

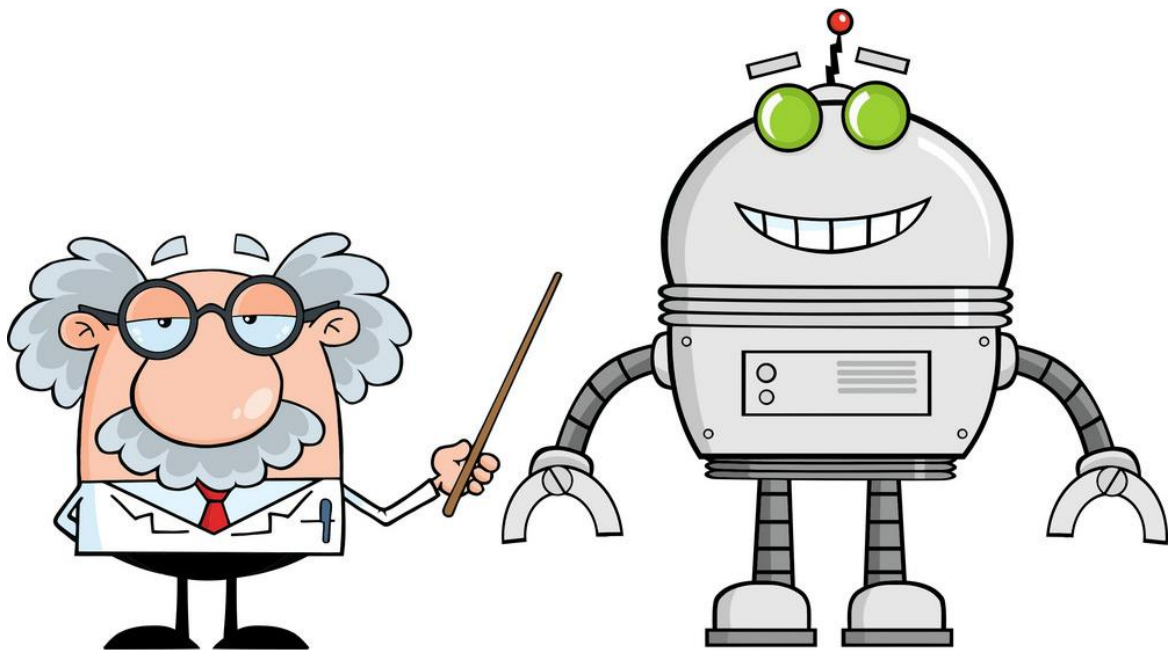


William Hulme's Grammar School

The best in everyone™

Part of United Learning

YEAR 6 TRANSITION WORKBOOK



Becoming a Scientist

(Student Booklet)

Name: _____

We are really looking forward to meeting you at WHGS in September. We hope you find the activities in this booklet interesting and hope they start to get you thinking like a scientist.

Health and Safety Problems in the Lab

Science Laboratories can be very dangerous places - if we aren't careful.

Circle the dangers on the diagram and write a list of hazards you can spot in this Science Lab.



Hazard Definitions

Match the hazard Symbol to its correct meaning

Symbol

Hazard



Oxidising

These substances burn easily.



Toxic

These substances contain Oxygen which is a gas that we need and supports burning.



Highly flammable

These substances cause death if swallowed, it is poisonous if breathed in or absorbed through the skin.



Irritant

These substances attack and destroy living tissue such as skin and eyes.



Corrosive

These substances are **NOT** corrosive, but does cause the skin to turn red or blister.

Human Body Quiz

1. What is the name of the biggest part of the human brain?
2. The coloured part of the human eye that controls how much light passes the pupil is called the?
3. What is the name of the substance that gives skin and hair its pigment?
4. What temperature is best to keep our body healthy?
5. True or false? The two chambers at the bottom of your heart are called ventricles.
6. What substance are nails made of?
7. What is the human body's biggest organ?
8. The innermost part of bones contains what?
9. True or false? An adult human body has over 500 bones
10. How many lungs does the human body have?
11. Another name for the voice box is called the?
12. The two holes in your nose are called?
13. Your tongue is home to special structures that allow you to experience tastes such as sour, sweet, bitter and salty, what is their name?
14. The bones that make up your spine are what?
15. The shape of DNA is known as?
16. The flow of blood through your heart and around the body is called?
17. The bones around your chest that protect organs such as the heart is called what?
18. What is the name of the long pipe that shifts food from the back of your throat down to your stomach?
19. True or False, your ears are important when it comes to staying balanced.
20. The outside layer of skin on the human body is called the?

Space Quiz

1. What is the closest planet to the Sun?
2. What is the name of the 2nd biggest planet in our solar system?
3. What is the hottest planet in our solar system?
4. What planet is famous for its big red spot on it?
5. What planet is famous for the beautiful rings that surround it?
6. Can humans breathe normally in space as they can on Earth?
7. Is the sun a star or a planet?
8. Who was the first person to walk on the moon?
9. What planet is known as the red planet?
10. What is the name of the force holding us to the Earth?
11. Have human beings ever set foot on Mars?
12. Can you name a place that uses telescopes/ scientific equipment to research space astronomy?
13. What is the name of NASA's most famous space telescope?
14. Earth is located in which galaxy?
15. What is the name of Saturn's largest moon?
16. Does the sun orbit the Earth?

HUMAN BODY QUIZ ANSWERS:

1. The cerebrum	2. Iris	3. Melanin	4. 37 degrees
5. True	6. Keratin	7. The skin	8. Bone marrow
9. False (there are 206)	10. 2	11. Larynx	12. Nostrils
13. Taste buds	14. Vertebrae	15. A double helix	16. Circulation
17. Ribs	18. The esophagus	19. True	20. Epidermis

SPACE QUIZ ANSWERS:

1. Mercury	2. Saturn	3. Venus	4. Jupiter
5. Saturn	6. No	7. A star	8. Neil Armstrong
9. Mars	10. Gravity	11. No	12. An observatory
13. Hubble Space Telescope	14. The Milky Way Galaxy	15. Sputnik	16. Yes

CHANGING STATES

SCIENCE
CHALLENGE

01

Designed by Charles,
Design engineer at Dyson

The brief

Make an egg fit into a bottle without breaking it.

The method

1. Submerge the egg in a glass of vinegar for two days: the shell will become rubbery.
2. Heat the bottle in hot water – remember to use gloves or a tea towel when handling it.
3. Rest the egg on the neck of the bottle.
4. As the air inside the bottle cools down, it will contract and suck the egg down.

Top tip

Try lubricating the egg with cooking oil or washing up liquid.

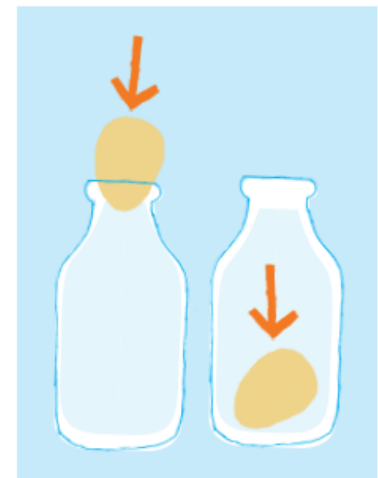
Materials

An uncooked egg

A pan of boiling water
(with adult supervision)

A glass of vinegar

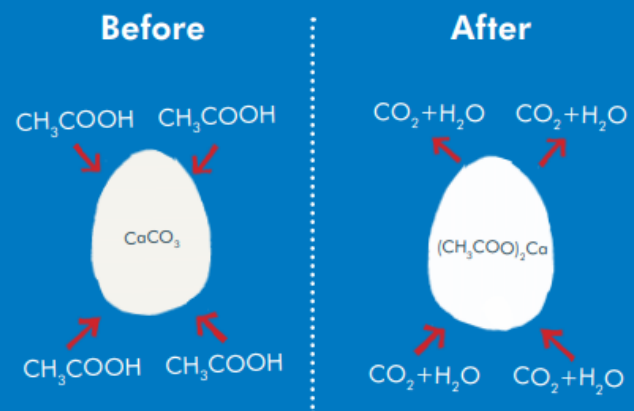
A wide-mouthed
glass bottle



How does it work?

Eggs are rich in protein. When heat is applied, chemical bonds within the protein molecules are broken, and new bonds are formed between adjacent molecules. This creates a network of inter-connected proteins which causes the egg to go hard.

Vinegar contains acetic acid (CH_3COOH) that dissolves the calcium carbonate (CaCO_3) shell but leaves behind the egg's springy membrane.



UNDERWATER VOLCANO

SCIENCE
CHALLENGE

02

Designed by Ian,
Design engineer at Dyson

The brief

Create a colourful underwater volcano.

The method

1. Cut a two foot length of string with a pair of scissors. Tie a knot around the neck of a salt shaker with one end of the string. Double-knot it to ensure the knot is secure. Repeat this process with the other end of the string, resulting in a handle to lower your shaker.
2. Empty and clean a large jar. Fill the clean jar about three quarters full with cold water.
3. Fill the salt shaker with hot water (with adult supervision) – as hot as you can get from your tap – to just below the neck. Add three to four drops of red food colouring.
4. Hold your salt shaker over the mouth of the jar by the string handle. Slowly lower the salt shaker into the jar until the shaker is completely submerged and resting upright on the bottom of the jar. Observe how the coloured water erupts from the shaker into the cold water.

Materials

String

Scissors

(with adult supervision)

An empty salt shaker

A large jar

Food colouring



How does it work?

This shows how convection currents work. A convection current is the way that heat rises and falls in liquids and gases.

Design icons

Hot air balloons use convection currents. As hot air rises, so too does the balloon.



LIQUID DENSITIES

SCIENCE CHALLENGE 05

Designed by Ben,
Design engineer at Dyson

The brief

Layer different liquids in a tube and discover how and why they settle in a certain order.

The method

1. Start by adding food colouring to the surgical spirit and to the water – using a different shade for each. This will allow you to identify each liquid.
2. Measure out equal quantities of each liquid. Add them to the tube, one by one.

Top tip

Try weighing each liquid before you add it and predict which order the liquids will settle in. The layers may be a little mixed at first. Allow them to settle for a moment and watch the layers start to define.

How does it work?

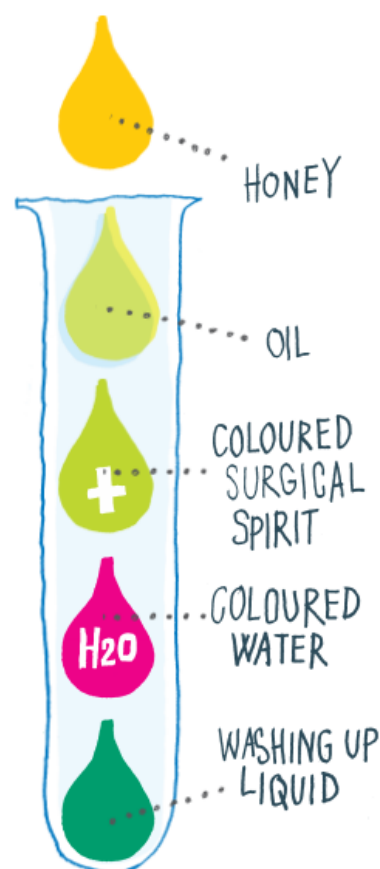
Different liquids have different densities and therefore, different weights. The heaviest liquids will sink, the lighter liquids will rise to the top. Density is a comparison between an object's mass and volume. Remember the equation:

$$\text{DENSITY} = \frac{\text{MASS}}{\text{VOLUME}}$$

Based on this, if the weight – or mass – of something increases but the volume stays the same, the density has to go up. Lighter liquids, like water, are less dense than heavy liquids, like honey, and so float on top of the more dense layers.

Materials

- A test tube
- Honey
- Oil
- Surgical spirit
- Water
- Washing up liquid
- Two shades of food colouring



EXPANDING GASES

SCIENCE
CHALLENGE

06

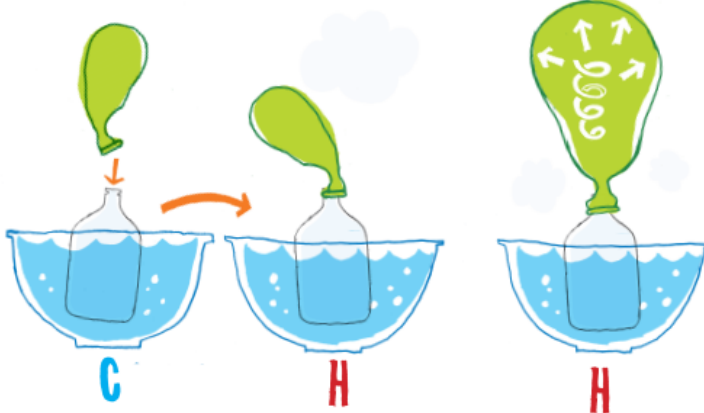
Designed by David,
Senior mechanical engineer
at Dyson

The brief

Find out what happens when gases are heated up or cooled down.

The method

1. Fill two bowls – one with cold water the other with hot water.
2. Put the bottle into cold water.
3. Fit a balloon to the neck of the bottle.
4. Now place the bottle into the hot water.
5. Watch the balloon expand.



Materials

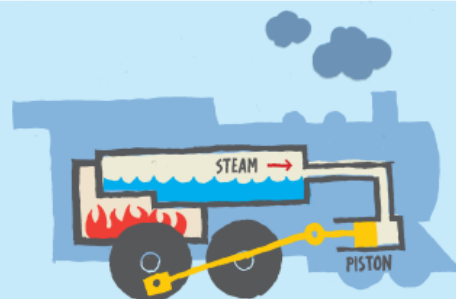
Two bowls
Cold water, hot water
(with adult supervision)
A sturdy plastic bottle
A balloon

How does it work?

Gas expands when it is heated. The rule is, if the pressure of a gas remains constant, the volume of the gas will increase as the temperature increases. So if the temperature increases, the gas takes up more space. This is known as Charles' Law. The principle was first formulated by the French physicist Jacques Alexandre Cesar Charles in 1787.

Design icons

Steam engines heat up air and allow it to expand in cylinders to drive wheels.



BRIGHT AS A NEW PENNY

SCIENCE
CHALLENGE

09

Designed by Roy,
Design engineer at Dyson

The brief

Clean a penny using cola.

The method

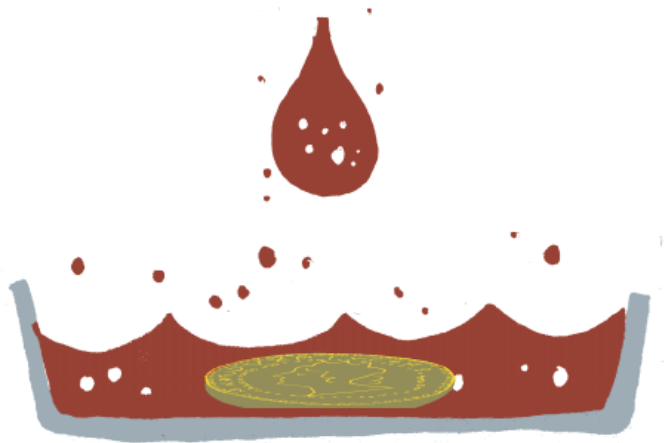
1. Place the penny in the container.
2. Add enough cola so the penny is covered.
3. Leave overnight.
4. In the morning, you should find that your penny is clean.

Materials

Shallow container

Cola

A penny – the older
and dirtier the better



How does it work?

Pennies have a copper coating. As the copper gets older, it reacts with the oxygen in the air and begins to form a copper-oxygen compound. This compound is what makes the penny look dull.

Meanwhile, cola contains phosphoric acid. This acid breaks down the copper-oxygen compound chemical bonds allowing a fresh, unoxidized layer of copper to be exposed.



Apparatus Word search

Try and find as many names of scientific apparatus as you can

<u>H</u>	<u>P</u>	<u>P</u>	<u>E</u>	<u>Q</u>	<u>R</u>	<u>W</u>	<u>U</u>	<u>T</u>	<u>W</u>	<u>K</u>	<u>K</u>	<u>E</u>	<u>D</u>	<u>J</u>
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<u>D</u>	<u>D</u>	<u>A</u>	<u>K</u>	<u>E</u>	<u>Z</u>	<u>Y</u>	<u>R</u>	<u>V</u>	<u>A</u>	<u>J</u>	<u>E</u>	<u>T</u>	<u>C</u>	<u>U</u>
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<u>Q</u>	<u>R</u>	<u>G</u>	<u>W</u>	<u>E</u>	<u>L</u>	<u>I</u>	<u>C</u>	<u>Y</u>	<u>U</u>	<u>A</u>	<u>C</u>	<u>O</u>	<u>S</u>	<u>D</u>
<u>S</u>	<u>Y</u>	<u>N</u>	<u>R</u>	<u>E</u>	<u>L</u>	<u>M</u>	<u>H</u>	<u>J</u>	<u>J</u>	<u>L</u>	<u>B</u>	<u>R</u>	<u>H</u>	<u>D</u>
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Measuring Volume

Scientists love to measure things and be as accurate as can be.

Measuring cylinders are used to measure volumes of liquid.

The units of volume are cubic centimetres (cm³), litres (L) and milli litres (ml.)

Everyday measuring

Measuring volume can be important, if you look at the pictures you can see the reasons why. Write out and finish the sentences below.



The nurse has to measure the volume of the injection carefully because...



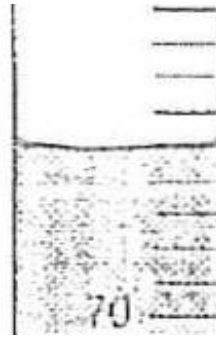
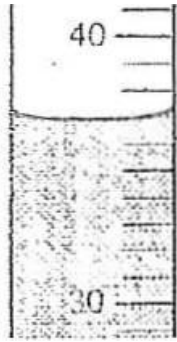
The volume is measured on a baby's bottle so that...



The petrol pump has a volume measuring it so that...

How to use a measuring cylinder...

Write the total volume for the liquids in each of these measuring cylinders. Think carefully about your units



Measuring Temperature

When you measure the temperature, you try to find out how hot or cold something is. Temperature is measured using a thermometer. The units are **degrees Celsius ($^{\circ}\text{C}$)** for short.

Activity (Reading/Writing)

Look at the pictures, in each case work out one reason why its important to measure the temperature. Finish off each sentence;



A doctor measures your temperature because..



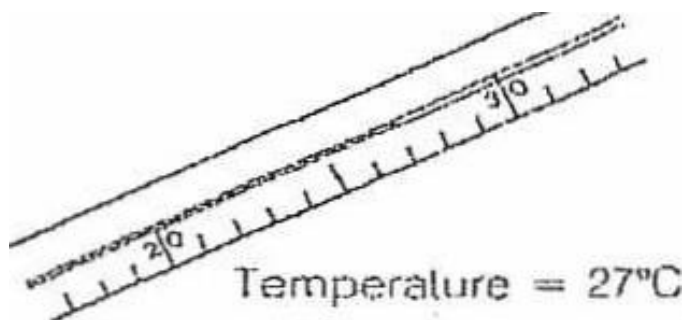
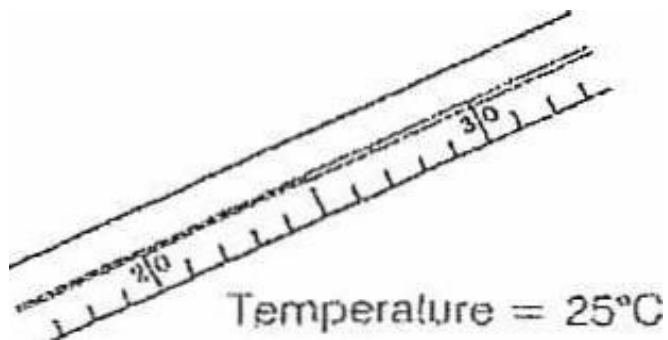
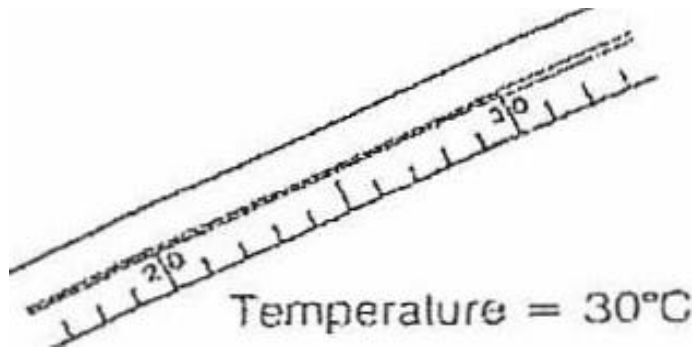
The gardener has to check the temperature of the greenhouse because...



Its a good idea to keep a thermometer inside a fridge freezer because...

A scientific thermometer

A thermometer is a fragile instrument - handle very carefully! Read the temperature scale and draw an arrow to show the correct temperature.

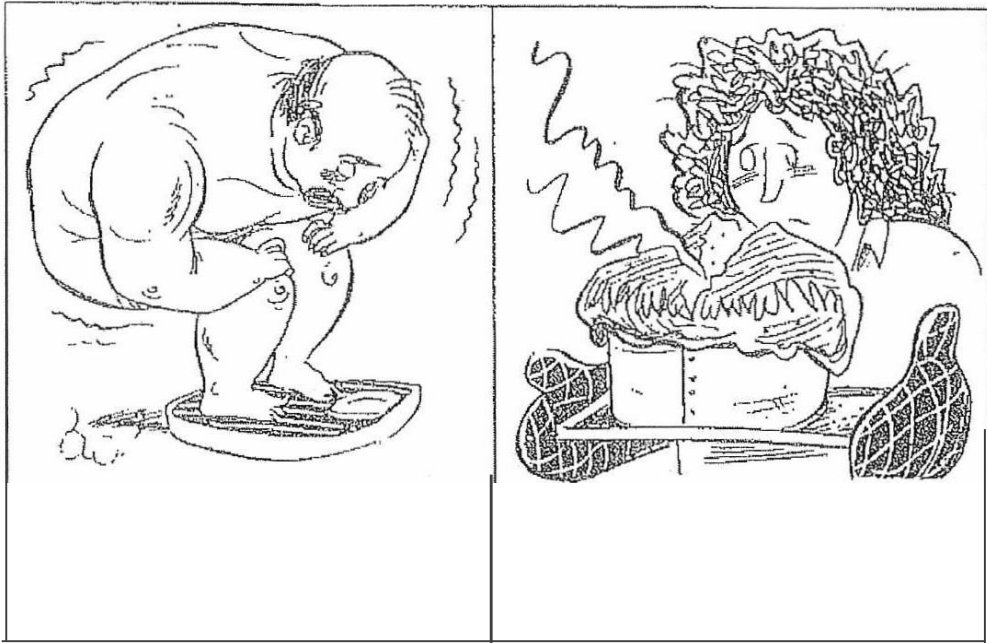


Measuring Mass

Balances and Scales are used to measure mass. The units of mass are **grams(g)** and **Kilograms (Kg)**

Everyday measuring (Reading/Writing)

Why do people measure mass? For lots of different reasons! Look at the pictures and then complete the sentences.



A man measures his weight every week because he is...

If you don't use scales when you are baking you might...