SCIENCE FUN AT HOME

Have some fun at home with these science activities from **Science Sparks** and the **Primary Science Teaching Trust**

BEFORE YOU START! Please read through this with an adult:

- Make sure you have read the 'IMPORTANT NOTICE' on the back of this page.
- If you have a space outside that you can use safely, then you can do the 'Try this outdoors' activity outside. Don't worry if not as you could still do it indoors.
- Talk to your adult about sharing the science you have done and if they want to share on social media, please tag **@ScienceSparks** and **@pstt_whyhow** and use **#ScienceFromHome**

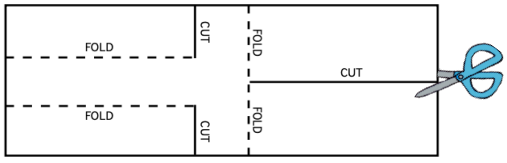
SPINNING SCIENCE

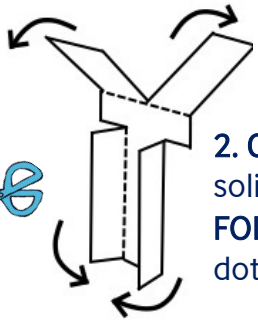
You will need

- paper
- paper clips
- Scissors
- different types of paper or card

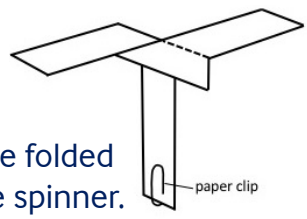
1 TRY THIS INDOORS .... MAKE A SPINNER

1. Cut out the spinner - you can download a template here.





2. CUT along the solid lines and **FOLD** along the dotted lines.



3. PAPER CLIP the three folded pieces of the tail of the spinner.

4. FOLD the two 'wings' of the spinner in opposite directions. Hold the spinner high up, let go and watch what happens!

5. MAKE more spinners .... you could make different sizes, use different types of paper, use more paper clips or change the length of the wings.

WHAT DO YOU NOTICE? Things to talk about ...

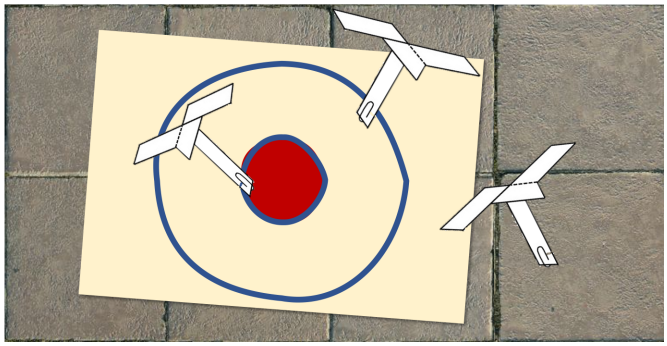
What happens when you let the spinner go? Can you slow the spinner down? How? What happens if you use different sorts of paper? Does tissue paper fall fast or slower than cardboard? What happens when you make the wings longer or shorter? What if you make a giant one? A tiny one?

2 TRY THIS OUTDOORS ....

Take your spinner outside. Make a target on the ground – you could do this by drawing a circle on a large sheet of paper, or you could use a big shallow bowl. Hold your spinner up and drop it, trying to get it to land on your target. Have ten goes and count how many times you hit the target. Try moving the target to a different place outside and see if your score increases or decreases.

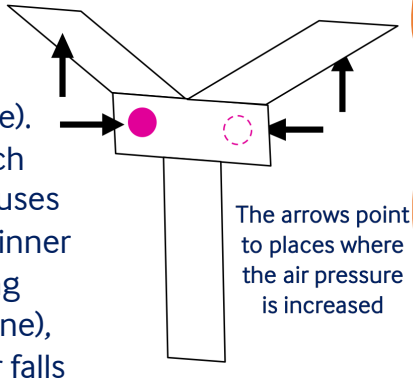
WHAT DO YOU NOTICE? Things to talk about ...

Where outside is it easiest to get the spinner to hit the target? Why do you think that is? What happens if you make the target bigger or smaller?



3 WHAT IS THE SCIENCE?

The paper spinner spins as it falls. When it starts its fall, the air pressure under the wings increases (air resistance). This causes an upward force underneath the wings which slows the spinner down. The increased pressure also causes a sideways push on the vertical part at the top of the spinner (where the pink dot is). The same thing will be happening diagonally opposite under the other wing (dotted pink line), which causes the spinner to spin. The faster the spinner falls the greater the sideways push, and so the more it spins.



The arrows point to places where the air pressure is increased

4 MORE ACTIVITIES YOU COULD TRY

MAKE A DIFFERENT KIND OF SPINNER! https://www.science-sparks.com/easy-paper-spinners/

MAKE A PARACHUTE AND FIND OUT MORE ABOUT AIR RESISTANCE
https://wowscience.co.uk/resource/bitz-and-bob-parachute/

HAVE A LOOK AT DR CHIP'S WONDER WEDNESDAY - PAPER HELICOPTERS
https://www.youtube.com/watch?v=RurbAsctWrk

TAKE A SCIENCE SELFIE! Maybe you could show other people what you have been doing?

IMPORTANT NOTICE: Science Sparks and The Primary Science Teaching Trust are not liable for the actions or activity of any person who uses the information in this resource or in any of the suggested further resources. Science Sparks and The Primary Science Teaching Trust assume no liability with regard to injuries or damage to property that may occur as a result of using the information and carrying out the practical activities contained in this resource or in any of the suggested further resources.

These activities are designed to be carried out by children working with a parent, guardian or other appropriate adult. The adult involved is fully responsible for ensuring that the activities are carried out safely.

ENGINEERING IN THE MOVIES

CHEMICAL ERUPTION

STEM

Science and Technology Focus

ROYAL ACADEMY OF ENGINEERING

Tomorrow's Engineers

Supported by

BAE SYSTEMS

INSPIRED WORK

INTRODUCTION

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Disaster movies are the favourite genre of many movie-goers. Such disasters include earthquakes, floods, asteroid collisions, shipwrecks and aeroplane crashes. The genre includes high-profile films such as DANTE'S PEAK (1997), VOLCANO (1997) and 2012 (2009), which all featured devastating volcano eruptions.

How do these eruptions happen? Complete this science and technology focused challenge to recreate the reaction of a volcano using baking soda (sodium bicarbonate) and vinegar (dilute acetic acid).

CHALLENGE

- Teams of three
- 60 minutes
- 2/3 KS2/3
- Apprentice

MATERIALS

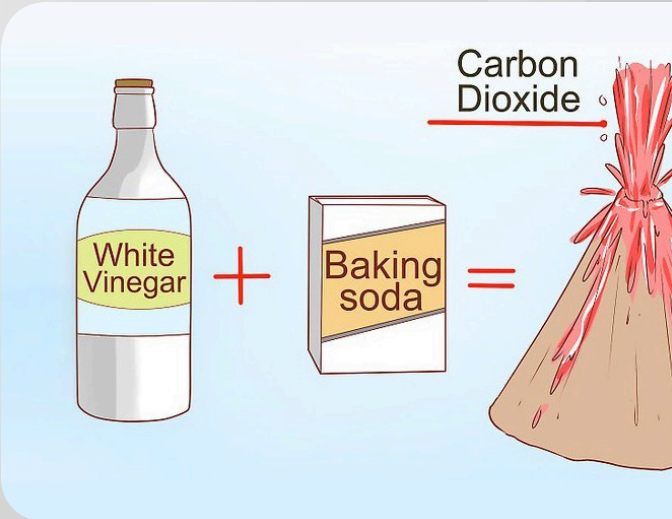
- Foam sheet
- Scissors
- Sticky tape
- Empty clear plastic bottles (x2)
- Vinegar
- Cooking oil
- Flour
- Salt
- Red food colouring
- Washing-up liquid
- Baking soda
- Plastic plate

OVERVIEW

The chemical eruption is a classic science project that can help you learn about chemical reactions and how volcanoes work.

$$NaHCO3(s) + CH3COOH(l) \longrightarrow CO2(g) + H2O(l) + Na+(aq) + CH3COO-(aq)$$

THE CHALLENGE



1. Make a cone shape using the foam sheet and sticky tape.
2. Mix six cups of flour, two cups of salt, four tablespoons of cooking oil and two cups of water in the plastic bottle. The resulting mixture should be smooth and firm (more water may be added if needed).
3. Fill the bottle almost to the top with warm water and a bit of red food colouring.
4. Add six drops of washing-up liquid to the bottle. This will trap the bubbles produced by the reaction so you get better lava.
5. Add two tablespoons of baking soda to the liquid.
6. Slowly pour vinegar into the bottle. Watch out – eruption time!

WHAT'S HAPPENING?

As the carbon dioxide gas is produced, pressure builds up inside the plastic bottle until the gas bubbles (thanks to the washing-up liquid) out of the volcano.

YOUTUBE GUIDE

www.thoughtco.com/baking-soda-volcano-science-fair-project-602202

EXTENSION

Can you think of ways to change the volcano to make the eruption higher or last longer?

This might involve changing the chemicals or the shape of the volcano. It helps to record numerical data, such as the volume of liquid, the height of the 'lava', or duration of the eruption.

QUESTIONS

What happens if you change the amount of baking soda or vinegar? Record and analyse the effect.

Does it affect your volcano if you use a different kind of chemical to colour the volcano? You could use powder paint or try using tonic water instead of regular water to get a volcano that glows under black light.

What happens if you substitute other acids instead of vinegar or other bases instead of baking soda? Examples of acids include lemon juice or ketchup. Examples of bases include laundry detergent and household ammonia. Use caution if you substitute chemicals because some mixtures can produce hazardous gasses. Don't experiment with bleach or bathroom cleaners.

NOW TRY MAKING YOUR OWN 'DARK ARTS' MAGIC POTIONS!

Entertainment Pictures / Alamy Stock Photo

Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

We have four strategic challenges:

Make the UK the leading nation for engineering innovation

Supporting the development of successful engineering innovation and businesses in the UK in order to create wealth, employment and benefit for the nation.

Address the engineering skills crisis

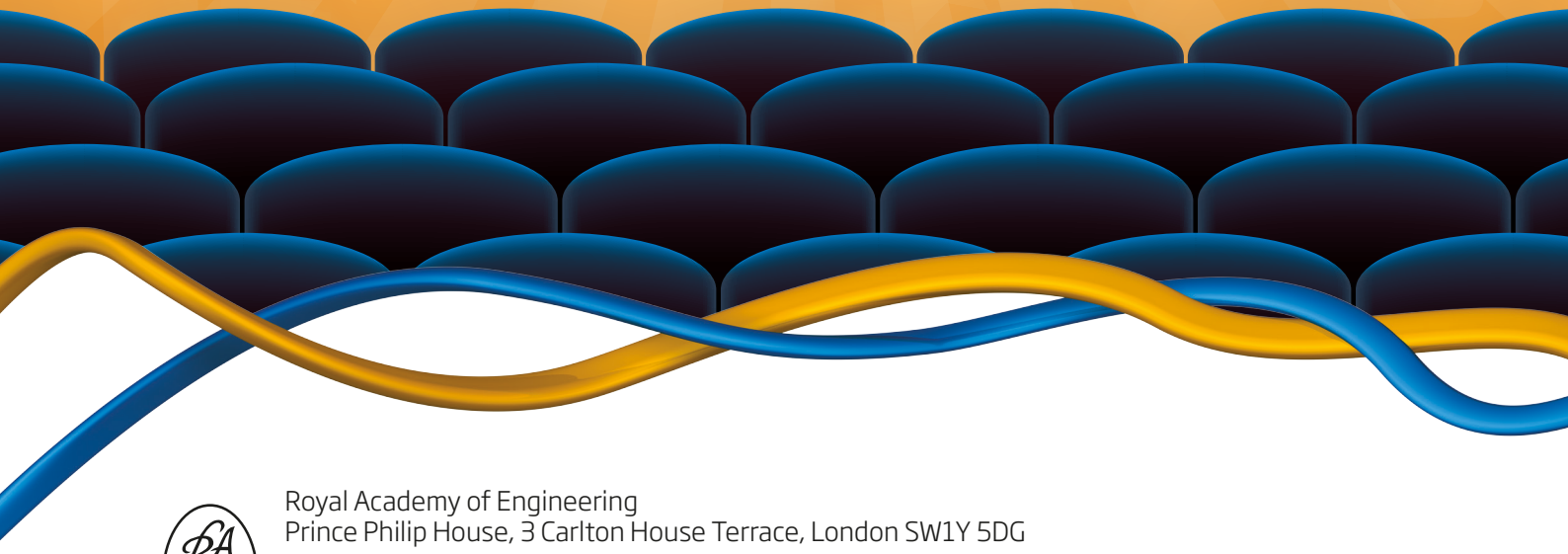
Meeting the UK's needs by inspiring a generation of young people from all backgrounds and equipping them with the high quality skills they need for a rewarding career in engineering.

Position engineering at the heart of society

Improving public awareness and recognition of the crucial role of engineers everywhere.

Lead the profession

Harnessing the expertise, energy and capacity of the profession to provide strategic direction for engineering and collaborate on solutions to engineering grand challenges.



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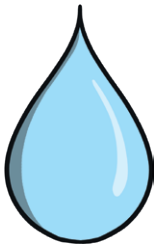
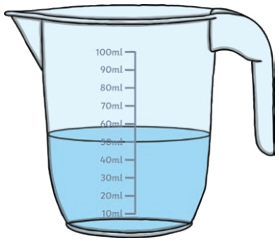
How to Make an Egg Float

Materials

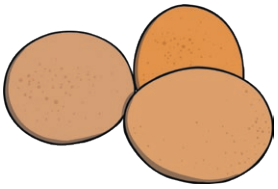


Water



Glass or Jug

Salt



Eggs

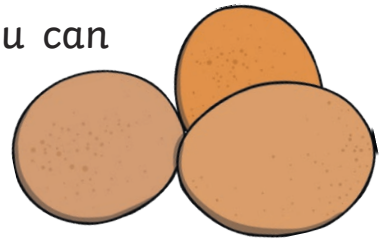
Instructions

1. Fill the bowl or glass about 2/3 full with tap water.
2. Drop the egg carefully into the bowl and observe it sinking to the bottom.
3. Remove the egg and add about 5 tablespoons of salt, test to see if your egg floats.
4. Add more salt if the egg still sinks.

The Science Bit

Objects sink in water when they are more dense than the water, by adding salt we make the water more dense, once the water is denser than the egg it floats.

You could also try other objects and see what else you can make float!



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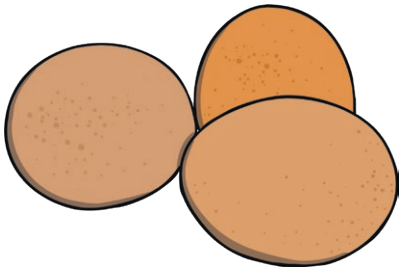
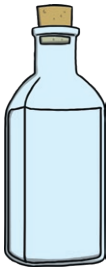
How to Make an Egg Bounce

Materials



Eggs



White Vinegar

Instructions

1. Fill a container with white vinegar, and carefully drop the egg inside. Make sure the egg is completely covered.
2. After a couple of days carefully rinse the egg, rubbing the shell gently.
3. Leave for another day in the vinegar if some shell remains and then rinse again.
4. Once the shell is removed carefully try to bounce the egg.
5. Drop carefully from quite a low height, the egg should bounce up from the surface.

The Science Bit

Investigation! Can you measure at what height it breaks? (maybe try this outside!) Or how high it can bounce on different surfaces?

Think about how you can show your results! Think about using a table or a graph!

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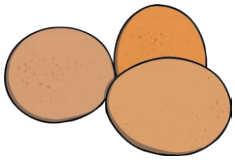
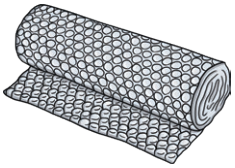
Fun with Rolling Eggs

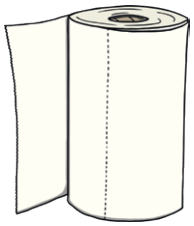
Materials



Eggs
(Hard boiled might be safest)



Bubble wrap



Kitchen roll

Stop Watch/ Timer

Ramp or Slide

Instructions

1. Decide on two markers on your ramp which you will use to time the amount of time the egg takes to travel down the ramp.
2. Place the egg at the top marker and let the egg roll down the ramp to the second marker stop the timer when it gets to the second marker and record the result
3. Repeat 3 times, make sure you record your result each time.
4. Wrap bubble wrap around your egg then repeat steps2 and 3.
5. Wrap kitchen roll around your egg then repeat steps2 and 3.

The Science Bit

Investigation! Can you think of any more materials to try? What do you think slows down or speeds up the egg? Does friction play a part? Did any of the eggs break? Which material protected the egg the best?

Can you make an parachute for the egg to protect it from a fall?

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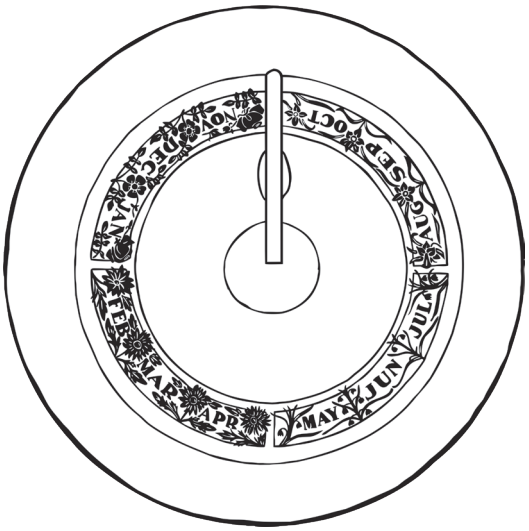
Sundial Activity

This experiment only works on a sunny day!

You will need:

- sundial gnomon
- white piece of card
- scissors
- sticky tape
- ruler
- black felt tip



What to do:

1. Cut the gnomon out.
2. Using sticky tape, stick the gnomon in the middle of the piece of card.
3. Put the sundial in a place that will be in the sun all day. A table or raised area works best as the sundial must not be moved all day.
4. On each hour of the day, use the ruler and pen to draw a line where the shadow falls. Mark the time of each line.

Use the words in the box to fill in the spaces.

revolve	24 hours	rotation

A sundial works because of the of the _____ earth. The earth rotates once every _____ Although it looks like the sun is moving, this is because of the earth's rotation. The sun doesn't rotate or _____ .

What time was the shadow of the sundial shortest? Why do you think this?

_____

_____

_____

_____

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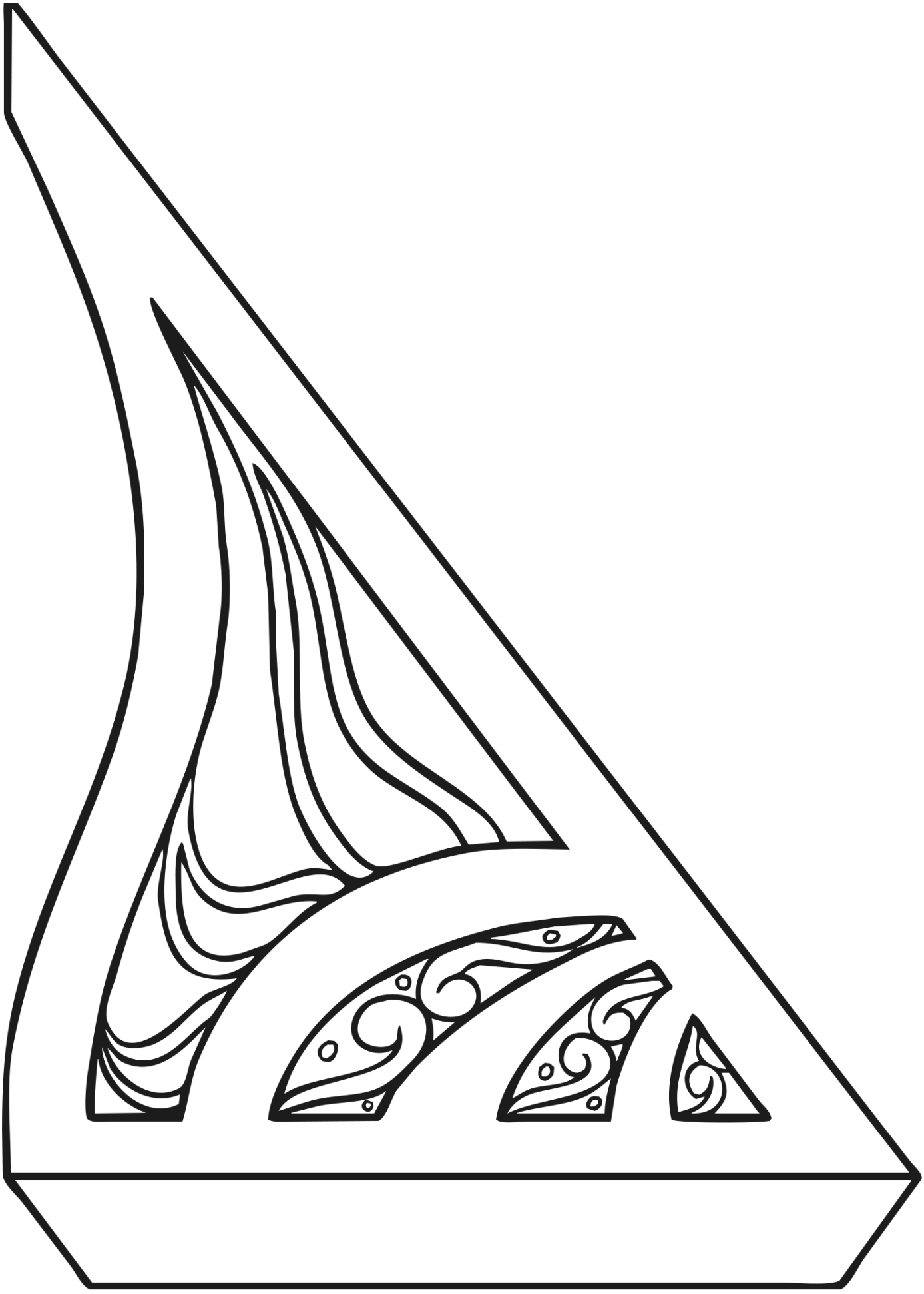

Sundial Activity - Answers

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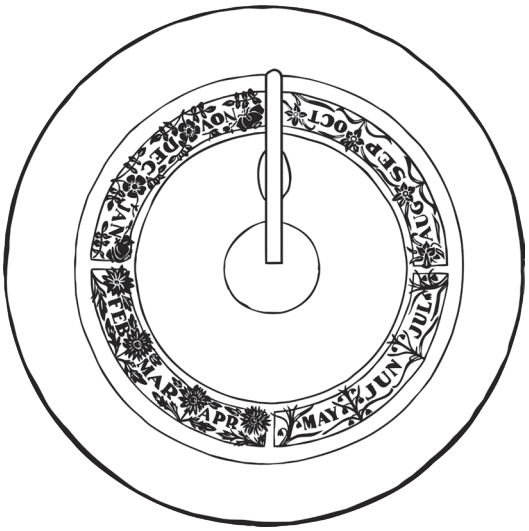

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Use the words in the box to fill in the spaces.

revolve	**24 hours**	**rotation**

A sundial works because of the **rotation** of the earth. The earth rotates once every **24 hours**. Although it looks like the sun is moving, this is because of the earth's rotation. The sun doesn't rotate or **revolve**.

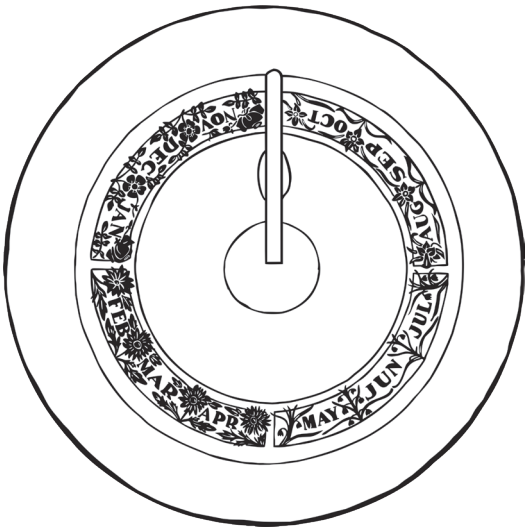
What time was the shadow of the sundial shortest? Why do you think this? **The shadow of the sundial was shortest at midday. Because of the rotation of the earth, the sun appears to be higher in the sky at midday so the shadows are shorter.**

Sundial Activity

This experiment only works on a sunny day!

You will need:

- sundial gnomon
- white piece of card
- scissors
- sticky tape
- ruler
- black felt tip



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4. On each hour of the day, use the ruler and pen to draw a line where the shadow falls.
   Mark the time of each line.

Fill in the gaps.

A sundial works because of the of the _____ earth. The earth rotates once every _____ Although it looks like the sun is moving, this is because of the earth's rotation. The sun doesn't rotate or _____ .

What time was the shadow of the sundial shortest? Why do you think this? What time do you think the shadows would be longest?

_____

_____

_____

_____

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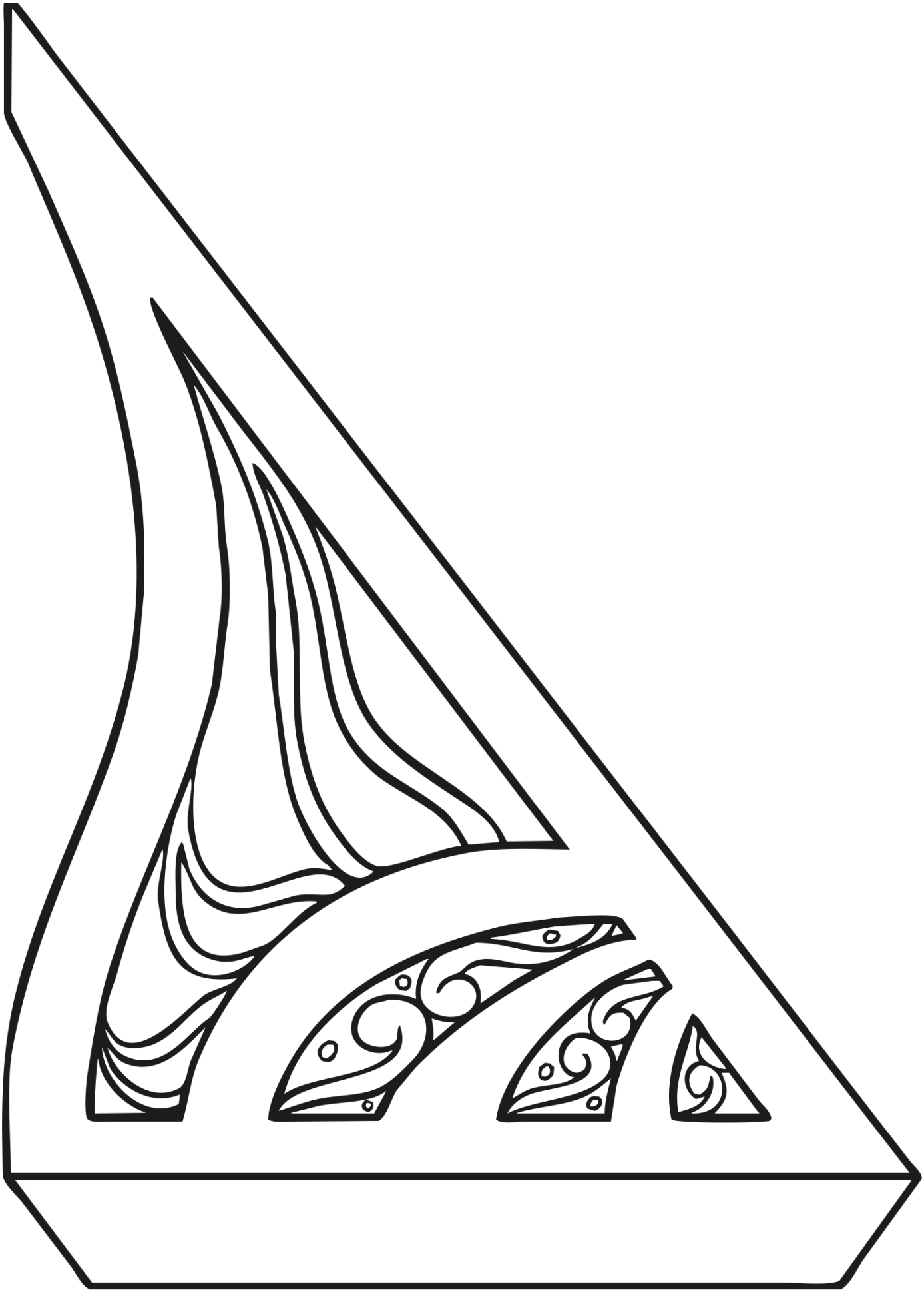

Sundial Activity - **Answers**

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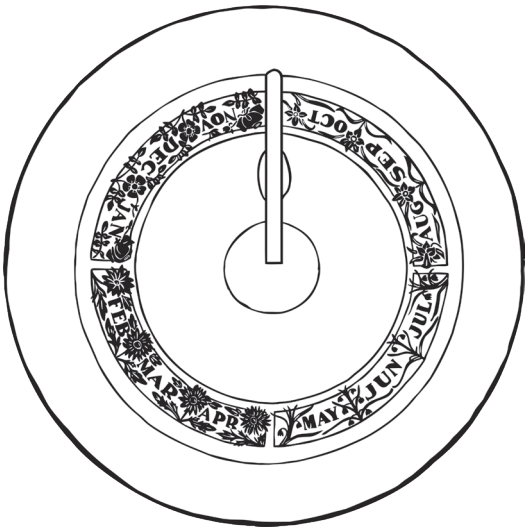

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Fill in the gaps.

A sundial works because of the **rotation** of the earth. The earth rotates once every **24 hours**. Although it looks like the sun is moving, this is because of the earth's rotation. The sun doesn't rotate or **revolve**.

What time was the shadow of the sundial shortest? Why do you think this?

What time do you think the shadows would be longest?

The shadow of the sundial was shortest at midday. Because of the rotation of the earth, the sun appears to be higher in the sky at midday so the shadows are shorter. The shadows would be longest at sunrise and sunset (these times will depend on the time of day).

Sundial Activity

This experiment only works on a sunny day!

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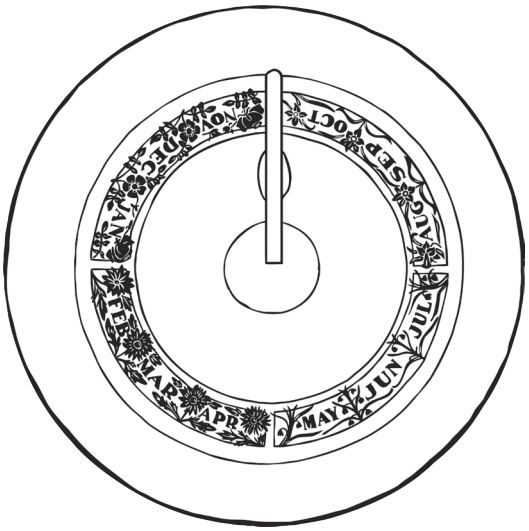

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4. On each hour of the day, use the ruler and pen to draw a line where the shadow falls. Mark the time of each line.

Explain how a sundial works. Use the words in the text box to help you.

rotation	sun	earth	shadow

What time was the shadow of the sundial shortest? Why do you think this?

In what direction does the sun rise and set?

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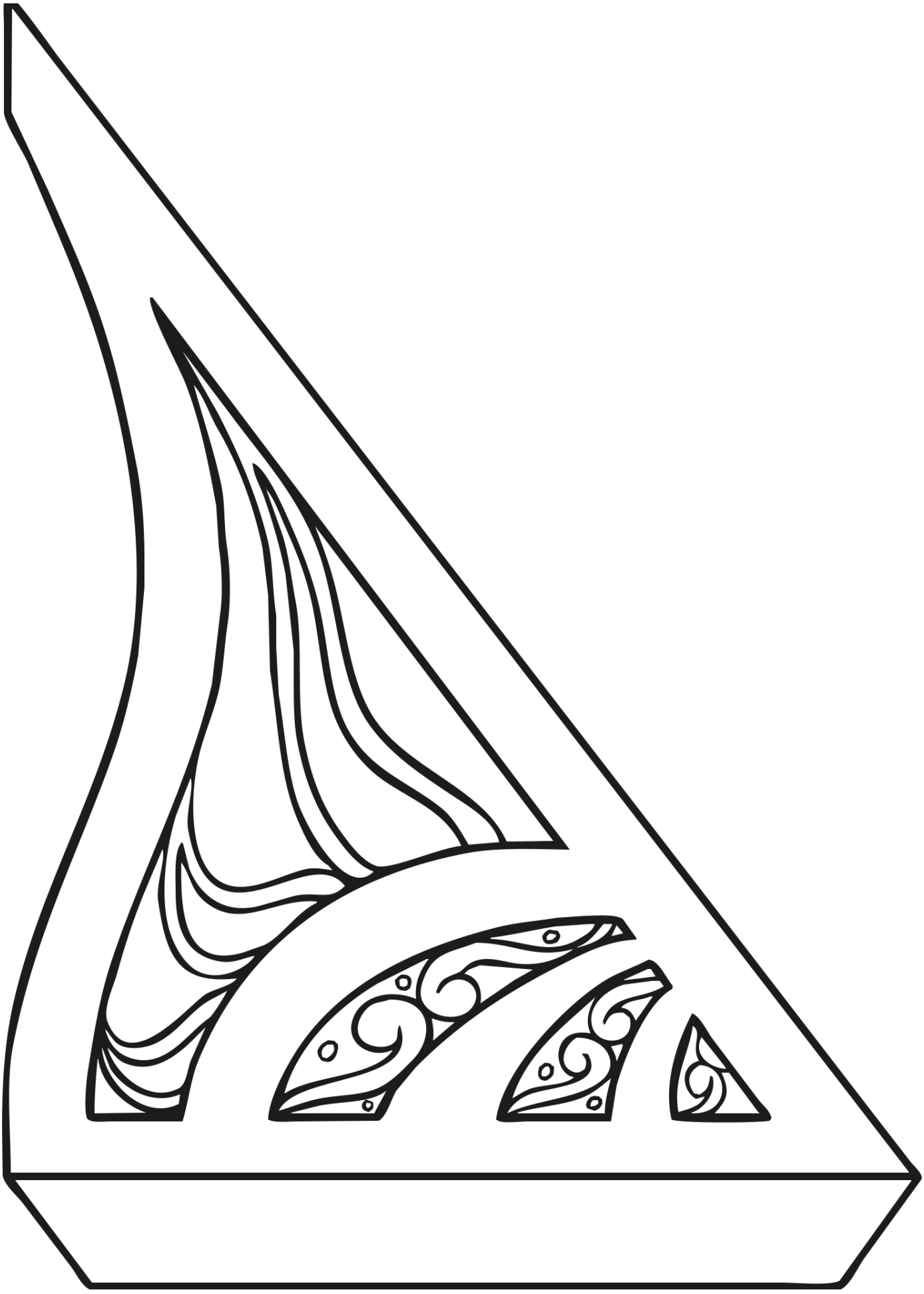

Sundial Activity - **Answers**

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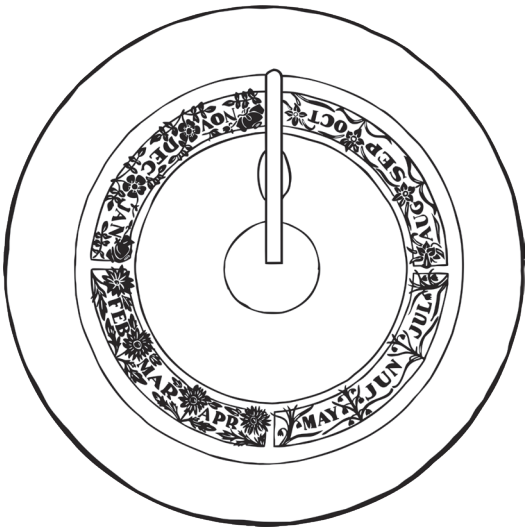

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Explain how a sundial works. Use the words in the text box to help you.

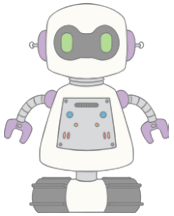
rotation	**sun**	**earth**	**shadow**

Example answer:

A sundial works because of the rotation of the earth. The earth rotates once every 24 hours. Although it looks like the sun is moving, this is because of the earth's rotation. The sun doesn't rotate or revolve.

What time was the shadow of the sundial shortest? Why do you think this? In what direction does the sun rise and set?

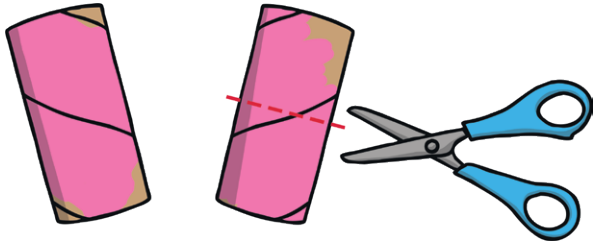
The shadow of the sundial was shortest at midday. Because of the rotation of the earth, the sun appears to be higher in the sky at midday so the shadows are shorter. The sun rises in the east and sets in the west.



STEM
Challenge Cards

Make the tallest tower you can which is capable of standing freely and not attached to anything.

Competition – Which is the tallest tower?



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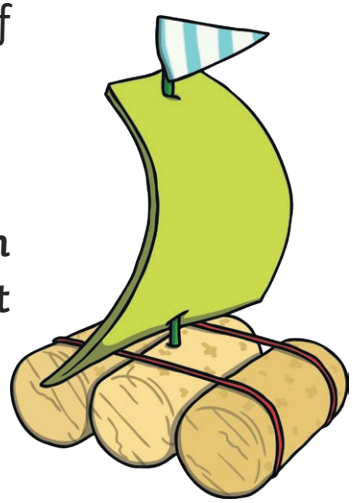
Make a boat which floats successfully in a tank of water and can carry a cargo of at least one penny.

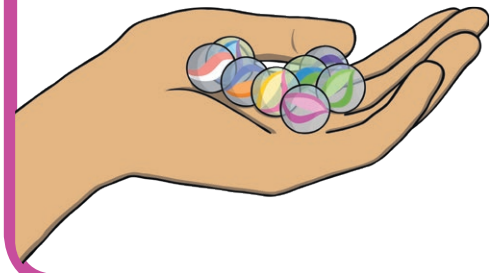
Competition – Which boat can carry the most pennies before it sinks?



twinkl.com

Make a marble roller coaster which brings a marble down from a start height of 1 metre without any drops of longer than 5 cm.

Competition - Which marble takes the longest to successfully descend 1 metre?



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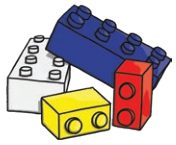
STEM Challenge Cards

Use the materials you have been given to make a creative sculpture. It can be abstract or a 'thing' – you decide!

Competition – Which sculpture would other learners pay most for? Hold a ballot.



twinkl.com

STEM Challenge Cards

Design and make an umbrella or any device to keep the user dry during a rain shower.

Competition – Which device would keep the user the driest? You can judge this by inspecting the quality of the materials and the seams (does any daylight show through?) or wait for it to rain and try them out for real!

twinkl.com

STEM Challenge Cards

Construct a zip wire or a similar thrill seeking experience for a chosen type of mini figure.

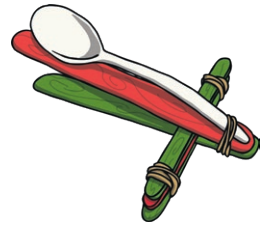
Competition – Which experience would have been the most thrilling for the mini-figure (i.e. the best compromise of excitement and safety)?

twinkl.com

STEM Challenge Cards

Create a catapult which can be used to fire a chosen projectile without the operator either touching the object or propelling it forward with their own power.

Competitions – Which catapult can launch the projectile the furthest? Which catapult is the most accurate when firing at a given target?



twinkl.com

STEM Challenge Cards

Construct a pair of glasses designed to fit the wearer safely and securely.

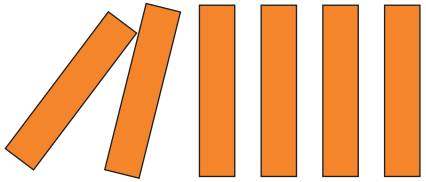
Competition – Which glasses stay on for the longest when worn by a test pilot performing a sequence of standing long jumps?

twinkl.com

STEM Challenge Cards

Set up a sequence of linked events so that an initial movement in your creation leads to another and then another.

Competition – Which sequence contains the most linked events?



twinkl.com

STEM Challenge Cards

Design and make a desktop organiser.

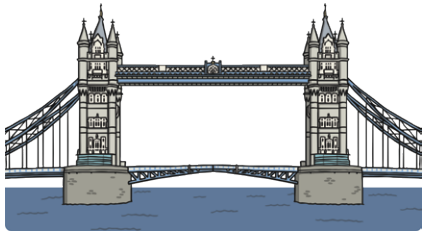
Competition – Which would consumers buy if all of the desktop organisers were the same price?

twinkl.com

STEM Challenge Cards

Design and make a bridge spanning a gap of 30cm which can hold as much weight as possible.

Competition – Which bridge can hold the most weight before it fails? (Use actual weights, books, blocks etc.)

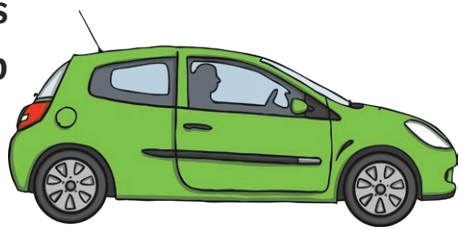


twinkl.com

STEM Challenge Cards

Design and make a wheeled vehicle which will travel independently from the top to the bottom of a slope angled at 30 degrees.

Competitions – Which vehicle travels the furthest? Which vehicle reaches the bottom of the ramp in the quickest time?



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STEM Challenge Cards

Make a structure which you can fit completely inside and are then hidden from the outside world.

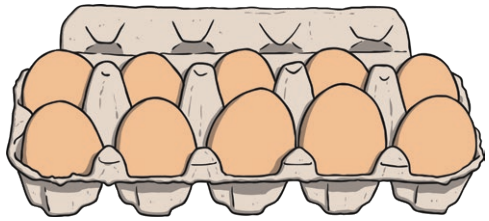
Competitions – Which structure covers most of a body? Who can get into their structure in the fastest time?

twinkl.com

STEM Challenge Cards

Make a safety container for a fresh egg to be dropped from 2 metres high in without breaking.

Competition – Which container can be dropped from the highest height without the egg breaking?



twinkl.com

STEM Challenge Cards

Make and design a device which can be used to tell whether or not an intruder has entered a room in an empty house.

Competition – When the designers of each device set up their equipment by a door, can they tell whether someone has entered or not?

twinkl.com

STEM Challenge Cards

Design and make a trophy which could be awarded to the winner of a STEM challenge.

Competition – Which trophy would other contestants be most delighted to win?

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ENGINEERING IN THE MOVIES

POP ROCKETS BLAST OFF

STEM

Science, Technology and Engineering Focus

ROYAL ACADEMY OF ENGINEERING

THIS IS ENGINEERING

INTRODUCTION

Science History Images / Alamy Stock Photo

APOLLO 13 (1995) is about the third Moon-landing mission. An onboard explosion deprives the rocket of most of its oxygen supply and electric power, forcing NASA to abort the Moon landing and turning the mission into a struggle to get the astronauts home safely.

The filmmakers went to great lengths to ensure that the depiction of the launch of the rocket was technically accurate. Watch the scene at **https://www.youtube.com/watch?v=lMtWWls4oas**

But how do you get a rocket to take off? This pop rocket challenge will show you how a chemical reaction occurs when you mix things together to make cool things happen.

OVERVIEW

Launch your own rocket into space by mixing acid and water to create gas.

When gas is in a small space, you get pressure. Pressure equals blast off!

CHALLENGE

- Teams of two
- 60 minutes
- 2/3 KS2/3
- Apprentice

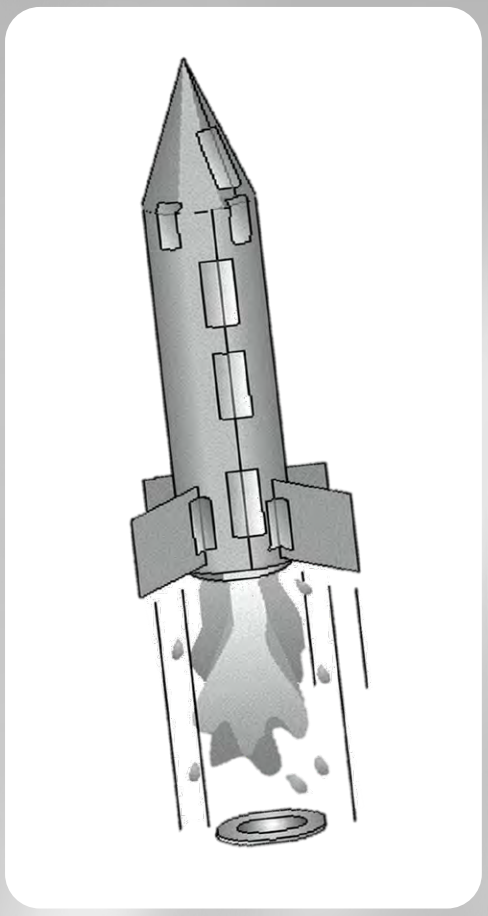
MATERIALS

- Sweet tube or empty glue stick container
- Antacid tablet
- Water
- Heavy paper/card
- Sticky tape
- Markers
- Scissors

AF archive / Alamy Stock Photo

THE CHALLENGE

1. Build a small rocket with a sweet tube or empty glue stick container at the centre. The lid should be at the bottom of the tube and easily accessible so that water and an antacid tablet can be added later.
2. You could stabilise the rocket by taping four pencils of the same length to the container to help it stand upright.
3. Take off the cover and put an antacid tablet into the tube. You must be a certain age to get this, so let your teacher provide the tablet for you. You may have to break it into pieces to get it all to fit in.
4. Add a teaspoon of water to the tube, snap on the cover and put the rocket lid down on the ground.
5. Watch what happens once the water dissolves the antacid tablet.



WHAT'S HAPPENING?

By mixing water and antacid, you are creating an acid-based chemical reaction that releases carbon dioxide gas.

The gas fills the tube and the air pressure builds to a point where it is too great to be contained. That's when the lid pops off and the rocket flies up into the air.

EXTENSION

Experiment by adding baking soda and vinegar to the tube.

It may help make the rocket fly higher, faster or even give time for a countdown.

Compare how the different rockets worked. Which one was better?

Substitute soda for water in the antacid rocket and see if it works differently.

YOUTUBE GUIDE

www.youtube.com/watch?v=AJLy5HHn3ok&t=1s

Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

We have four strategic challenges:

Make the UK the leading nation for engineering innovation

Supporting the development of successful engineering innovation and businesses in the UK in order to create wealth, employment and benefit for the nation.

Address the engineering skills crisis

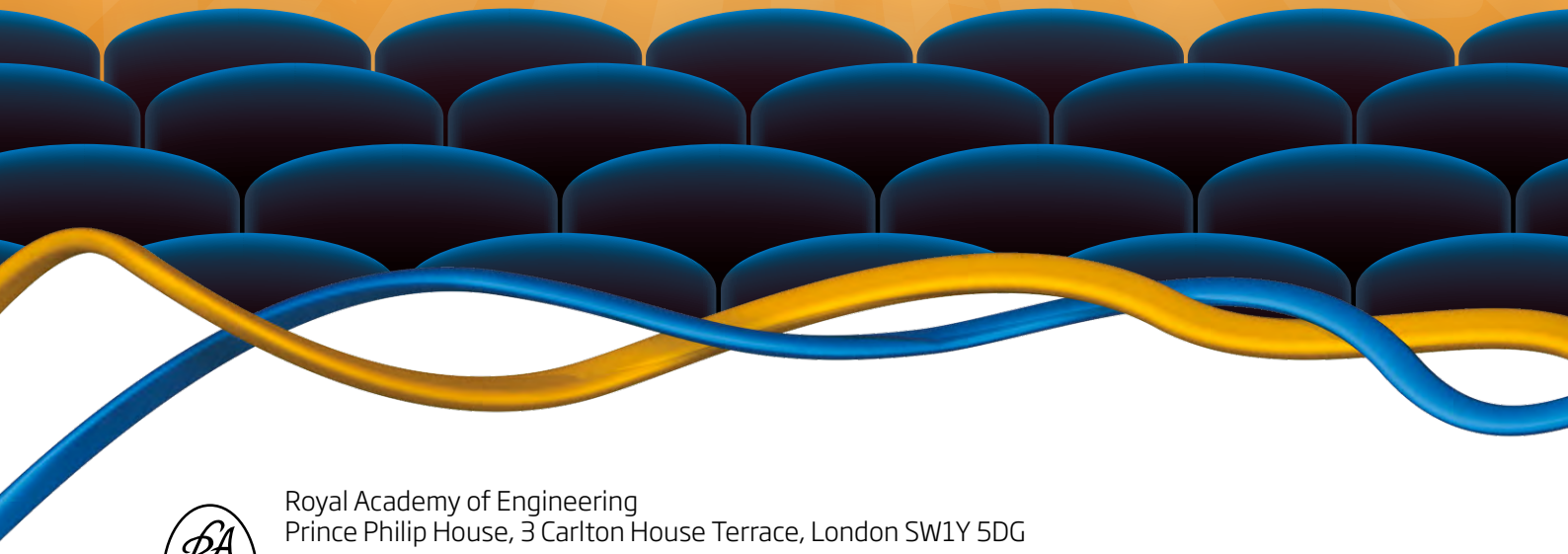
Meeting the UK's needs by inspiring a generation of young people from all backgrounds and equipping them with the high quality skills they need for a rewarding career in engineering.

Position engineering at the heart of society

Improving public awareness and recognition of the crucial role of engineers everywhere.

Lead the profession

Harnessing the expertise, energy and capacity of the profession to provide strategic direction for engineering and collaborate on solutions to engineering grand challenges.



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www.raeng.org.uk

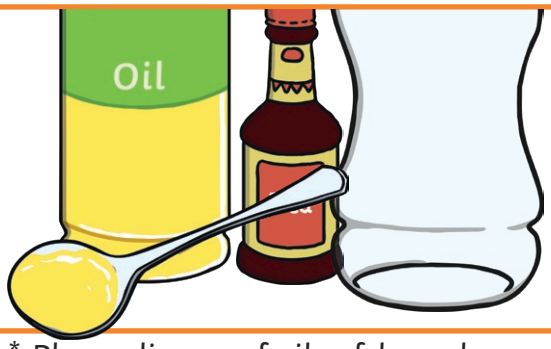
Registered charity number 293074

Cover images: Shutterstock.com/iStockPhoto.com

Lava Lamp

You Will Need

- Water
- Vegetable Oil*
- A Clear Plastic Bottle or Jar
- Food Colouring
- Effervescent Tablets



* Please dispose of oil safely and responsibly.

Method

1. Fill the bottle or jar a quarter full with water.
2. Top up, almost to the top with the vegetable oil
3. They should separate into two layers, water at the bottom and oil sitting on top.
4. Add about 6-8 drops of food colouring once the oil and water separate.
5. The colour will mix with the water at the bottom.
6. Pop in half an effervescent tablets and watch the bubbles form. Add more effervescent tablets bit by bit to keep the bubbles rising and falling.

The Science Bit

Firstly water and oil will not mix – this is because we say that water is a polar molecule – its structure means that is has a positive charge one end and a negative charge the other. Water molecules stick together because the positive end of one water molecule is attracted to the negative end of another. Oil molecule structure is different – it is non polar, meaning that its charge is more evenly spread out, so the oil is not attracted to water – in fact we call it hydrophobic (water fearing) so it tries to get as far away from water as possible and will not mix. The reason that oil rests on top of the water rather than underneath is because it has a different density to water.

As the effervescent tablets is added (this is made of citric acid and sodium bicarbonate) it reacts with the water and form carbon dioxide gas and sodium citrate. It is the carbon dioxide bubbles that carry the coloured water to the top.

SCIENCE FUN AT HOME

Have some fun at home with these science activities from **Science Sparks** and the **Primary Science Teaching Trust**

BEFORE YOU START! Please read through this with an adult:

- Make sure you have read the 'IMPORTANT NOTICE' on the back of this page.
- If you have a space outside that you can use safely, then you can do the 'Try this outdoors' activity outside. Don't worry if not as you could still do it indoors.
- Talk to your adult about sharing the science you have done and if they want to share on social media, please tag **@ScienceSparks** and **@pstt_whyhow** and use **#ScienceFromHome**

SCIENCE WITH ICE

You will need

- A container
- Small plastic toy
- Water
- Freezer (or ice compartment in the fridge)
- Salt
- Warm water
- Ice cubes

1 TRY THIS INDOORS .... ICE RESCUE

Place a small plastic toy or figure (Lego works well) into the container and fill to almost the top with water. Leave in a freezer or ice compartment in the fridge until the water is frozen. Remove the container and leave for 5-10 minutes until the ice loosens and then tip it out onto a plate or tray.

WHAT DO YOU NOTICE? Things to talk about ...

What happens when you pour a little bit of warm water onto the ice? What happens if you put salt onto the ice? What do you think would be the fastest way to rescue your toy from the ice? What could you do to find out? Are bigger toys easier to rescue from the ice than smaller toys?

2 TRY THIS OUTDOORS .... MELTING ICE

Freeze several small ice cubes or shapes of the same size. Put them in separate containers and choose different places to leave them. If you can go outside, you could put one in the shade, one in the sunshine and also leave one inside. You could also try making ice cubes out of different liquids like milk, vinegar or cooking oil.

WHAT DO YOU NOTICE? Things to talk about ...

Where does the ice cube melt the most quickly? Why might that be? Can you find the place where the ice cube will take the longest time to melt? Or the shortest time to melt? What happens with frozen cubes made from different liquids?

3 WHAT IS THE SCIENCE?

Water can be a solid, liquid or a gas. A liquid turns into a solid (freezes) when its temperature drops below its freezing point. For water this is at zero degrees Celsius. Ice melts when its temperature rises above its freezing point. Ice melts faster when salt is added as the salt makes the freezing point of the ice lower. Different liquids have different freezing points. Oil freezes at a lower temperature than water, so an 'ice cube' made of oil will melt faster than one made of water.

Did you know? Fresh ice feels sticky because it immediately freezes the moisture in your skin, making it feel sticky to touch.

4 MORE ACTIVITIES YOU COULD TRY

MAKE ICE CREAM IN A BAG! https://www.science-sparks.com/how-to-make-ice-cream-with-ice-and-salt/

WATCH A VIDEO ABOUT HOW PLANTS SURVIVE IN ICY CONDITIONS
https://wowscience.co.uk/resource/adaptation-of-plant-life-to-extreme-cold-temperatures/

FIND OUT ABOUT ICEBERGS AND WHAT HAPPENED TO THE TITANIC
http://www.nicurriculum.org.uk/docs/key_stages_1_and_2/areas_of_learning/the_world_around_us/activity5.pdf

TAKE A SCIENCE SELFIE! Maybe you could show other people what you have been doing?

IMPORTANT NOTICE: Science Sparks and The Primary Science Teaching Trust are not liable for the actions or activity of any person who uses the information in this resource or in any of the suggested further resources. Science Sparks and The Primary Science Teaching Trust assume no liability with regard to injuries or damage to property that may occur as a result of using the information and carrying out the practical activities contained in this resource or in any of the suggested further resources.

These activities are designed to be carried out by children working with a parent, guardian or other appropriate adult. The adult involved is fully responsible for ensuring that the activities are carried out safely.

How Do Polar Animals Stay Warm in Icy Water?

Science Experiment

You will need:

A bowl of icy water with ice cubes in

A selection of toy polar animals

Wool glove

Version 1:

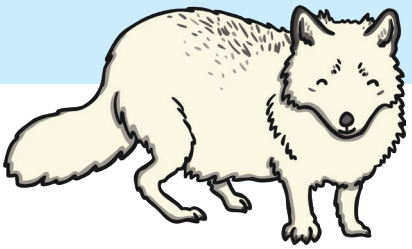
Vegetable oil

3 zipper storage bags

Version 2:

Latex/plastic glove

Lard



Method

1. Start off by talking about the toy animals you have and where they live. What is the weather like where they live? (Penguins live in the Antarctic in the South Pole, polar bears live in the Arctic in the North Pole.)
2. How do the children think the animals keep warm? Listen to the children's suggestions.
3. Show the children the bowl of icy water and let them feel how cold it is for themselves.
4. It is possible that one of the children may have suggested that the animals have thick fur coats to keep them warm, so let the children wear a woollen glove each.
5. Do the gloves keep the children warm?
   What happens when the ice starts to melt?
   The gloves get wet and hands start to get cold.
6. The explanation of fat keeping the animals warm can be demonstrated in 2 different ways:
   - Fill 2 zipper storage bags with vegetable oil and seal them. Then put those 2 bags inside another small bag and get the children to put their hand inside between the two bags of oil. They then put both hands in the bowl of ice to see the comparison in temperature.
   - Put a plastic glove on each child and then cover the glove in lard. Again, put both hands in the water and feel the difference in temperature
7. Conclusion - Polar animals stay warm when it's dry with their thick fur coats. When it's wet they have a layer of fat, called blubber, that insulates their bodies from the cold and even water.

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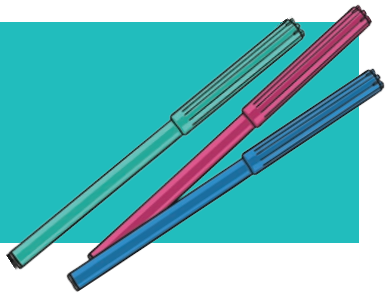
Colour in Felt-Tip Pens

Science Experiment



You will need:

5 different coloured felt-tip pens

Glass jar

Coffee filter paper

Method

1. Cut 5 strips of coffee filter paper.
2. Put a dot of felt-tip pen, about 4cm up from the bottom of the filter paper. Use a new strip of filter paper for each of the colours.
3. Pour a small amount of water into the jar (approximately 3cm deep).
4. Place the end with the dot on it into the jar so that it is just touching the water. Do not let the coloured dot touch the water.
5. Leave for a couple of minutes and then check. You should see colour starting to spread up the filter paper.
6. After 10 minutes, the water will have moved up the filter papers and left areas of different colours along the paper.

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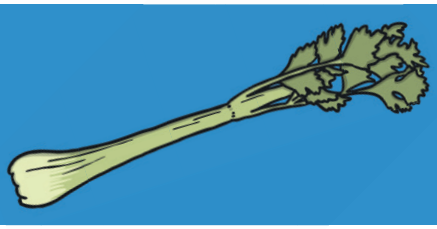
Coloured Celery

Science Experiment



Method

1. Pour some water into the glass.
2. Add a few drops of food colouring to the water and stir to distribute the colour.
3. Cut 2cm off the bottom of the celery stalk and put the stalk into the glass of coloured water.
4. Leave the glass and celery in a sunny spot for a couple of hours or overnight.
5. Observe the results.

You will need:

Celery stalk with leaves

Tall glass

Water

Food colouring

Scissors

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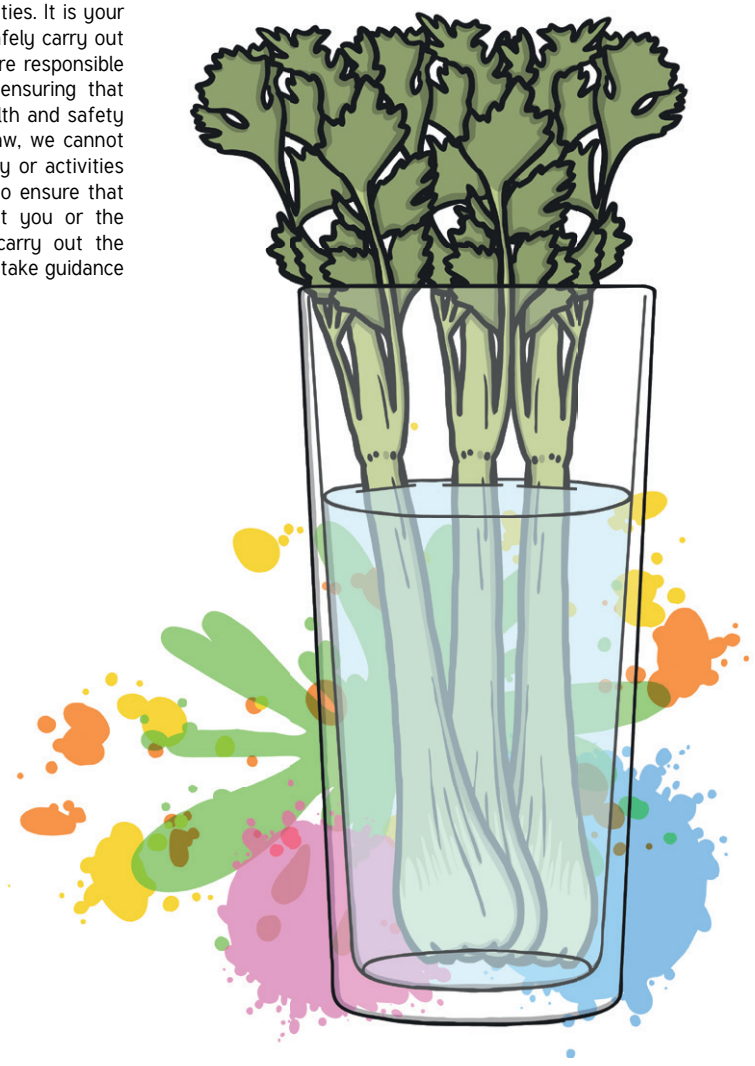
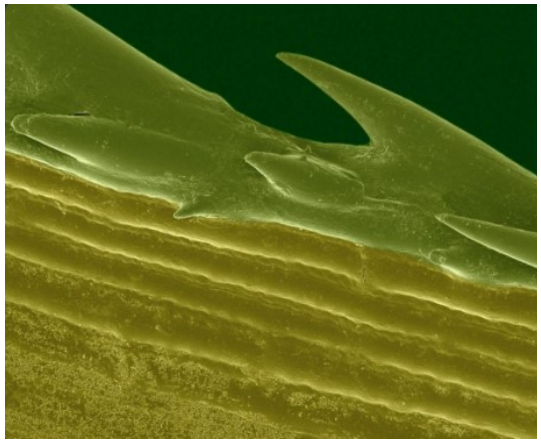
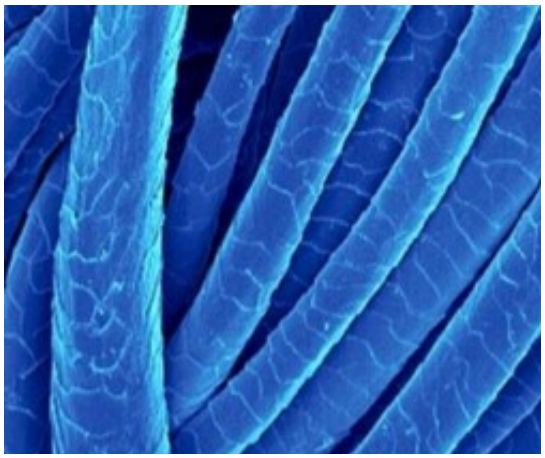







Under the Microscope!

Take a much closer look at this familiar object. Can you work out what the object is?

Don't forget to explain why you think it is that object!

- I think it is a … because…
- In my opinion…
- I believe that…
- I already know that … so …
- Based on… I think that…
- I agree/disagree with …

Explorify

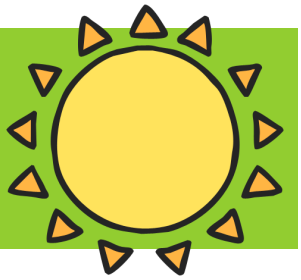
1. A blade of grass
2. A rugby boot
3. Running track
4. A shell
5. A bird
6. A woolly hat
7. An orange
8. A dog's nose
9. A daisy

Want to have a go at some more? Use the website: https://explorify.wellcome.ac.uk/

Explorify

Grow a Bean in a Bag

Science Experiment



Method

1. Wet the paper towel and put it inside the bag.
2. Put the bean on the paper towel and seal the bag.
3. Tape the bag to a sunny window.
4. The seed needs warmth to germinate and the sun should provide that. Plus the light will enable everyone to see the germinating seed better. It should take 3-5 days for the seed to germinate. Keep the paper towel moist, you may need to add a bit of water to it if it dries out. After 2 weeks, your bean can be planted in the soil or in a pot.

You will need:

A ziplock bag

Paper towels

Water

Bean seed

Sticky tape

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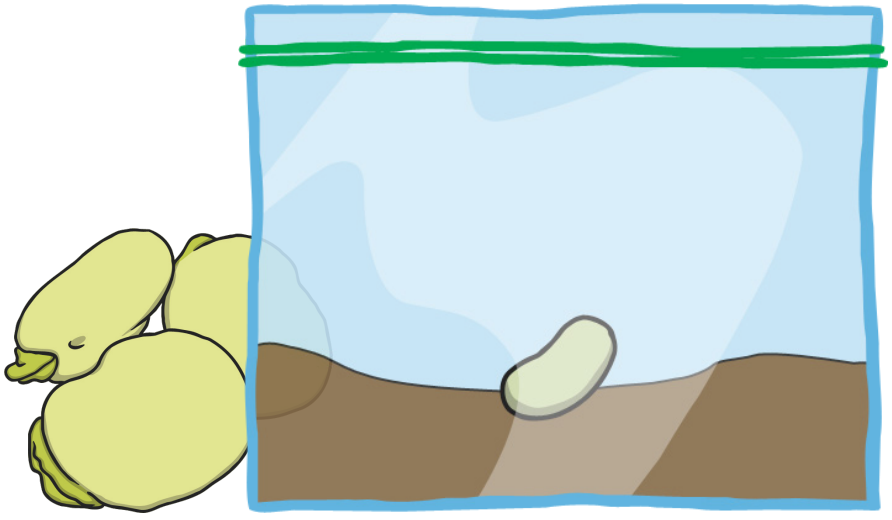
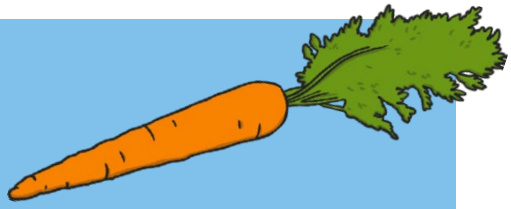


Regrowing Vegetables

Science Experiment



Method

1. Carrot - Place the top cut-off end of a carrot in a shallow bowl of water. The green leaves will shoot from the top. Keep inside and place in a sunny spot.
2. Celery - Cut off the bottom 8cm of the stalk and place in a small bowl of water. After 3 or 4 days it will start to grow from the centre of the celery. Keep inside and place in a sunny spot.
3. Lettuce - Cut off the bottom of the head of lettuce and place it in a small bowl of water. It will start to regrow in around 3 days. Keep inside and place in a sunny spot.
4. Spring Onion - Use the white part of the onion, with any roots still intact. Place in a glass with water and it will start to grow. Keep inside and place in a sunny spot.

You will need:

Water

Bowls

Carrot

Celery

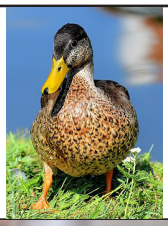
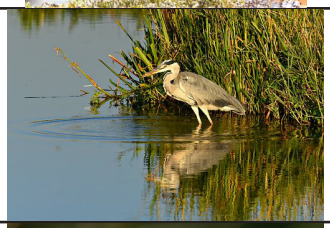
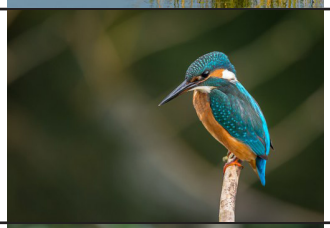
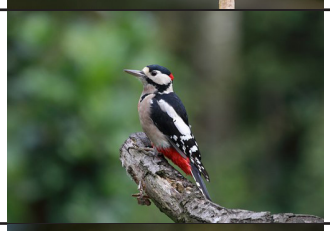
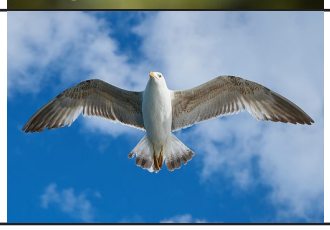
Romaine lettuce

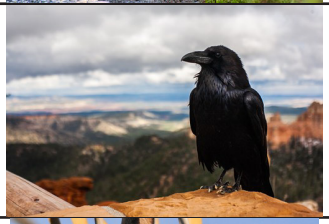
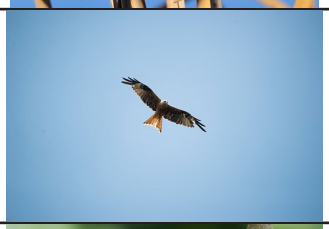
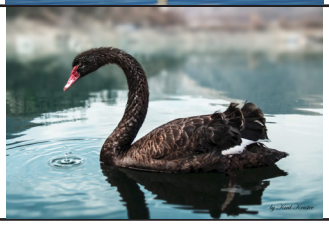
Spring onion

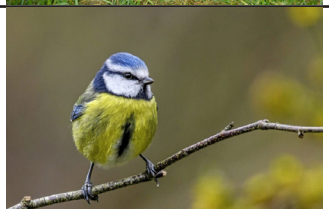
Scavenger Hunt - Birds

Discover the countryside of the United Kingdom.
The United Kingdom is home to many different types of birds.

This scavenger hunt has a general list of some of the common birds you might find in the United Kingdom. Give yourself 2 points for every bird you find and see how many points you can score. Good luck!

Item		Number I Have Found	Points
	duck		
	robin		
	heron		
	kingfisher		
	woodpecker		
	sparrow		
	seagull		

Item		Number I Have Found	Points
	pheasant		
	raven		
	wren		
	eagle		
	chaffinch		
	grouse		
	magpie		
	white swan		
	black swan		

Item		Number I Have Found	Points
	owl		
	peacock		
	goose		
	chicken		
	blue-tit		
	kestrel		

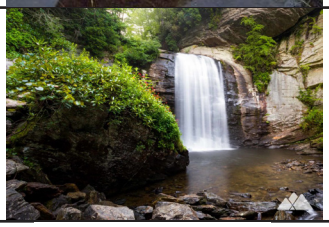
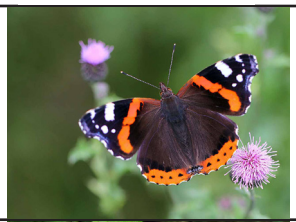
Which other types of birds did you spot?			
Item		**Number I Have Found**	**Points**

Scavenger Hunt

Discover the countryside of the United Kingdom. The United Kingdom is home to incredible beauty, with many forests and places to explore. This scavenger hunt has a general list of some of the things you might find in these wonderful places. Give yourself 2 points for each item you find and see how many points you can score. Good luck!

Item		Number I Have Found	Points
	squirrel		
	ant		
	spiderweb		
	toadstool		
	worm		
	caterpillar		

visit twinkl.com

Item		Number I Have Found	Points
	skeleton leaf		
	conker		
	acorn		
	willow tree		
	frog or toad		
	waterfall		
	feather		
	admiral butterfly		
	nettle		

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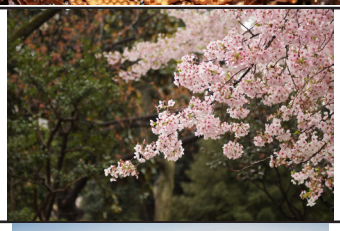
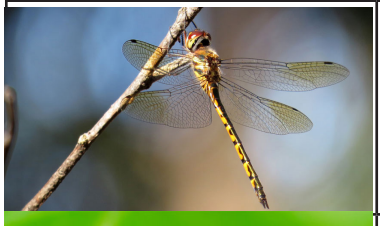
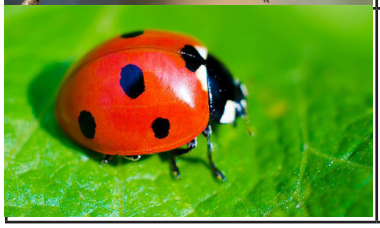
Item		Number I Have Found	Points
	tree stump		
	bee hive		
	cherry blossom tree		
	poppy		
	sycamore tree		
	woodlouse		
	oak tree		
	dragon fly		
	ladybird		

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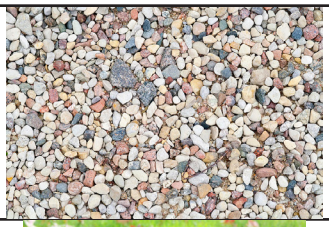
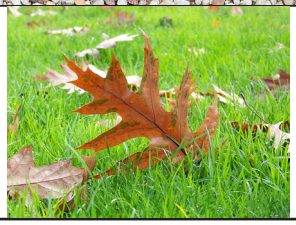
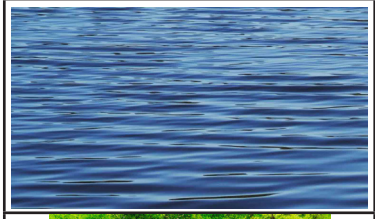
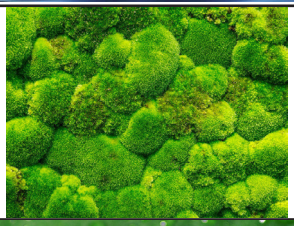
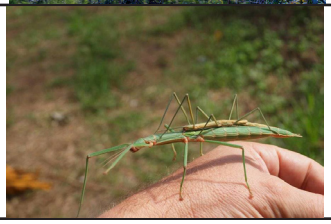
Item		Number I Have Found	Points
	small stones		
	leaf on the ground		
	water		
	moss		
	snail		
	hills		
	stick insect		
	mouse		
	tadpole		

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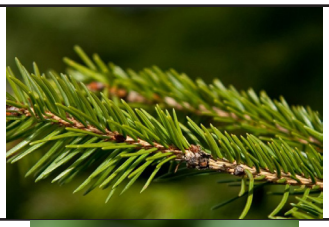
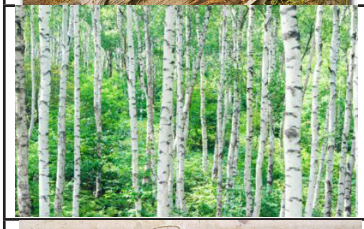
Item		Number I Have Found	Points
	pine needle		
	clover		
	berries		
	nest		
	ants carrying food		
	leaf eaten by insect		
	hollow tree trunk		
	birch trees		
	cocoon		

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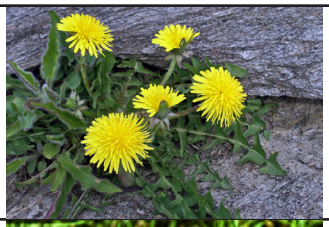
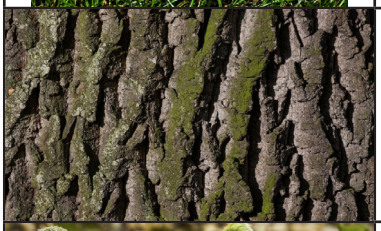
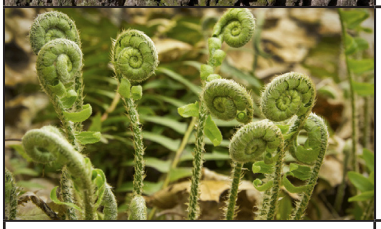
Item		Number I Have Found	Points
	dandelion		
	bird's egg shell		
	tree bark		
	fern fiddleheads		
	pine cone		

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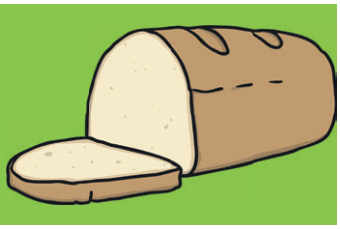
What Lives on Us?

Science Experiment



Method

1. Rub your hands over a slice of bread.
2. Put it in a plastic bag and label with your name and 'Unwashed'. Seal the back with sticky tape.
3. Wash your hands with soap and water.
4. Rub your hands on another slice of bread.
5. Put it in a plastic bag and label with your name and 'Washed'. Seal the back with sticky tape.
6. Keep both bags in a warm place. Check them daily, but **do not** open the bags.

You will need:

2 slices of bread per child

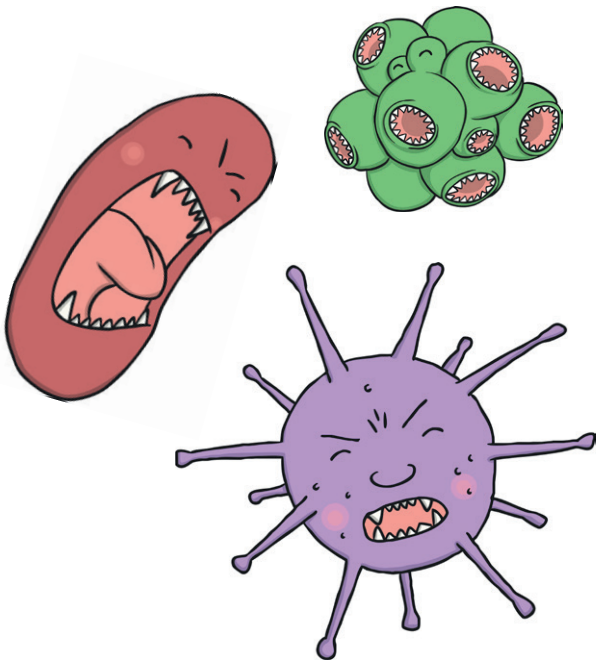
2 grip lock plastic bags per child

Soap

Sticky labels

Sticky tape

We hope you find the information on our website and resources useful. The activities set out in this resource are potentially hazardous. The activities are not suitable for all children and adult supervision may be required for some of the activities. It is your responsibility to assess whether the children in your care are able to safely carry out the activities and whether the children require adult supervision. You are responsible for carrying out proper risk assessments on the activities and for ensuring that activities can be carried out safely. We are not responsible for the health and safety of your group or environment so, insofar as it is possible under the law, we cannot accept liability for any loss suffered by anyone undertaking the activity or activities referred to or described in this resource. It is also your responsibility to ensure that those participating in the activity are fit enough to do so and that you or the organisation you are organising for has the relevant insurance to carry out the physical activity. If you are unsure in any way, we recommend that you take guidance from a suitably qualified professional.



Year 3 and Year 4 - Science Summer Revision Options

Rocks Y3

Have a look at a sample of soil at home or in the park.

- What can you find in the soil?
- What is soil made up from?
- Can you see any animals in the soil?
- Can you describe the rocks you can see? (hard/soft, shiny/dull, rough/smooth, durable)

Draw a diagram to show what soil is made from.

How does your sample differ from another soil sample?

Forces and Magnets Y3

Look around your house. Can you sort objects in to magnetic objects and non-magnetic objects?

- How do magnets work?
- What is a magnetic field?
- Can you give some examples of magnetic objects?
- Can you give some examples of non-magnetic objects?

Prove it: 'All metals are magnetic.'

Animals including Humans Y3

Animals and humans need different types and amounts of nutrition. Humans need a balanced diet to stay healthy, keep fit and fight illness.

Research different food groups (carbohydrates, fats, protein, vitamins, minerals, fibre and water) and how they keep us healthy. Can you design and create a balanced meal?

Animals including Humans Y3

The skeleton is the complete system of bones joined together. It protects vital organs, forms a framework to support the body (allows humans to stand up straight) and works together with our muscles to help humans move. Can you label the bones in the human body?

Can you measure your bones? How do our bones change as we grow older?

Plants Y3

Grow a plant at home.

- What does your plant need in order to grow?
- Can you label the roots, stem/trunk, leaves, flowers and petals?
- What is the function of each part of the plant? For example: 'Roots help anchor the plant and absorb nutrients from the soil.'

Can you create a growth diary and record how your plant grows?

Plants Y3

Grow seeds in cotton wool and observe how the seed germinates.

How does the amount of water, sunlight or air effect plant growth? Record your ideas. Explain what plants need in order to stay healthy and grow.

Light Y3

Explain what a shadow is and how it is formed. Explore patterns with shadows and how size of shadows change depending on the distance from the light source and time of day. Can you create shadow puppets?

Can you sort object into transparent, translucent or opaque?

Electricity Y4

Look at the objects around your house. Which objects are powered by electricity?

- Can you name different appliances and gadgets that use electricity?
- Which objects are powered by mains electricity?
- Which objects are powered by battery?

How can we stay safe when working with electricity?

Sound Y4

Explore how a range of musical instruments make sound.

- How is the sound made?
- How does the sound travel?
- Is it a high or low sound?
- Is it a loud or quiet sound?
- How can you change the volume or the pitch?

Can you design and create your own musical instrument?

Animals including Humans Y4

Teeth break food down into pieces, making it easy to swallow. The type of teeth an animal has depends on the food it eats. Create a poster to show how we can look after our teeth and the importance of keeping our teeth clean.

Look at different animals and their teeth. What does this tell us about their food and diet?

Animals including Humans Y4

Research different animals and the food they eat. Can you create a food chain you show how the energy passes between organisms within a habitat. The arrows on the food chain show the transfer of energy: grass – rabbit – fox.

Can you label herbivore, carnivore, omnivore, producer, consumer, predator and prey?

States of Matter Y4

Look at objects around your house. Can you group them into solids, liquids and gases?

What happens if you change the temperature (heating or cooling) of substances? Do they change state? Investigate with ice-cream, chocolate or butter.

Living things and their habitats Y4

Identify different animals and sort them into their habitats. For example: Fish, dolphins and sharks live in the ocean. Monkeys, parrots and snakes live in the rainforest.
Can you group animals depending on their habitat, environment and characterises?

Create a poster to show the characteristics of an animal or a habitat.

Living things and their habitats Y4

Environments can change due to natural changes and human changes. Natural changes such as the seasons changing, earthquakes, floods, fires, droughts can impact on environments and destroy habitats. How humans live and what they do can impact on habitats. They can impact positively (protecting endangered animals, cleaning bodies of water and recycling) and negatively (pollution, deforestation and littering.)

Research one of this aspects and create a poster or informative leaflet about it.

Why not have a go at some of the experiments on the school website?

Year 5 and Year 6— Science Summer Revision Options

Living things and their habitats Y5

A lifecycle is the stages a living thing goes through in its life from the beginning of its life until its death. Animals go through lots of different changes during their life. Animals are small when they start life and over time they grow bigger and their bodies change. When they reach adulthood, they might reproduce and have offspring of their own. Research the different lifecycle of a human, a butterfly and a frog.

- What is the same?
- What is different?

Don't forget to present your findings and label each life stage.

Living things and their habitats Y5

Explore and report on the findings of Jane Goodall and David Attenborough.

- Jane Goodall showed that chimps have individual personalities and experience emotions when she was the first human to be accepted into a chimpanzee community.
- David Attenborough is famous for his commitment to the natural environment and has spent years studying animals and living things.

Can you create a report or a leaflet about their works?

Earth and Space Y5

Can you create a model of the solar system?

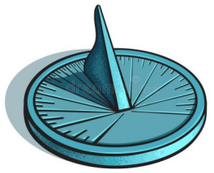
Don't forget!

- There are eight planets; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- The sun at the centre of the solar system.
- The planets orbit the sun.
- A moon is a huge lump of rock that orbits a planet.

Earth and Space Y5

Make a sundial and observe how shadows change throughout the day. How does a sundial work?

http://www.bbc.co.uk/norfolk/kids/summer_activities/make_sundial.shtml



Properties and changes of materials

Materials can have many different uses depending on their properties. Properties can include: the hardness or transparency of a material; whether it is a conductor or insulator of heat or electricity or whether it is attracted to magnets. Different materials are more suitable for different purposes based on their properties.

Which materials would be the most effective for making a warm jacket? Or for wrapping ice cream to stop it melting? Or for making blackout curtains?'

Explain your ideas.

Forces Y5

Mechanisms are something that makes work or a task easier to do, They allow a smaller force to have a greater effect.

- A lever is anything rigid moved around a fixed point called a fulcrum or pivot.
- A pulley is a rope around a wheel, used for lifting things. An object is fixed to one end of the rope, and the other end is pulled. As the rope turns the wheel, the object is lifted up.
- Gears are two or more toothed wheels, called cogs, which fit into each other and turn one another.

Can you design and make a product that use levers, pulleys or gears?

Animals including humans Y6

A lifecycle is the stages a living thing goes through in its life from the beginning of its life until its death. Gestation is the process or period of time between fertilisation and birth. The amount of time varies between different animals.

Research the gestation periods of different animals. Compare the gestation periods of different animals and humans.

Light Y6

Investigate the relationship between light sources, objects and shadows by using shadow puppets.

- How is a shadow formed?
- Is a shadow the same shape as the object that casts it?
- Does the size of the shadow change when the distance from the light source changes?

Electricity Y6

Have a go at designing your own set of traffic lights, a burglar alarm or some other useful circuit.

Draw out your design, including your circuit and components. Don't forget to use the correct symbols.

- How are you going to make the bulbs brighter?
- How are you going to make the buzzer louder?
- Are you going to use a switch?

Why is it important that we work safely with electricity? How can we work safely?

Evolution and Inheritance Y6

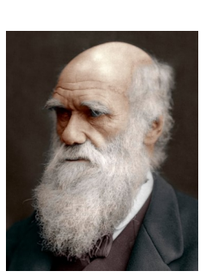
Adaptation is the process by which animals, plants and other living things have changed so that they better suit their habitat. For example, polar bears have developed thick fur and a layer of fat to keep out the cold of their Artic habitat.

Research an animal of your choice and describe their habitat and characteristics. Discuss how they are adapted to survive in extreme conditions. For example, cactuses, penguins and camels.

Research the dodo bird. Can you explain why they are extinct?

Evolution and Inheritance Y6

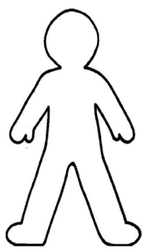
Explore and report on the findings of Charles Darwin, Alfred Wallace and Mary Anning.



Animals including humans Y6

Diet, exercise, drugs and lifestyle impact on the way bodies function. Explore how these features can impact on the body.

How does diet, exercise, drugs and lifestyle effect our health?



Living things and their habitats Y6

Living things can be sorted, or classified according to where they live, what type of organism they are and what features or characteristics they have.

Explore different animals and use a classification key to identify their habitat and characteristics.

Living things and their habitats Y6

Research an unfamiliar animal.

- What characteristics do they have?
- What do they look like?
- What habitat are they found in?

Examples:

- Glowing sea turtle
- Platypus
- Pangolin
- Gharial

Can you create a poster or leaflet about your animal? How are they adapted to their environment?

Why not have a go at some of the experiments on the school website?