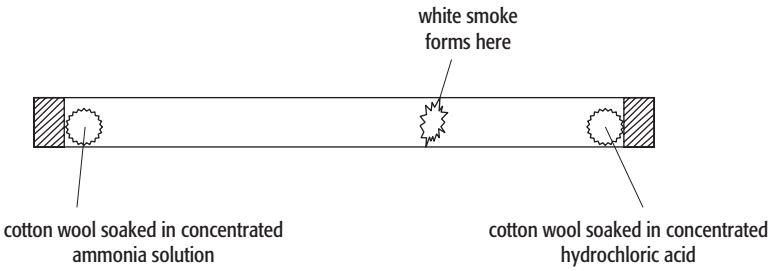
Worksheet 2.5

The motion of particles

The motion of particles can be demonstrated in a variety of ways.

The following experiment was carried out using concentrated ammonia solution and concentrated hydrochloric acid.



1 Ammonia contains the elements nitrogen and hydrogen and has the chemical formula NH_3.

a Name the type of bonding that exists in ammonia.

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b Draw a 'dot and cross' diagram to show the bonding in a molecule of ammonia. Only show the electrons in the outer energy levels.

c Explain why ammonia has a low boiling point.

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2 The ammonia and hydrogen chloride gases meet and react to form the ring of white smoke as shown.

a Explain, in terms of the particles of the gases, why the gases meet.

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b Explain why the ring of white smoke forms nearer to the concentrated hydrochloric acid.

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c What is the name of the chemical formed when ammonia and hydrogen chloride react? Write the word equation and chemical equation for the reaction.

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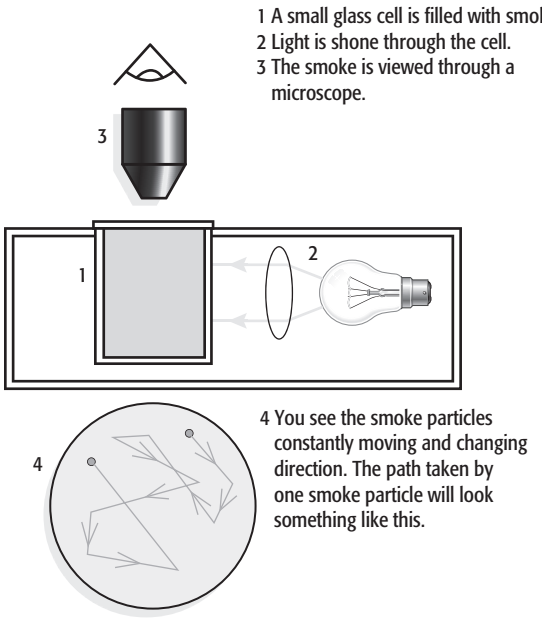
3 Some of the first evidence for the motion of particles in fluids came from the observations of Brownian motion. This can be observed using a smoke cell.



a Under the microscope, the smoke particles can be seen to move in a jerky way. Their movement is thought to be an effect of the unseen movement of other particles. Explain what is causing them to seem to change direction randomly.

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b What is the name given to the movement of particles from place to place in fluids?

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c What type of movement are the particles in a solid allowed?

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