

STUFF AND SUBSTANCE: PREDICTING WITH THE PARTICLE MODEL

Substances are made of particles:

- close together, vibrating - the solid state
- close together, moving around - the liquid state.

You are going to use the particle model to make predictions about how substances behave.

Task A Predicting

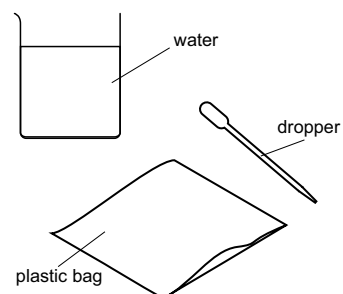
1. Imagine that a plastic bag is squeezed flat and then a drop of water is put inside it. The plastic bag is then sealed with a clip and heated. What might happen to the water inside? What will you see? Think about the particles. Draw a poster to show your ideas.

Task B Observing

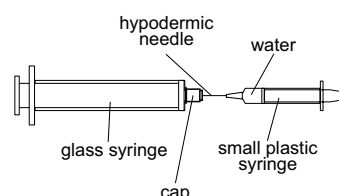
2. In this task, your teacher will use a glass syringe that has been heated to 150 °C. The plunger of the syringe has been pushed all the way in and there is a cap on the end. What is inside the glass syringe?
3. A small plastic syringe with a hypodermic needle is then filled with water.
4. Your teacher will inject a drop of water (0.05 cm³) into the hot glass syringe. What happens? How does this match your predictions?
5. What is inside the syringe?

Task C Particles

6. Use the ideas of the *particle model* to draw a labelled diagram of this experiment to explain the results:
 - Why did the volumes inside the syringes change?
 - Have the individual particles changed?
 - Which substance is in the syringe?
 - What is between the particles?
 - What state is the water in?



The glass syringe is hot and could cause burns. Wear thermal gloves. Ensure the plunger does not fly out. The hypodermic needle is sharp and could break the skin.



Particle model

- A sample of a substance is a collection of particles.
- There is nothing else except the particles.
- The particles of one substance are all the same.
- The particles hold on to each other – the 'ability to hold' is different for different substances.
- The particles are always moving in some way – they have energy of movement.
- Heating gives the particles more energy of movement – they are more energetic.