Diffusion and dissolving

Introduction

These questions are designed to help you to develop your mental models (pictures in your head) of the diffusion of particles of a liquid in water. These questions are also designed to help you to connect your understanding of diffusion with the idea of dissolving.

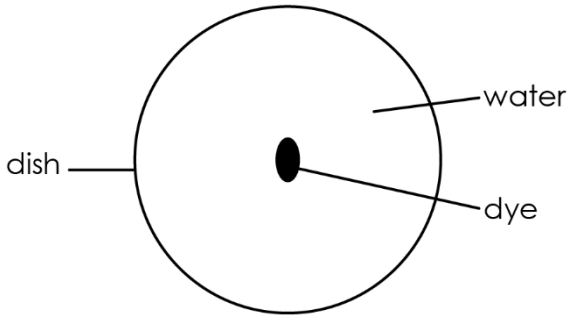
Macroscopic: what we can see. Think about the properties that we can observe, measure and record.

Sub-microscopic: smaller than we can see. Think about the particle or atomic level.

Symbolic: representations. Think about how we represent chemical ideas including symbols and diagrams.

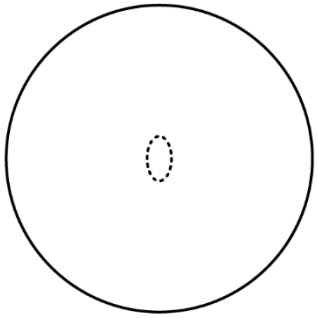
Questions

1. A student carefully adds a drop of blue dye to the centre of a dish containing water. The student places a lid on the dish.

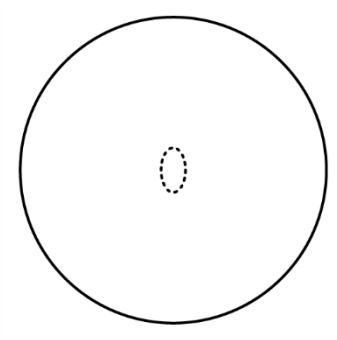


(a) Complete the diagram to show what you would expect to observe after

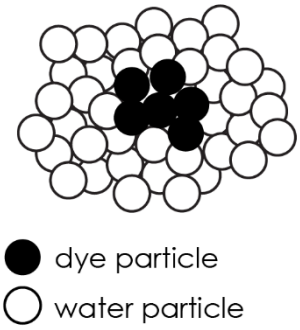
i. 10 minutes



ii. 10 hours



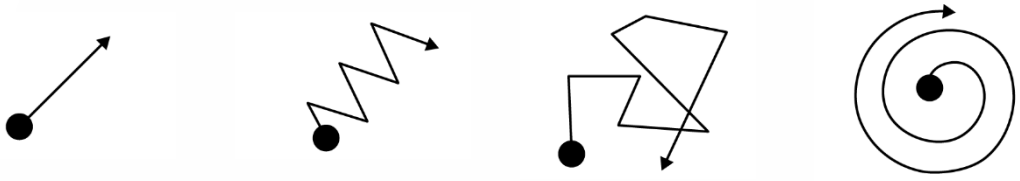
(b) The diagram shows particles of water and particles of the blue dye.



Draw a diagram to show the particles after 10 hours.

The particles move in all directions, bump into each other and change direction. This means that over time the particles move randomly.

(c) Select the diagram that shows random movement of a particle.



(d) Explain the why the blue dye eventually mixes with all the water in the dish, without being stirred.

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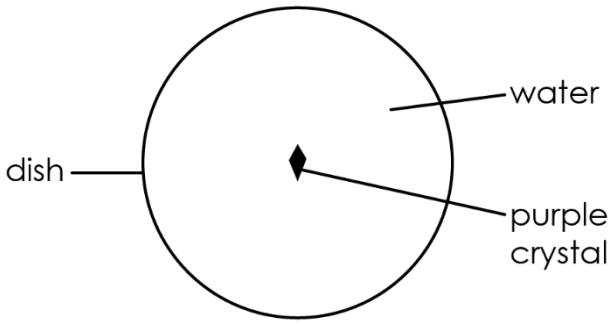
2. A student adds a purple crystal to the centre of a dish of water.



(a) Describe what will happen to the size of the crystal.

(b) Describe what will happen to the colour of the liquid in the dish.

(c) Explain why these changes are happening.

Use the words **dissolve** and **diffuse** in your answer.