

PRIMARY RESOURCE PACK

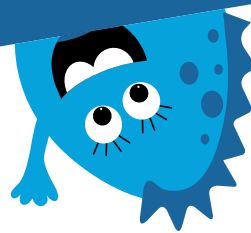
British Science Week
8 – 17 March 2019
britishscienceweek.org

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This resource pack is your 'one-stop-shop' for supporting you during British Science Week, but it can be used at any time. Feel free to adapt or extend the activities to suit your students' needs and the curriculum you are delivering.

In addition to the activities in this pack, there are lots of other ways to enthuse and engage your students throughout British Science Week.

In developing this pack, we have looked for activities which break down the stereotypes surrounding STEM and promote cross-curricular learning. We encourage you to use British Science Week as an opportunity to link STEM to other curriculum subjects and to your childrens' own backgrounds, lives and interests.

Events

You can either create your own club, class or school event or search for things happening near you.

Last year, there were over 2,700 events reaching more than 750,000 people. Help us make British Science Week 2019 even bigger and better! Visit britishscienceweek.org

Poster competition

Some of the activities in this pack could be followed up by designing a poster; simply look out for the paintbrush symbol shown to the right. The theme for this year's competition is 'journeys'. For more information on the competition and how to enter, read on further in the activity pack or visit britishscienceweek.org/plan-your-activities/poster-competition

CREST Awards

Many of the activities in this pack can count towards a CREST Award.

Further CREST resources can be downloaded for free from our library library.crestawards.org

Why not use British Science Week to launch CREST in your school? You can set up a free account and log in through the CREST website to keep track of pupil progress and order certificates; visit crestawards.org/sign-in



Eurotunnel

2019 marks the 25th anniversary of the opening of the Channel Tunnel, which links Folkestone in Kent with Coquelles, Pas-de-Calais in France.

In celebration of this special anniversary milestone, Eurotunnel has partnered with the British Science Association on British Science Week, to explore the theme of 'journeys'.

At 37.9km (23.5miles), the Tunnel still holds the record for the world's longest under-sea tunnel. The

project took five years to complete and involved over 13,000 engineers, technicians and workers. However, its journey started over 100 years before that; the first design for a cross-Channel tunnel was produced in 1802 and the first attempt at a tunnel excavation was in 1880.

In 2019, we want to share the knowledge and excitement of this ambitious engineering project with a new generation. The British Science Week activity packs feature activities

relating to rock layering, tunnels and signals, and time and speed. Beyond these topics, the Eurotunnel story involves archaeology, nature and logistics.

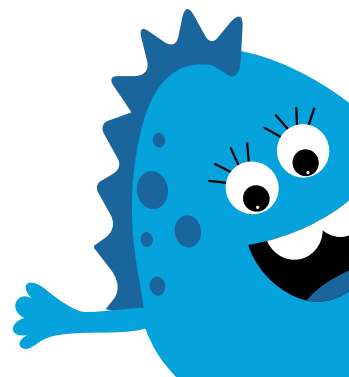
We hope that you will enjoy this pack and that it will inspire you and your students to find out more about the making and everyday working of this wonder of the modern world. You can download our infographic poster, which is jam-packed with fascinating facts, here: eurotunnel.com/build



The theme for this year's British Science Week is 'journeys', encouraging young people to think about the different scientific journeys that happen everyday and how they can discover science through their own lives and experiences. It is also a chance for young people to consider how journeys can help us experience more of the world around us.

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Why not start British Science Week off with a bang, by holding an assembly to get your students excited about the week ahead? Tell the British Science Association about your assembly ideas by tweeting or sharing images with the hashtag:

#BSW19

Assembly ideas

- ✔ You could reflect on important scientific journeys undertaken in the last century, with a special focus on people from your area. Note, a journey does not necessarily need to be a physical journey; think also about journeys of knowledge.
 - ✔ Get the students thinking about how journeys affect objects, animals or nature in their everyday lives, e.g. how objects are made and where they end up; the life cycle of animals; the water cycle.
 - ✔ Profile a prominent explorer and a journey they made that had a significant contribution to our understanding of our planet or even the solar system.
 - ✔ Invite a special guest or someone from the school community to come talk about a related topic. To connect with a range of speakers and volunteers visit:
sciencelive.net
inspiringthefuture.org
stem.org.uk/stem-ambassadors
- Here are some other ideas to include during your assembly:**
- ✔ Tell your students about the plan for British Science Week and give them a challenge related to the theme.
 - ✔ Launch the poster competition (see page 22 of this pack).



JOURNEYS ON EARTH AND BEYOND
Headline figures



About this activity

There are big numbers in the building and running of the Eurotunnel, some of them record breaking.

Big numbers can be tricky to picture. Can you transform some of these facts into infographics using familiar examples to help visualise them?

Kit list

- Paper
- Pens
- Other creative materials

Instructions:

Create an infographic to communicate the Eurotunnel stats in a visual and engaging way.

Choose a fascinating fact from this page. Think of an equivalent number, size, weight, distance or length of time which makes it easier for people to

understand. Use local and personal examples that mean something to you. For example, how many times bigger than your school is that? How many times further than your journey to school is that? How many times bigger than your favourite sports pitch is it?



37.9km (23.5miles): it's the longest under-sea tunnel in the world.

Eurotunnel has carried more than 26 million trucks since it opened in 1994.

Dinosaurs were wandering the Earth when the chalk layer that the Tunnel cuts through was deposited during the Cretacious period, 66 million years ago.

380,000,000 tonnes of freight have been transported via the Tunnel since it opened.

Over 2 million dogs and cats have travelled with Eurotunnel since it opened, representing 80% of all pets crossing the Channel.

11 boring machines were used to make the Tunnel. In total they weighed 12,000 tonnes.

185 million passengers have travelled through the Tunnel since 1994.

4.9 million cubic metres of Chalk Marl were excavated during construction and used to create Samphire Hoe in Kent and a hill at Le Fond Pignon in France.

13,000 engineers, technicians and workers helped construct the Tunnel.

80 million vehicles have boarded the Shuttle since it opened.

26 million roses are delivered through the Tunnel each day.

1 million express delivery parcels travel through the Tunnel each day.



Tracks and tunnels game

About this activity

In this activity, you will design and make your own board game. While making and playing the game, you will discover and share some of the challenges faced and achievements made during the building and running of the Channel Tunnel. You could organise a games night during British Science Week to try out your game.

Time

1 hour

Kit list

- ✓ Large sheet of paper or card to make your game board
- ✓ Small objects for playing pieces
- ✓ A dice
- ✓ Colouring pens or pencils to decorate your game
- ✓ Internet access to research the Channel Tunnel and/or use the printed fact sheets on previous page

Watch out!

- ✓ Come up with some fair play rules for your game to avoid arguments!

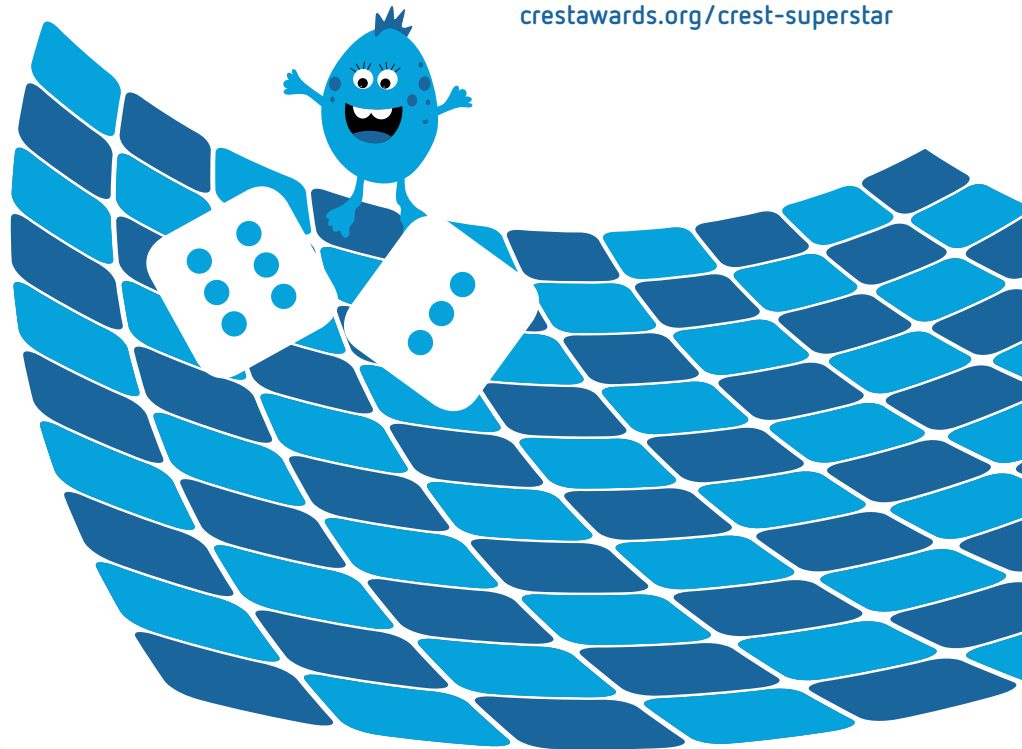


Instructions:

- 1 Engineering is all about solving problems in a creative way. The building and running of the Channel Tunnel are great examples of this. Research at eurotunnel.com/uk/build and make a list of some of the successes and challenges faced.
- 2 Draw a grid 10 squares by 10 squares to make your game board. Number the squares from one to 100 snaking across the board from the top left corner.
- 3 Randomly select eight squares on the board and add a 'tunnel' to a higher numbered square.
- 4 Now select 8 more squares and add a red signal and a 'track' to a lower numbered square.
- 5 Use the information on the previous page to add successes and challenges to each of the tunnel and track squares.
- 6 Make or collect a set of player pieces for your game.
- 7 Test your game out with your friends to make sure it works. Why not host a board games night at your school for family and friends?

Next steps:

- ✓ Discover more about the building of the Channel Tunnel here: eurotunnel.com/uk/build
- ✓ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar



JOURNEYS ON EARTH AND BEYOND

Resilient rovers



About this activity

You will create a design for a space rover that would be able to zoom around the Moon! This activity will put your knowledge to the test and improve your ability to work as a team.



A rover is a space-exploration vehicle designed to move across the surface of a planet or other celestial body. Their wheels are very important and you will need to think carefully about this when designing your rovers.

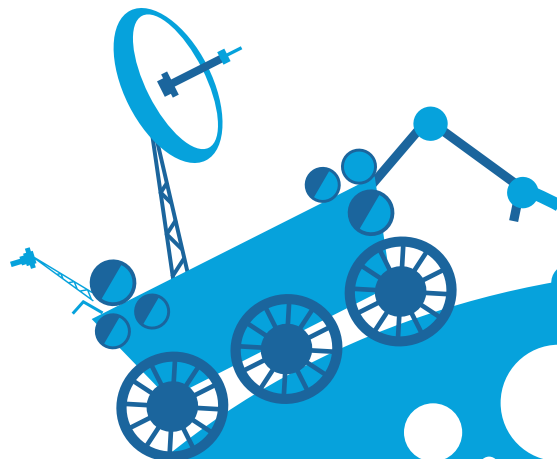
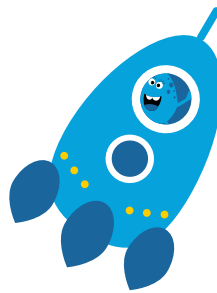
The Juno rover, designed by the Canadian Space Agency, can use many different types of wheels (rubber, metal or iRings), or a set of metal tracks.

Time

30 - 45 minutes

Kit list

-  Pencils
-  Paper




A flat tyre is always unwelcome, but even more if you are in the middle of roving around the Moon! iRings are specially developed rugged rover wheels made of an outer layer that looks like chain mail, which can be filled with whatever material might be available (for instance, lunar soil and rocks). Their sturdy, flexible design allows a rover to drive over rocks, lumps and bumps that are typical of the extreme terrain found on the Moon.

Instructions:

- 1 Get into groups, you will have **20 minutes** to create a design for a lunar rover.
- 2 Think about what components a lunar rover might need. Think about what it is used for, who or what it might need to carry, and what kind of terrain it might need to cover. Can you think of any vehicles on Earth that do a similar job?

- 3 After 20 minutes, it's feedback time. Discuss each other's creations as a class. Provide kind, specific and helpful feedback on how each other's creations might be refined.
- 4 Once everyone's designs have been evaluated, you now have the chance to improve on it based on the suggestions given.
- 5 When time is up, look at the final creations. Discuss what you've made and how your creations have changed as a result of the feedback. What have you learned from the other students?

Next steps:

-  Why not build your own lunar rover?
-  Try more activities from Explorify here: explorify.wellcome.ac.uk
-  Try another Explorify activity and watch a Juno rover in action at: explorify.wellcome.ac.uk/en/activities/whats-going-on/manoeuvring-on-the-moon

JOURNEYS ON EARTH AND BEYOND

Make it fly

About this activity

A paper aeroplane, glider or helicopter falls to the ground much more slowly and gracefully than a scrunched-up piece of paper. This is because of the forces generated by air pressing on and moving over the surface of the paper. You will discover this by creating your own paper aeroplane and helicopter, sending them on a journey and seeing how they fly!

Time

30 minutes

Kit list

- ✔ A stopwatch for the test

For the aeroplane:

- ✔ An A4 sheet of paper

For the glider:

- ✔ A drinking straw
- ✔ Sticky tape
- ✔ Two strips of paper (one twice as long as the other)

For the helicopter:

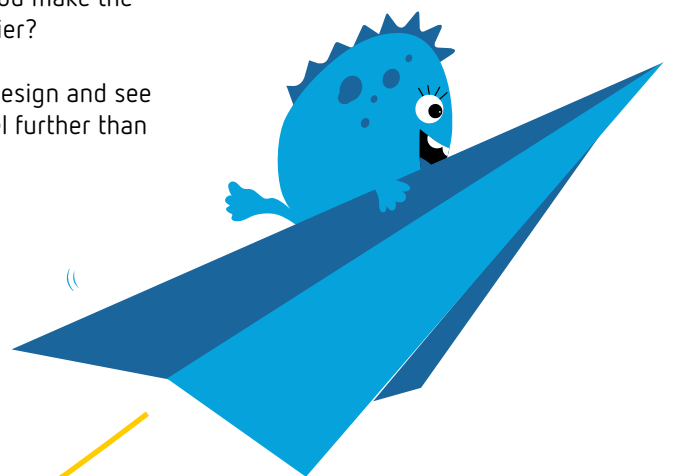
- ✔ A helicopter template
- ✔ Safety scissors
- ✔ A paper clip

Instructions:

- 1 Use the templates on the next page to build your aeroplane, helicopter and glider.
- 2 Once you have created your aircraft you should practice flying them. Once you are ready for the official test, you should time how long each aircraft stays in the air using the stopwatch. You should also see how far they can travel.
- 3 If there are lots of you taking part, you should see overall if the aeroplane, helicopter or glider stay up longer.
- 4 Which design travels fastest and why do you think this is?
- 5 Why do these designs behave differently to a scrunched-up piece of paper?
- 6 How do your paper planes compare with the shapes of real planes you've seen?
- 7 Which way does the helicopter spin? Can you make it spin the other way?
- 8 What do you notice if you make the front of the plane heavier?
- 9 Make your own plane design and see if you can make it travel further than the others.

Next steps:

- ✔ Real aircraft behave in very similar ways to your gliders and paper planes – but they also have powerful engines that keep pushing them through the air, and this is how they stay up. Real helicopter blades are pushed around by powerful engines too. Why not take the investigation further and learn more about aeroplane and helicopter engines?
- ✔ The best designs often come from nature; look at the world around you and see if you can spot examples of similar designs in nature.
- ✔ Visit the Science Museum Group's learning resources website to discover more activities, videos and games: learning-resources.sciencemuseum.org.uk
- ✔ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar



Watch out!

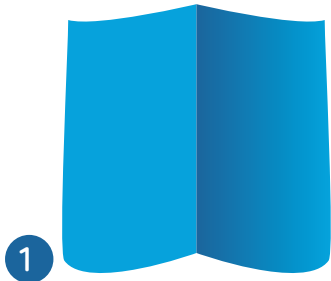
- ✔ Always be careful when using scissors.



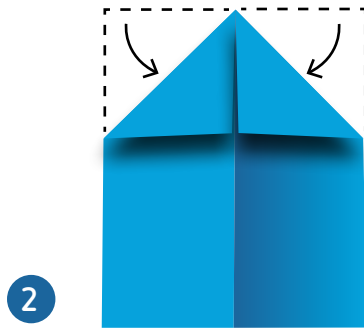
ACTIVITY SHEET

Make it fly

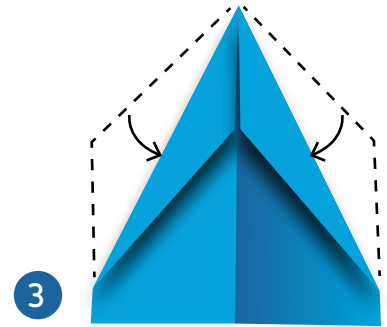
Aeroplane



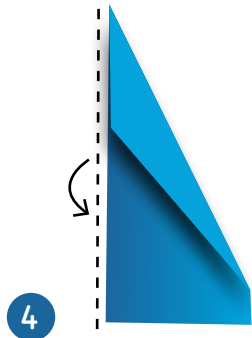
1 Take the A4 sheet of paper. Fold it in half, as shown, then unfold it.



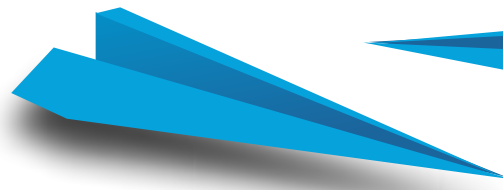
2 Fold the two top corners in to make a point.



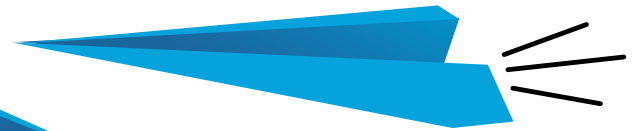
3 Now fold the edges in again so they meet in the middle from the tip.



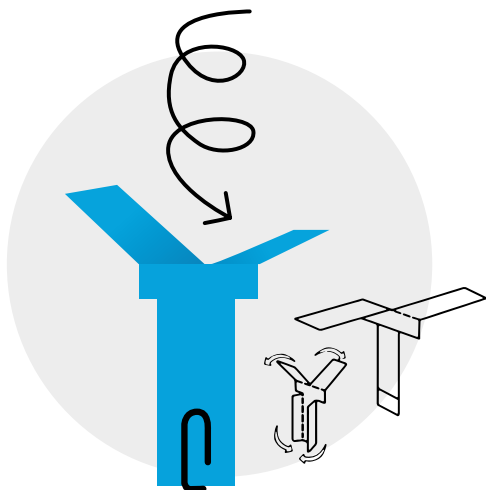
4 Fold the plane in half again.



5 Now fold the diagonal edge down to meet the straight edge on each side, making the wings. Your plane is complete.

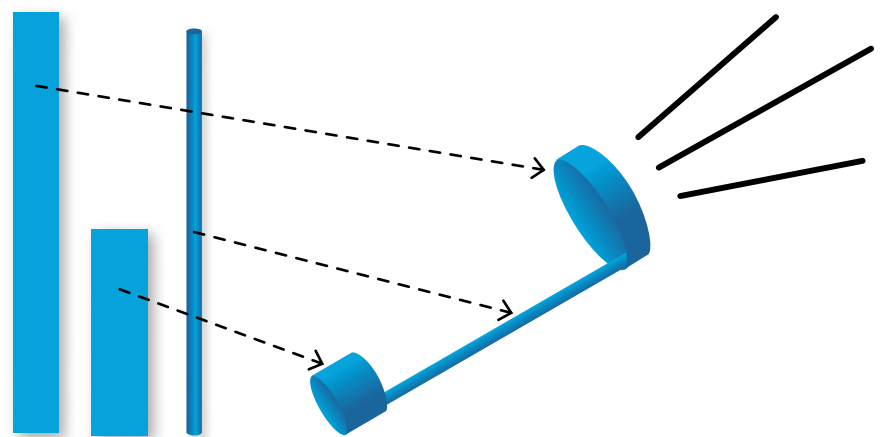


6 Test out your paper plane!



7 Helicopter

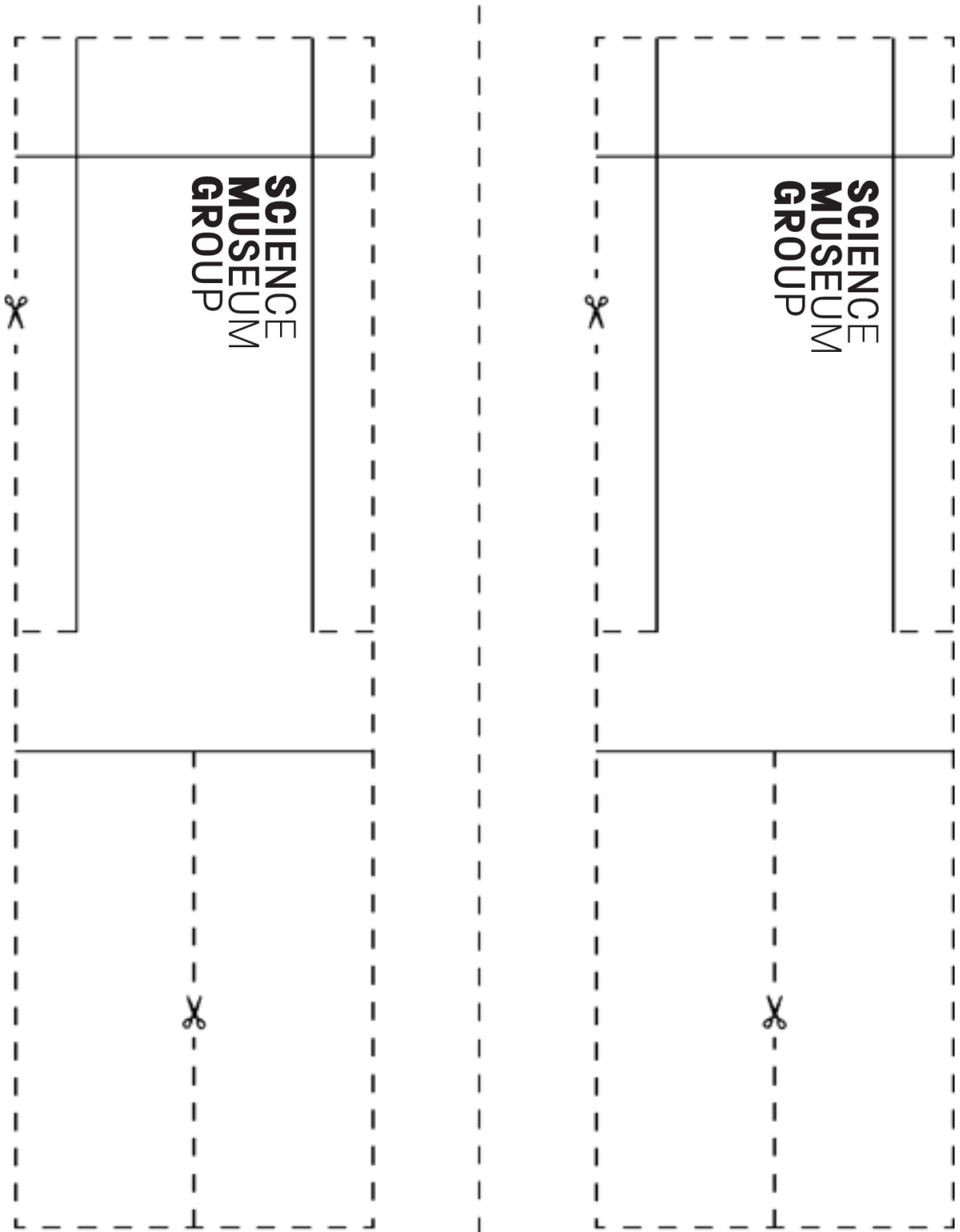
Use the template on the next page and the above diagram to help you make a paper helicopter. Drop it to see it spin.



8 Glider

Curl the strips of paper into loops and tape them to each end of a straw to make a glider.

Helicopter template





About this activity

Achoo! How far can a sneeze travel and how can we prevent others from getting ill? Through this fun activity you can learn more about the spread of microbes and their potential to infect people. You will get to measure the distance and impact of a sneeze by using water in a spray bottle.

Time

30 minutes

Kit list

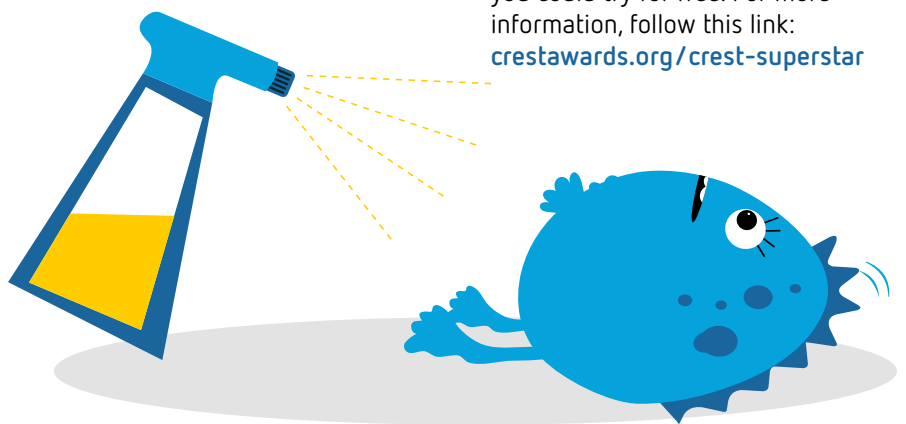
- ✔ 10 sheets of flip chart (A1) paper stuck together to make the *sneeze zone*
- ✔ An empty and clean spray bottle
- ✔ Sticky tape
- ✔ Gloves
- ✔ Sugar paper cut into squares (7cm x 7cm)
- ✔ Tape measure (approx. 4 metres long)
- ✔ Three different coloured pens (red, blue and black)
- ✔ Tissues
- ✔ Water

Instructions:

- 1 Stick the pieces of flip chart paper together so that you have a large sheet 4 metres long and 1 metre wide and stick this to the floor with tape. Place a tape measure along one side of the sheet and secure with tape. This is the *sneeze zone*.
- 2 Everyone should draw a round face or a stick person on a sugar paper square. This represents a person. You will need between 10 and 30 of these. Place the "people" anywhere in the *sneeze zone*.
- 3 Stand at one end of the *sneeze zone* and use the "nose" (water sprayer) to sneeze twice (spray the water). Measure how far the water droplets travelled using the ruler on the *sneeze zone* start mat. Count how many people on the mat were affected by the sneeze. Check each piece of sugar paper for any water marks. If there are any marks, draw a red circle around them.
- 4 Repeat step 3 but this time put a gloved hand in front of the "nose". Count how many people were affected. Draw a blue circle around the water marks (if any) and wipe away the water droplets.
- 5 Repeat a final time but put a tissue in front of the "nose" when you "sneeze". Draw a black circle around the water marks (if any). Wipe away the water droplets.
- 6 Compare the results. What might the problems be with just using your hand to protect others from sneezes? What are the best ways to stop sneezes spreading?

Next steps:

- ✔ Discover more about the spread of disease, as well as DNA, genes and genomes and all aspects of their impact on society here: yourgenome.org.
- ✔ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar



Perfume making



About this activity

Throughout history, people have found ways to make perfumes. Perfume making was particularly popular in the golden age of Muslim civilisation. In this activity, you will make a perfume from essential oils adapted from a recipe from over a thousand years ago.

The essential oils are mixed together with almond oil/olive oil, which acts as a 'carrier' to move the fragrance to the skin. The perfume can also be mixed with water and sprayed as an air freshener using a spray bottle.

Time

45 minutes

Kit list

- ✓ Small bottles with lids for the perfume (1 per person or group)
- ✓ Almond oil/olive oil
- ✓ Jasmine oil
- ✓ Orange oil
- ✓ Thyme oil
- ✓ Sandalwood oil
- ✓ Vanilla extract
- ✓ Teat pipettes/droppers

Watch out!

- ✓ Make sure no one has any allergies e.g. to the almond oil
- ✓ Avoid contact between any essential oils and eyes. Rinse thoroughly if accidental contact occurs
- ✓ Wash hands after this activity



Instructions:

- 1 Each person/group should add 60 drops of almond oil into their bottle.
- 2 Then add '5 drops of vanilla extract per bottle.
- 3 Pass round each of the other oil bottles – jasmine, orange, thyme and sandalwood – and put 1 drop of each oil into each bottle.
- 4 Put the lid on each bottle and shake the perfume vigorously.
- 5 Anyone who wants to can dab the perfume onto their skin.

Over the two hundred years which followed, physicians and scientists such as al-Kindi, al-Razi and al-Zahrawi perfected the alembic still. As well as extracting essences for perfume, they used it to distill alcohol as a hospital disinfectant, extract essences for new medicines and separate lamp oil from crude black oil.

Al-Kindi even wrote a book on the chemistry of perfumes. It contained 107 different recipes for scents using many essential plant oils which can still be extracted through distillation today.

Did you know?

For centuries, people used primitive apparatus to distil (separate out) plant essences for perfumes.

Over a thousand years ago in Iraq, a chemist called Jabir ibn Hayyan felt sure he could improve on the process. After much experimentation, he developed the alembic still – this still extracted the essences far more effectively than primitive apparatus.

Next steps:

- ✓ This activity is part of *1001 Inventions: Journeys from Alchemy to Chemistry* - a new global initiative produced by 1001 Inventions, in partnership with UNESCO, to celebrate the United Nations proclaimed International Year of the Periodic Table of Chemical Elements (IYPT2019). For more information, visit: 1001inventions.com and iypt2019.org



ELECTRIC JOURNEYS

Electric art

About this activity

Did you know that you can use salt water or dough to make a light bulb shine? It sounds crazy, but it's true! This is because salt is a good conductor of electricity; i.e. it helps the electricity journey through the water or dough. Pure water contains very few ions, so it does not conduct electricity, but when salt is dissolved in water, the salty water does conduct electricity because the salt contains ions. These ions are what carry electricity on their journey.

Try this electric art activity to light up an LED, or buzzzzz a buzzer!

Time

1.5 hours

Kit list

Salt dough:

- 🕒 160g flour
- 🕒 165ml water
- 🕒 3 tbsp salt
- 🕒 2 tbsp cream of tartar
- 🕒 2 tbsp vegetable oil

Equipment:

- 🕒 Tablespoons
- 🕒 Measuring jug
- 🕒 Scales
- 🕒 Pan
- 🕒 Wooden spoon
- 🕒 Supervised access to a hob
- 🕒 Cookie cutters (optional)
- 🕒 Foil – at least 20cm long & 3cm wide
- 🕒 Zinc/carbon or zinc/chloride batteries
- 🕒 LEDs or buzzers

Instructions:

- 1 Mix the dough ingredients in a pan. Ask an adult to help you heat the mixture gently.
- 2 Keep stirring until the mixture gets thicker and then forms one big lump of dough.
- 3 Leave the lump to cool a bit, then start kneading it on a non-stick surface. When the dough is nice and smooth, it's ready to use.
- 4 The dough conducts electricity, so you can use it to replace the wires in simple circuits. Do some research on how to make a working circuit, and then experiment to see what you can create. Remember that you will need an adult helper whenever you are working with batteries. Always disconnect when you have finished as the circuit can get hot and cause fires.



Next steps:

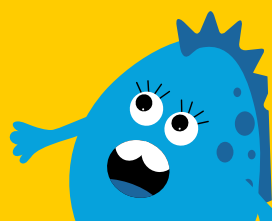
- ✔ For more fun activities go to whizzpopbang.com
- ✔ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar

Some jokes from *Whizz Pop Bang's Shocking Science* issue:

- Q: What did the electrical engineer ask her husband?
A: Watts for tea?
- Q: What do electrical engineers eat?
A: Shock-a-lot cake!

Watch out!

- ✔ Adult supervision required when using the hob.
- ✔ Never touch an electrical item with wet hands.
- ✔ Electricity can cause fire. Separate the batteries and disconnect them from the foil as soon as you finish the experiment.



ELECTRIC JOURNEYS

Make a neuron, make memories



About this activity

Our brains control everything we think, feel, say and do. Inside our brains we have around 80 billion cells called neurons. Luckily, neurons are tiny, so we can fit them all in — about 30,000 neurons could fit on a pinhead!

A neuron connects to lots of other neurons; every second, millions of electrical signals journey through your brain, passing from neuron to neuron, a bit like a tiny game of pass the parcel.

When you learn something new, neurons make new connections. When you remember something, a signal passes through these connections.

In this activity, make your own neuron out of pipe cleaners and learn about some of the amazing parts of these cells.

Time

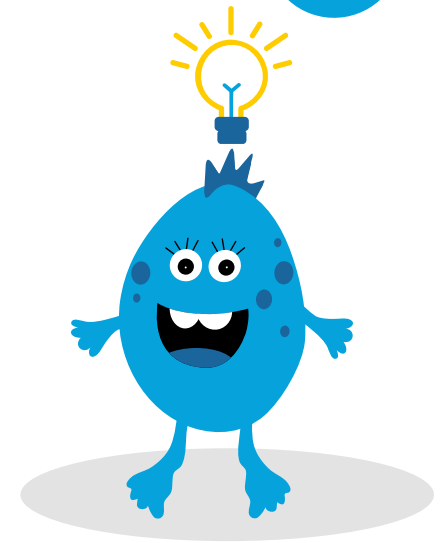
1 hour

Kit list

- Pipe cleaners
- Safety scissors
- Paper/luggage tags
- String/glue
- Pen and pencil

Instructions:

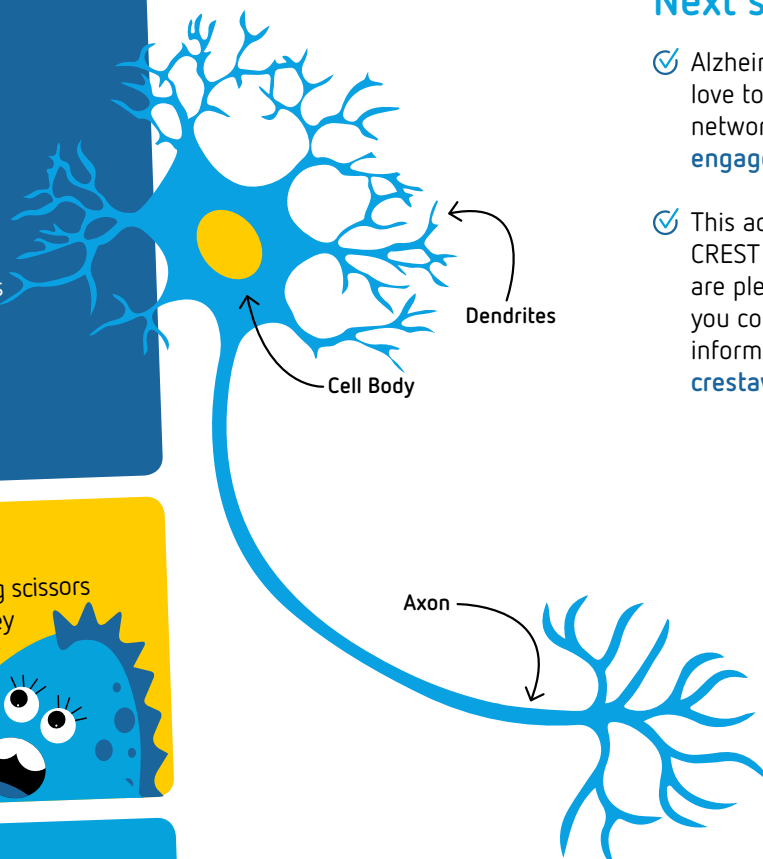
- 1 Take a pipe cleaner and make it into a circle. Twist the ends of the pipe cleaner around to secure it. This is the cell body and the control centre of the cell. It tells the rest of the neuron how to work.
- 2 The small branches that come out of the cell body and receive signals are called dendrites. Wind more pipe cleaners around the cell body and spread them out from one side of the cell body to make the dendrites.
- 3 Bend another long pipe cleaner around the cell body and then around itself to make a long tail on your cell. This is called the axon, it carries electrical signals to the end of the cell.
- 4 Twist more pipe cleaners around the end of the pipe cleaner axon. These are the branches that pass connections onto the next neuron.



- 5 The way your neurons link up in your brain is important for forming memories. Write your earliest or favourite memories onto a piece of paper and stick it on to your neuron.
- 6 Join up your neurons with others in your class to form a big network. Add these onto a pin board wall.

Next steps:

- Alzheimer's Research UK would love to see a photo of your neuron network, so please send them in to engage@alzheimersresearchuk.org
- This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar



ELECTRIC JOURNEYS

Matilda's floating feat









About this activity

Have you read *Matilda* by Roald Dahl? In the story Matilda is a little genius who comes up with tricks to teach her ogre of a headteacher a lesson. When Miss Trunchbull wrongly accuses Matilda of putting a newt in the water jug, Matilda feels a strange sense of power. She uses that power to tip the glass without touching it, spilling the water over her horrible headteacher! This activity is taken from a new book called *Matilda's How To Be A Genius* and will show you how to complete a similar feat...

Time

45 minutes




Kit list

-  Tissue paper
-  A pen
-  Round-ended scissors
-  A balloon
-  A wool jumper or fake fur
-  Feathers and small polystyrene balls (optional)

Instructions:

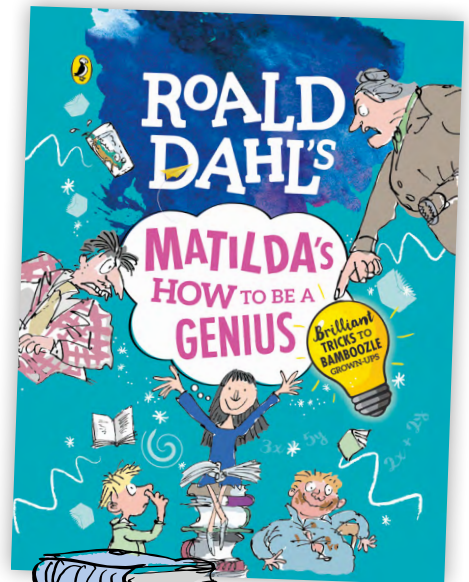
- 1 Use tissue paper and a pen to trace over the newt shown on the next page. Do this twice, then cut them out.
- 2 Blow up the balloon and rub it with the jumper or fake fur for at least 20 seconds.
- 3 Hold the balloon near your hair. If you feel or see your hair moving towards it, then the balloon is ready.
- 4 Hold the balloon above the newts. Command: 'Lift up! Lift up!' and amaze your audience as the newts float up without you touching them!

Next steps:


-  Why not use the same process to lift feathers and polystyrene balls?
-  Use this trick to tell Matilda's story to your family and friends. Show the journey that she goes on with her powers.
-  This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar

Matilda's phenomenal fact:

While performing this trick, you discovered static electricity – a stationary electric charge produced by friction (when two objects rub together). An electric current is a flow of something called electrons. When you rubbed the balloon, electrons jumped from the material onto the balloon. These electrons produced the force that pulled on the paper newts, lifting them up.

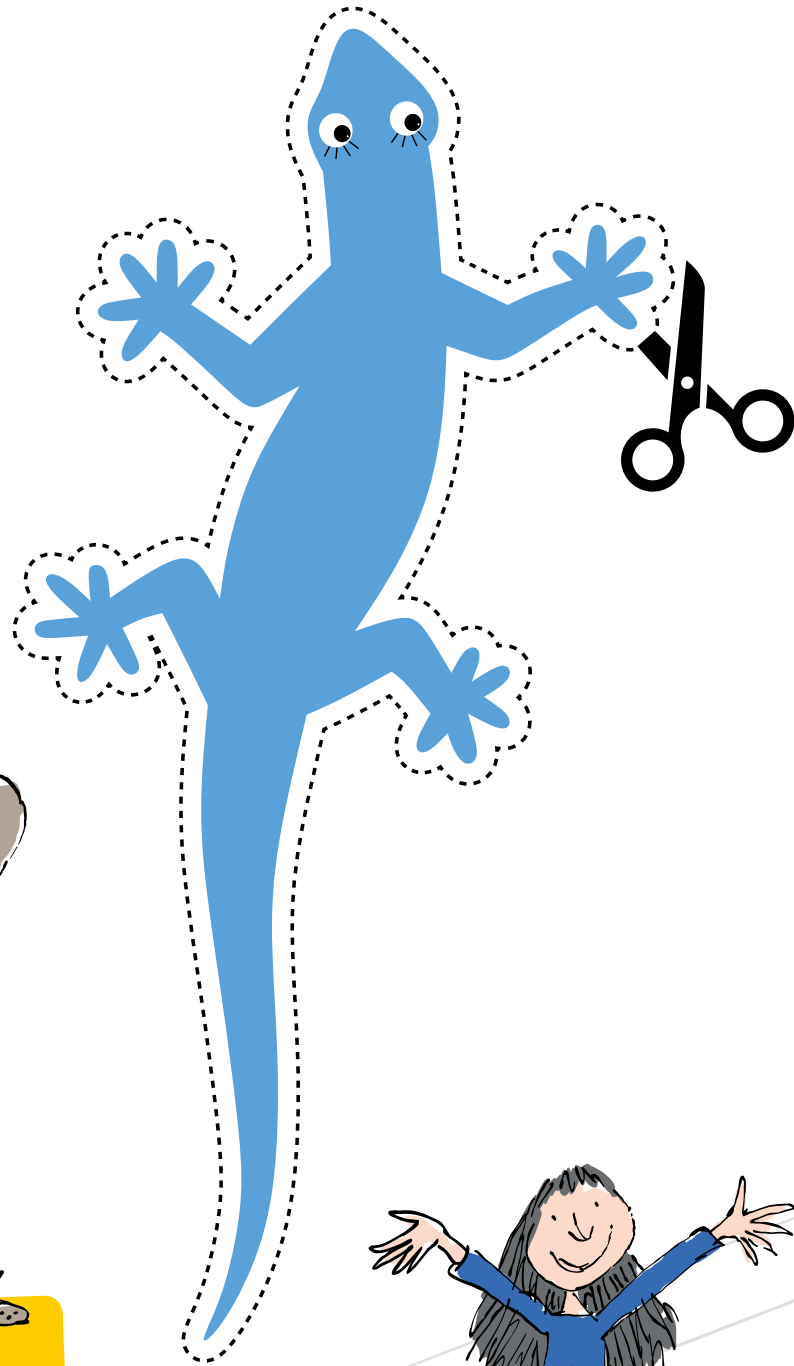


Watch out!

-  Always be careful when using scissors.

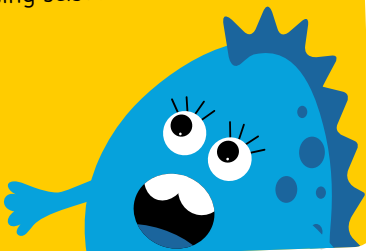


Matilda's floating feat



Watch out!

Always be careful when using scissors.



ROALD DAHL

JOURNEYS THROUGH NATURE

Under your feet



About this activity

Although insects are small, some achieve great feats that even humans couldn't do without modern technology! For example, the Dracula ant of Australia and South-East Asia can snap its jaws shut at a lightning-quick speed of 90 m/s – about 5,000 times quicker than the blink of a human eye! Imagine you woke up very small, the size of even the smallest insect. What challenges would you face?

Time

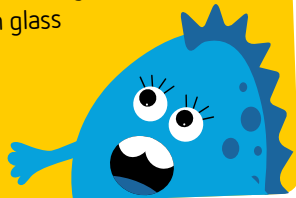
1 hour

Kit list

- ✓ Card
- ✓ Safety scissors
- ✓ Hand-held magnifying glasses
- ✓ Identification charts or books
- ✓ Drawing materials
- ✓ Digital camera (optional)
- ✓ A garden or area that is likely to have a variety of insects

Watch out!

- ✓ Children must always be supervised
- ✓ Always be careful when using scissors
- ✓ Wash hands once you are finished exploring
- ✓ Make sure you treat animals and insects with care
- ✓ Avoid areas that are likely to be contaminated, e.g. with dog faeces or broken glass



Instructions:

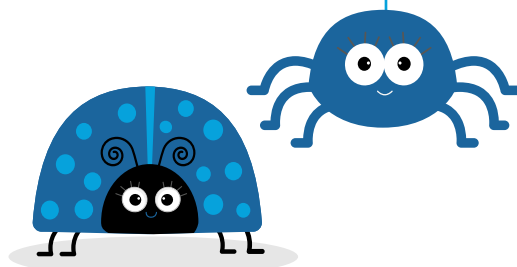
- 1 Cut a foot shape out of the pieces of card, keeping both the foot cut-out and the piece of card with the foot-shaped hole. Try using an adult's foot or shoe to make sure the hole is big enough!
- 2 Go outside and think about what kinds of insects may be living nearby. Share your ideas.
- 3 Place the card with the foot-shaped hole on the ground and look through the hole. What can you see? Remember to use your magnifying glass.
- 4 Using the other piece of card which you cut out, write down what you see. Make sure you have enough detail, so you can remember it all later
- 5 Think about different habitats that you could check, such as bushes or the roots of trees.
- 6 Once you have seen a few creatures, you should share what you found with your class or group. Think about how differently you would view these creatures if you were as small as them.
- 7 If you have time, why not write a story about waking up the size of an insect, and the challenges you would face? Use the 'Did you know?' and 'Next steps' sections to give you some ideas.

Did you know?

- ✓ Highest living spider: In 1924, a new species of spider was discovered in Nepal at an elevation of 6,700m (21,981ft) on Mount Everest. It wasn't until 1975 that the arachnid was given a name: the Himalayan jumping spider.
- ✓ Fastest insect on land: The Australian tiger beetle can travel at a speed of up to 2.5m/s. At full speed the beetle's visual system struggles to keep up, which means it must slow down if it wants to see properly!
- ✓ Most dangerous bee: Africanized honey bees are known to attack in big swarms if people venture too close to their nests. They can pursue their victims over great distances, the furthest recorded being 0.84km.
- ✓ The monarch butterfly flies from Canada and the USA to the warmer climate of Mexico for winter. One butterfly was estimated to have travelled 4,635km – that's about five return trips between London and Paris!

Next steps:

- ✓ Check out [Guinness World Records 2019](#) and Guinness World Records' [Wild Things](#) to find more amazing facts about insects and the world around you.
- ✓ Using a free augmented reality app, you can see record-breaking insects come to life from the page - visit [guinnessworldrecords.com/products/books/wild-things/bugstolife](https://www.guinnessworldrecords.com/products/books/wild-things/bugstolife)



About this activity

Bees journey to flowers collecting nectar, and as they do so, they transfer some of the pollen from one flower to another. This is one of the ways that plants reproduce, and it is called insect pollination. In this activity, you and your class will role-play the process of insect pollination.

Time

1 hour

Kit list

- ✓ Card - for sepal, petals, antennae
- ✓ Headbands, real or cardboard - for bees
- ✓ Containers e.g. used plastic bottles or yoghurt pots - to hold the 'pollen'
- ✓ Small circular objects or spheres e.g. ping pong balls, Styrofoam balls, Velcro dots, milk bottle lids or pompoms - for the 'pollen'
- ✓ Woolly hats to hold the pollen - for the stigma
- ✓ Sticky tape or glue stick - to construct outfits

Watch out!

- ✓ If you help your teacher make the props be careful with scissors.
- ✓ Watch your step when you are moving around during the role play.



JOURNEYS THROUGH NATURE

What do bees do?



Advance activity for teachers:

You will need to use the kit list to create different outfits for children. On the day you will need to dress students up as flowers (holding a petal, sepal or acting as the stigma), stamen (holding pollen grains) or bees (wearing antennae headbands). Every flower needs a stigma and there should be enough bees to go around.



Instructions:

- 1 Watch this video clip: bsa.sc/snap-sci
Why do you think the bee visits the flowers and what happens to the pollen?
- 2 Watch this animation to learn about pollination: bsa.sc/snaps-ci-pol
- 3 Dress up as either part of a flower (a stamen, a petal or a stigma) or a bee.
- 4 If you are a flower choose a space to stand in the room and stay there. As a flower you should include a stamen, a petal and a stigma.
- 5 The bees can then journey from flower to flower, when they land on a flower they should collect some of pollen grains from the stamens.
- 6 When the bees visit the next flower they should give some of the pollen grains to the stigma. This means that the flower has been pollinated.
- 7 Once you have acted out the role play, you should write a script as a class to describe what's happening.



Next steps:

- ✓ Visit collins.co.uk/SnapScience for more information and fun activities.

JOURNEYS THROUGH NATURE

Journey stick



About this activity

When Australian Aboriginals went on long journeys they tied objects to a stick. They would start at one end of the stick and work along it as they travelled. The objects would help them to remember events and experiences on their journey, and to tell others of their adventures. Go on your own journey and make a journey stick with a friend. Where you will go?

What might you find or experience and how will you attach the items to the stick? Share your journey stick with other people to tell them about your journey.

Kit list

- ✓ Sticks (choose your own)
- ✓ Something to fasten the objects to the stick e.g. string, tape, cotton thread, elastic bands
- ✓ Coloured wool or strips of fabric in a large tray or little bags for each group. They can represent places and events on the journey e.g. blue wool for water or red fabric for the sun setting as the journey ended
- ✓ Items collected on your journey

Watch out!

- ✓ Remember to wash your hands after the event. No fingers in mouths!
- ✓ Make sure to listen to advice from adults about avoiding poisonous or prickly plants.
- ✓ Avoid going too close to water.
- ✓ Don't attach any animals or insects to the stick!
- ✓ All journeys should be supervised by an adult

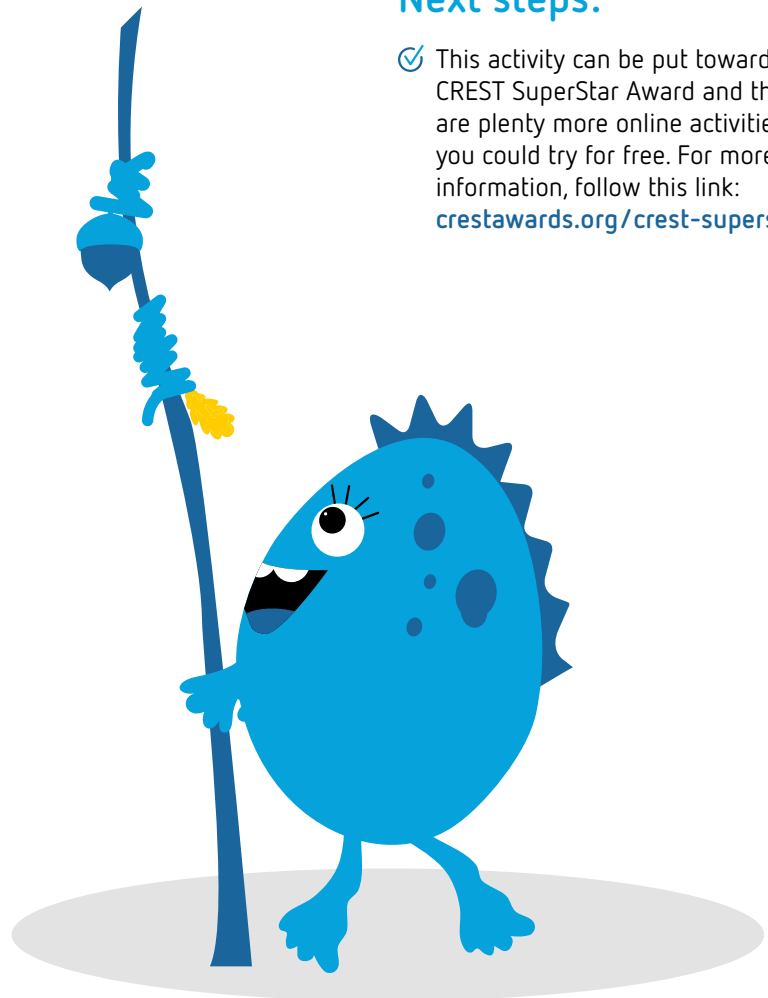


Instructions:

- 1 Think about how others might be able to guess where you have been. For example, if you passed an old oak tree, you might want to collect a leaf or an acorn.
- 2 If you saw a robin, you might tie some red wool on your stick.
- 3 How could you show it was sunny when you started your journey?
- 4 Look very carefully as you travel. Remember to start at one end of the stick and work across to the other end.
- 5 Can others tell where you have been? Does the stick help you to remember your journey?
- 6 Talk about your journey to your friends.
- 7 What other journeys can you make?
- 8 How are your sticks different for each journey?
- 9 Can you make a simple map of your journey?
- 10 Can you find out more about how the Aboriginal people used their journey sticks?

Next steps:

- ✓ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar



JOURNEYS THROUGH NATURE

Pollution solution

About this activity

When we look around, we do not usually see the 'air' so it is easy to assume that our air is clean. In reality, the air and the pollution in it are made up of mostly invisible gases. Many pollution particles are so small that we cannot see them. This means that it is hard to know if the air we breathe is clean or polluted. This experiment will help you discover how we can test for air pollution.

Time

1 hour

Kit list

- ✓ Bicarbonate of soda dissolved in water ("pollution")
- ✓ Red grape juice ("reagent")
- ✓ Droppers/spoons
- ✓ Beakers/cups (ideally white or clear)
- ✓ Sticky labels
- ✓ Paper
- ✓ Pen or pencil for recording ideas

Advance activity for teachers:

- ✓ Make 2 types of sample in large containers e.g. litre bottles: (A) neutral (just water) and (B) polluted (Add around 1-2 teaspoons of bicarbonate of soda per 500ml of water).
- ✓ Label the container of plain water (A) 'Park' and the water mixed with bicarbonate of soda (B) as 'Busy road'.

Instructions:

- 1 Your teacher should give you two containers of water. One labelled 'Busy road' and one labelled 'Park'
- 2 Make a hypothesis about whether a busy road or a park would be likely to be more polluted.
- 3 Use a teaspoon or pipette to add ten drops of the 'reagent' to each container.
- 4 Watch for a reaction to see if the reagent changes colour when it is added to the sample.

- 5 Which container has the 'pollution' and which one does not? Is the more polluted container the busy road or the park? Why do you think this? Was your hypothesis correct?
- 6 What do you think are the biggest causes of pollution in the UK?
- 7 Can you think of any solutions to air pollution? Try designing a vehicle that creates no pollution.

Next steps:

- ✓ Why not write a letter to your local MP with your thoughts about air pollution?

Use ClairCity's letter template: claircity.eu/2018/10/15/teachers-toolkit

- ✓ Make a poster about air pollution and what teachers and students can do to reduce it.
- ✓ Make a transport Top Trumps card game. You can make cards with existing transport options in your area and invent some futuristic ones too. Score each mode of transport on different attributes: Is it clean for the air? Is it fast? How expensive is it?
- ✓ This activity can be put towards a CREST Discovery Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-discovery



Plastic - journey to the ocean



About this activity

There is a lot of plastic in landfill sites which often ends up journeying to the ocean. It is estimated that a plastic bottle may take up to 450 years to rot away. Plastic also causes problems for wildlife; some animals become tangled in it and some mistake it for food. This can be fatal to animals and, even when it isn't, scientists are worried that plastic is ending up in the food chain as it can break down into small particles called micro-fibres.

This investigation tests the prediction that micro-fibres of plastic get into the water when synthetic clothes are washed.

Time

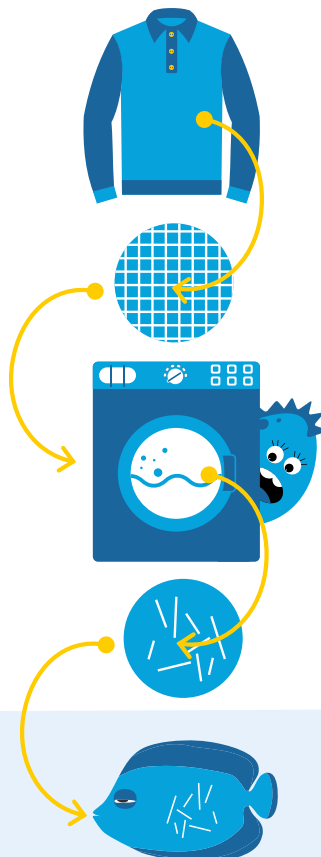
45 minutes

Kit list

- ✓ A synthetic fleece
- ✓ Two bowls
- ✓ Warm or cold water
- ✓ A funnel
- ✓ A jug
- ✓ Two sheets of filter paper
- ✓ A magnifying glass and/or microscope
- ✓ Mop or cloths to wipe up any spills on the floor

Instructions:

- 1 Place/insert the filter paper into the funnel.
- 2 Half fill a bowl with warm tap water.
- 3 Hold the funnel over a bowl to catch the water. Use the jug to help transfer the water from the bowl and through the filter paper in the funnel.
- 4 Remove the filter paper from the funnel. Use the magnifying glass and/or digital microscope to look closely at the filter paper.
- 5 This is a control. Why do you think you need to do this? Can you see anything on the filter paper?
- 6 Half fill the bowl again with warm water.
- 7 Dunk in the fleece so it is completely wet.
- 8 Take it in turns to give the fleece a good rub and squash under the water. Then lift the fleece out of the bowl and squeeze the water from it back into the bowl. Get as much water out of the fleece as you can.
- 9 Look at what is left behind in the water.
- 10 Line the funnel with a clean piece of filter paper. Hold the funnel over a bowl to catch the water and use the jug to help transfer the water from the bowl and through the filter paper in the funnel.
- 11 Remove the filter paper from the funnel. Use the magnifying glass and/or digital microscope to look closely at the filter paper.
- 12 Compare what you see on this filter paper to what is on the control paper.

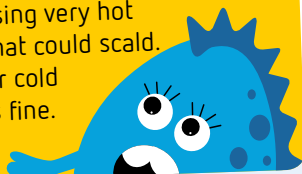


Next steps:

- ✓ You've looked at the negatives of recycling plastics in fleece. Why not have a discussion around the benefits?
- ✓ Create a presentation about how we can reduce plastic waste and research how some people/ companies are doing this.
- ✓ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: crestawards.org/crest-superstar

Watch out!

- ✓ Avoid using very hot water that could scald. Warm or cold water is fine.



JOURNEYS THROUGH NATURE

Nature walk diary



About this activity

In this activity, you will have the opportunity to explore, observe and document the natural world using all your senses, and then use your findings to write poems. You will go for a walk in a park, wood or open field and document your observations, by noting the sights, smells and sounds you encounter on your journey.

Time

1 hour

Kit list

- ✓ Nature walk evidence sheet
- ✓ Clipboard
- ✓ Pens
- ✓ A bag for leaves
- ✓ Camera (optional)

Watch out!

- ✓ All living things, including plants, should be looked after carefully and not injured in any way. Make sure you leave everything as you find it and take all litter away with you.
- ✓ Adults should supervise activities outdoors.
- ✓ Wash hands after working outside.

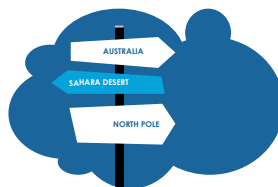


Instructions:

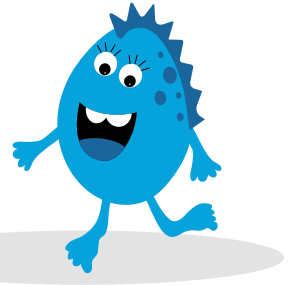
- 1 Plan your walk. You could use a map of a local park or forest to plot your route. What do you expect to see while you are there? What time of year is it?
- 2 Tip: take a camera to photograph species. Then you can identify the plants and animals when you get back to home or school.
- 3 Go on your walk. Record what you see, smell and hear. Collect a variety of leaves from the ground (but don't pick any off trees or plants).
- 4 Listen closely to the sounds you can hear. What birds or insects can you detect? Can you hear the wind moving through the trees? What does the ground sound like as you walk over it?
- 5 Make sure you check under rocks and logs to inspect micro-habitats beneath.
- 6 Once you're back at home or at school, use the words you have written down to write your own poem.
- 7 Use nouns and descriptive words and try to think about similes to describe your observations.

Next steps:

- ✓ Check out the poetry resources in Discovery Education Espresso for ideas and inspiration for how to turn your scientific observations into a beautiful list poem, haiku or other poem of your choice.
- ✓ Why not go on an imaginary journey? Imagine what your nature walk would have been like if you had completed it in another country – or on another continent!
- ✓ What would your walk have been like in a desert? Or at the North or South Pole?
- ✓ Create a new version of your poem in which you adapt the descriptions to match the weather and animals in another place.
- ✓ Resources to accompany your nature walk can be found on [Discovery Education Espresso](https://www.discoveryeducation.co.uk), find out more at [discoveryeducation.co.uk](https://www.discoveryeducation.co.uk)
- ✓ This activity can be put towards a CREST SuperStar Award and there are plenty more online activities you could try for free. For more information, follow this link: [crestawards.org/crest-superstar](https://www.crestawards.org/crest-superstar)



Nature walk diary



Name

Date

The weather is:



Insects I saw:



Other animals I saw:



Leaves I found:



About this activity

Get creative and enter the British Science Association's annual poster competition. You can make your poster about whatever type of journey you like and enter our UK-wide competition with the chance to win an array of prizes. Many activities found in this pack could be entered into the poster competition, simply look for the paintbrush symbol. Or you can use them to serve as a source of inspiration to get you started.

Time

1 hour



Kit list

- ✓ Paper (A4 or A3)
- ✓ Creative materials, e.g. pens, pencils, scissors, glue, watercolours, paint, colouring crayons, pipe cleaners, felt, thread, wool, foil, clay, string, beads, stamps, foam, pompoms

N.B. try to avoid using straws or glitter - these plastics often end up journeying to the sea and harming ecosystems



Poster competition

Instructions: Research your poster

Investigate and imagine all the amazing journeys that take place around the world. Here are some topic ideas to get you started:

- ✓ What sort of journeys have you made? E.g. holidays.
- ✓ Research famous journeys; e.g. Amy Johnson's flight alone from Britain to Australia or Charles Darwin's journey on the HMS Beagle.
- ✓ Think about journeys that might be made in the future or travels through time.
- ✓ Other than travel, what other journeys can you think of? E.g. life cycles of animals or plants, the water cycle, or the life cycles of materials such as plastics.
- ✓ Why not use page 16 as inspiration for a **Guinness World Records** themed poster? The winner of the Junior category will get the chance to spend a day in the life of the **Guinness World Records** team at the global headquarters! Use the link opposite to find out more.

Make your poster

Once you've done your research, it's time to get creative! Your poster must be:

- ✓ 2D (flat) – if you make a model, you need to just send us a photo of it on A4 or A3 paper
- ✓ You can use pop up pictures, pull out tabs or use materials such as paint, drawing pencils, crayons and paper.

Send us your poster

Posters will be judged on creativity, how well it fits the theme and how well the poster has been made or drawn. Once the poster is complete, write your children's information on the back, fill in the online registration form, and then post your entry to us at:

British Science Week Poster Competition,
British Science Association,
165 Queens Gate,
London, SW7 5HD

Next steps: Celebrate!

For more details, along with the full set of rules and tips for educators, check out our website

britishscienceweek.org/plan-your-activities/poster-competition

