

Using ideas about particles

Scientists can use their imagination to make **models** of the way they think that particles are arranged and the way that they move. These models can explain the **observations** that we make, and can sometimes be used to make further **predictions**.

1 Cut out all the boxes.

Think about which of the 'theory' boxes best matches each observation.

Then look at the 'particle model' boxes and find the correct diagram.

When you have matched up the six sets correctly, stick them into your book.

2 Use the information in the boxes to make the following predictions. In each case, explain your reasoning. If you cannot make a prediction, try to explain why not.

- a What happens to the size of a solid if you heat it?
- b What happens to the size of a solid if you cool it down?
- c Which evaporates the fastest, petrol or perfume?
- d What will happen to the temperature of the ice while it is melting?

Observations

A
When water boils, it stays at the same temperature as long as there is some water left.

B
Ice is a solid which floats on water. Snowflakes are always six-sided shapes.

C
If you spill some petrol, it evaporates very quickly. Water takes longer to evaporate.

D
When the water boils, the heat gives the particles enough energy to escape from the liquid.

E
When ice melts, it takes up less space.

F
When you heat water, it expands (gets bigger).

Theories

1

In ice there is a regular arrangement of particles. The particles build up in hexagon rings. This explains the shape of snowflakes. There are gaps in the middle of the rings, which means that ice is less dense than water.

2

Hot water takes up more space than the same amount of cold water. In any volume, there will be fewer particles of hot water than cold.

3

The bonds between particles of petrol are weaker than the bonds between particles of water. It is easier for the petrol particles to escape from the liquid and evaporate into the air.

4

When the water boils, the heat gives the particles enough energy to escape from the liquid.

5

As the water heats up, the particles gain energy and move faster. This movement means that the water takes up more space.

6

When the ice melts, the hexagon pattern is broken up. The particles do not have any particular arrangement, and there are fewer gaps between them.

Particle models

