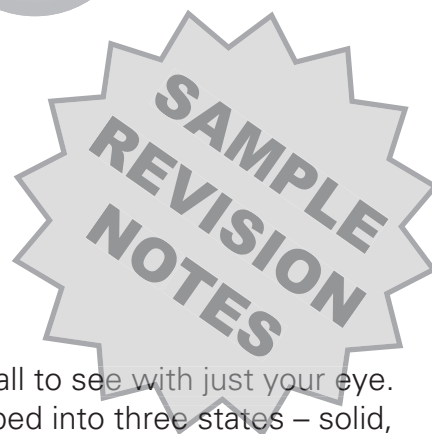
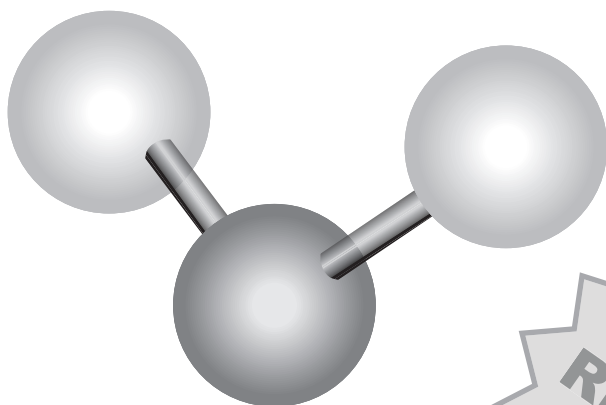


MATERIAL WORLD

CHEMISTRY

Unit 1 – Change of state



Solid, liquid and gas

Everything in the world is made of tiny atoms, too small to see with just your eye. Molecules are made up of atoms. Things can be grouped into three states – solid, liquid or gas. It all depends on how the atoms are put together.

- Solid – when the molecules are stuck so closely together that they can only move backwards and forwards a very little, this is a solid.
- Liquid – if the molecules move freely around quite a bit but are quite close together, it's a liquid.
- Gas – if the molecules have heaps of energy, are far apart and are free to move around a lot, it's a gas.


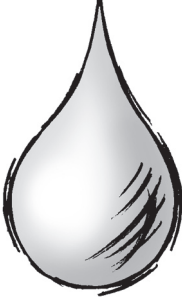

The state of a thing can be changed. Water can change into all three states – a liquid, a solid (ice) and a gas (water vapour). Light a candle and the solid wax melts into a liquid, and it also burns to make gases.



Grouping

Group these things into solid, liquid or gas. Write the words under the shapes.

pencil, milk, wax, air, popsicle, popcorn,
tomato sauce, rain, golden syrup, lava, oil

Solid	Liquid	Gas
 _____ _____ _____ _____	 _____ _____ _____ _____	 _____ _____ _____ _____

Experiments

Warning: Adult help is needed when you want to experiment with hot water.

Changing water

Water changes state as it is heated or cooled.



Experiment 1:

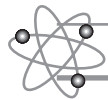
- Solid → liquid: Put a few ice cubes in a pot on the stove top. Slowly melt the ice cubes.
- Liquid → gas: Heat the water until it is boiling.
- Gas → liquid: Cool a plate in the fridge. Ask an adult to hold the plate over the pot of boiling water.

What happens to the water vapour above the boiling water when it hits the plate?

Friction arrow

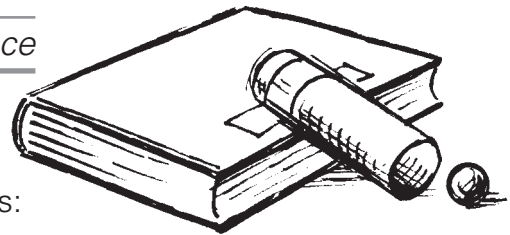


Experiments



Experiment 1: Friction and rolling distance

Test different surfaces for friction with a marble. Tape a cardboard tube (for example, a toilet roll) to a book so it's on a slope like this:



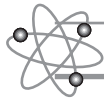
Place your tube on flat surfaces and let the marble roll down the tube. Try the carpet, lino, plastic, concrete, sandpaper, a wooden table, grass, or soil. Measure how far the marble rolls on each surface. Always start the marble from the top of the tube so it's a fair test.

Write your results here:

Surface	Distance rolled (cm)

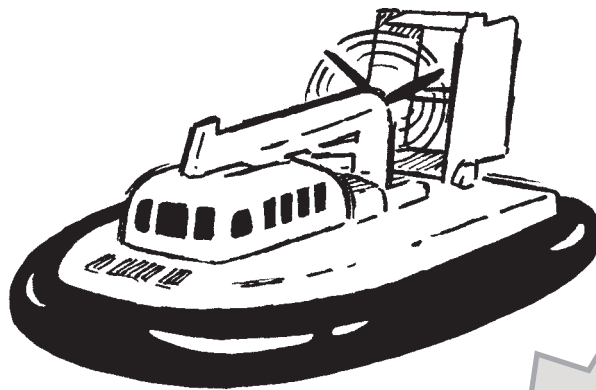
On which surface did the marble roll the longest distance? _____
This surface has the lowest friction.

On which surface did the marble roll the shortest distance? _____
This surface has the highest friction.



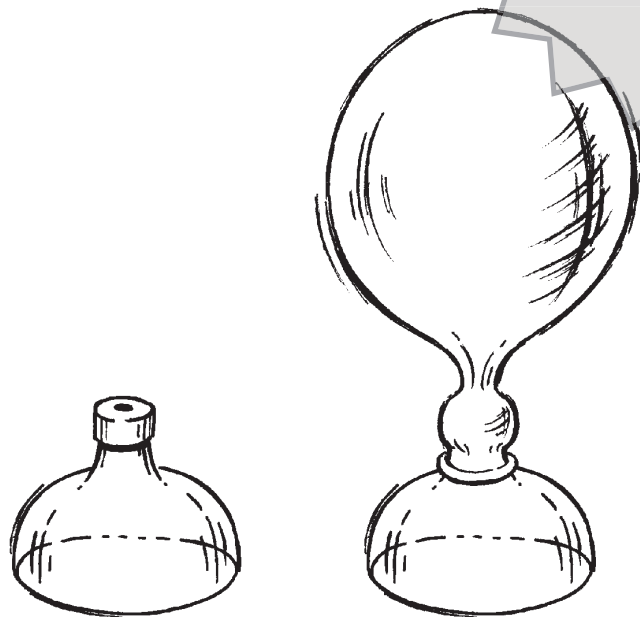
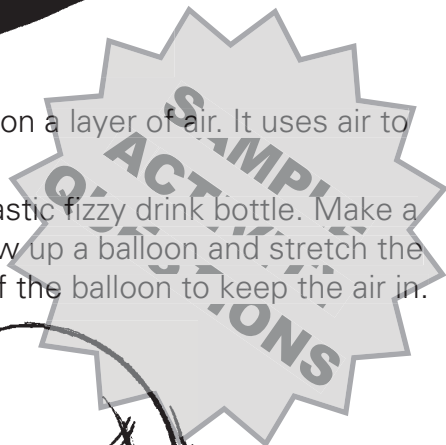
Experiment 2: Technology

Make a Hovercraft.



A hovercraft slides along over water or ground on a layer of air. It uses air to make less friction with the water or ground.

Ask an adult to neatly cut the top 6 cm off a plastic fizzy drink bottle. Make a small hole in the lid. Place it on a flat table. Blow up a balloon and stretch the mouth over the bottle top. Squeeze the neck of the balloon to keep the air in.



Release the neck of the balloon and give the hovercraft a small push.

ANSWERS

PLANET EARTH AND BEYOND

ASTRONOMY

Unit 1 – The planets

Planet quiz, p. 1

1. It is a galaxy.
2. Neptune.
3. Mercury, Venus, Mars.
4. Jupiter.
5. There may be life on planets beyond our solar system but there is no evidence for this.

Unit 2 – The Sun

1. The Sun is a yellow star.
2. The planets are held in orbit by gravity.
3. A year is the time taken for one orbit.
4. The Sun is made of burning gases.
5. The Sun gives the Earth light and heat.

GEOLOGY

Unit 3 – Mountains

Diagrams, p. 9

1. Dome.
2. Fold.
3. Block.

New Zealand mountain wordfind, p. 12

