are packed together very tightly in fixed positions, they can't move around, they can't go through the hole.
- Cold water molecules are not so tightly packed together, but they are close together (they stick to one another), they move around and change places. The molecules in a liquid can move about more than in a solid and less than in a gas.
- Hot water molecules move faster than cold water molecules. So the faster the molecules move around, the easier it is for them to slide past one another.
- As you increase the temperature, the molecules move quicker.