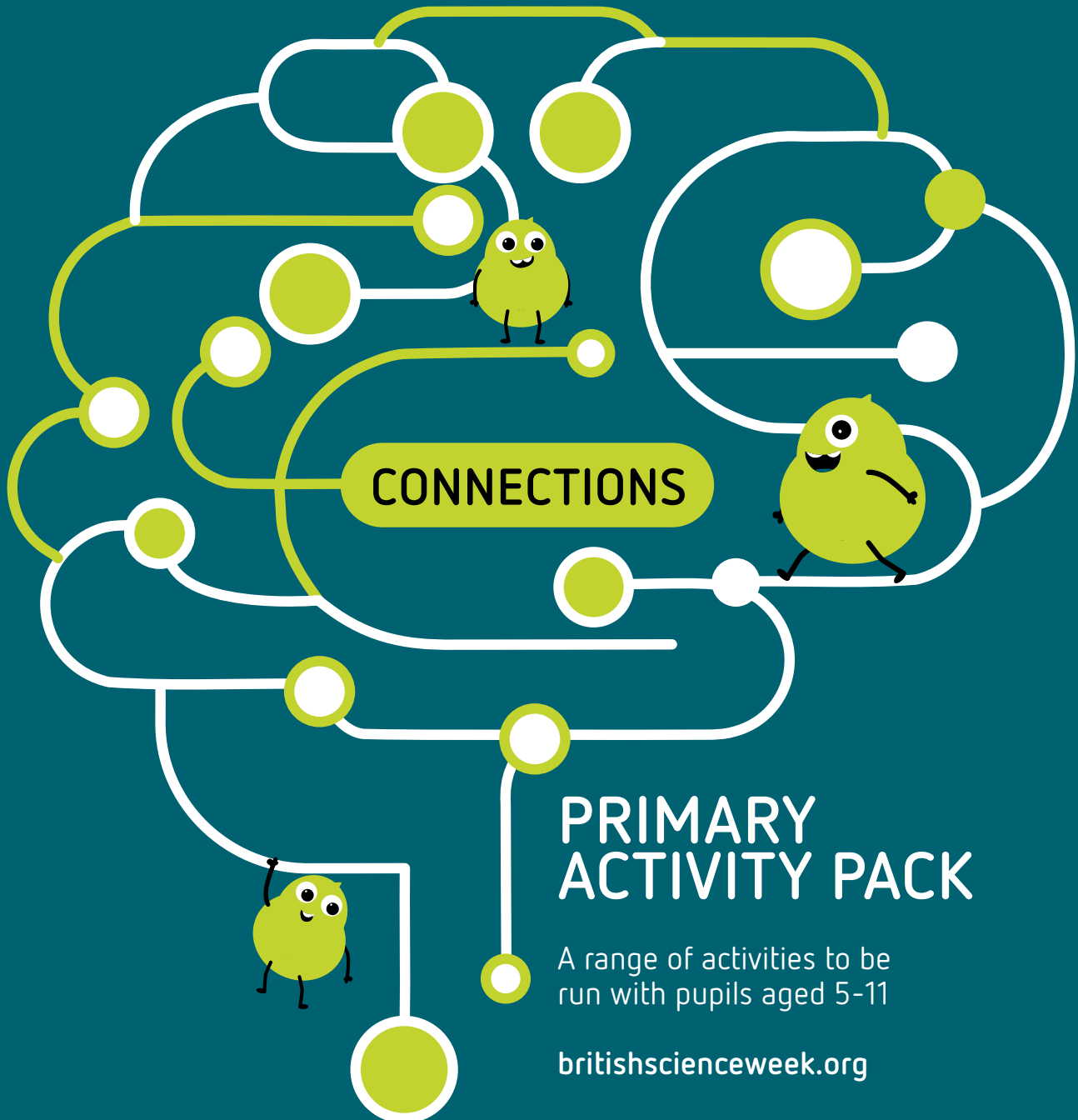




BRITISH  
SCIENCE  
WEEK

10-19 March 2023



## PRIMARY ACTIVITY PACK

A range of activities to be  
run with pupils aged 5-11

[britishscienceweek.org](http://britishscienceweek.org)

Delivered by



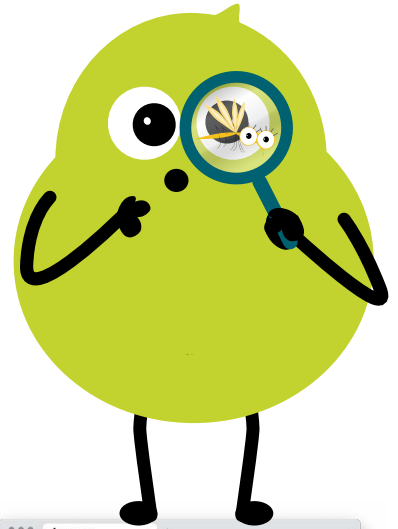
Supported by





# BRITISH SCIENCE WEEK

10-19 March 2023



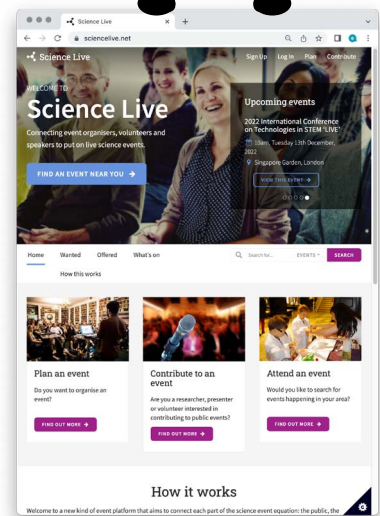
This activity pack is a one-stop shop to support you during British Science Week, and you can use it all year!

When developing this pack, we looked for activities which promote cross-curricular learning and break down the stereotypes surrounding science, technology, engineering and maths (STEM). We therefore encourage you to use British Science Week as an opportunity to link STEM to other curriculum subjects and to your pupils' own backgrounds, lives and interests.

We have included activities for pupils to complete in any setting, whether that's their school, a club, an organisation or at home with their families.

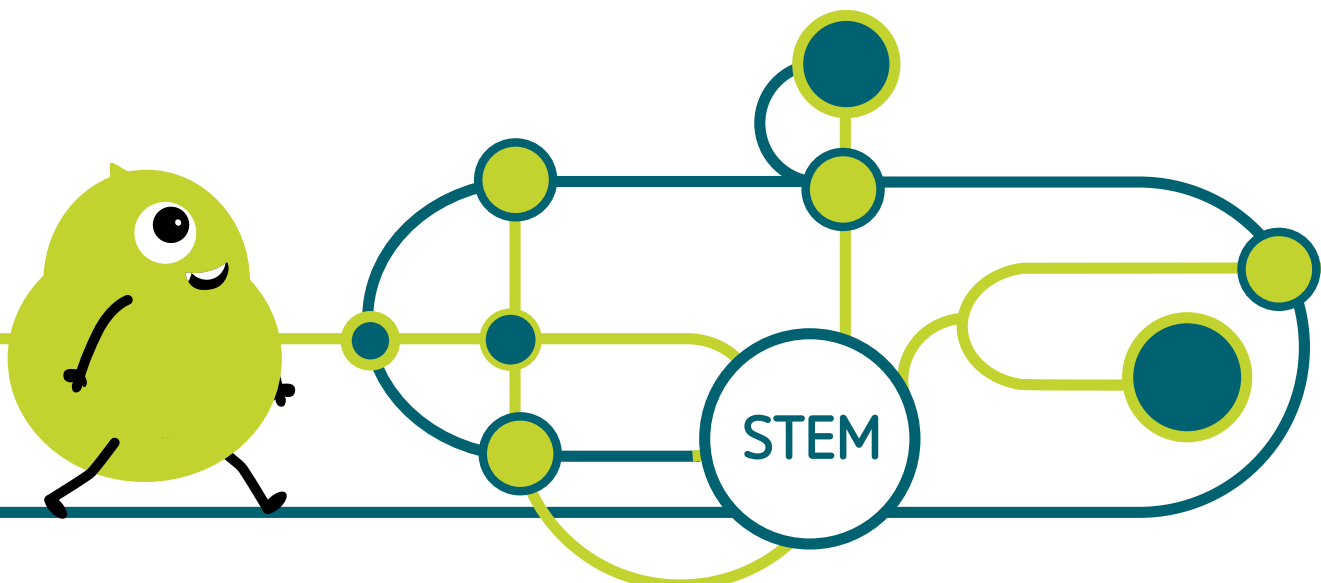
Share your brilliant activities, vlogs or images on social media! Join the conversation or see what's happening during the Week by tagging British Science Week on Twitter (@ScienceWeekUK 🐦) and using the hashtag #BSW23.

All activities (excluding links) have been health and safety checked and include a list of 'Watch out' instructions for pupils to follow. Find out more information at: [britishscienceweek.org/plan-your-activities/activity-packs](https://britishscienceweek.org/plan-your-activities/activity-packs) 🐦.



## Find an activity near you

Last year more than 100,000 people participated in activities around the UK. Help us make British Science Week 2023 even bigger and better! Visit [scienclive.net](https://scienclive.net) 🐦 to find science activities in your local area.



# CONTENTS

We want to hear from you!  
Tell us what you think of the  
activities using our survey...



Visit [bsa.sc/activitypacksurvey](https://bsa.sc/activitypacksurvey) 

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## INTRODUCING THE THEME

# CONNECTIONS

The theme this year for British Science Week is 'Connections'! Introduce the theme to pupils in a fun, imaginative way to get them excited about the Week ahead. You can check out some ideas on how to do this below:

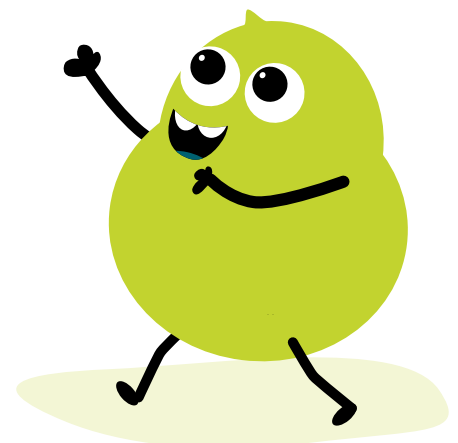
- Ask pupils to design a poster based on this year's theme and enter it into our poster competition for the chance to win some fabulous prizes. Some of the activities in this pack can provide inspiration, simply look out for the activities marked with the paintbrush symbol shown below! The theme for this year's poster competition is 'Connections', and you can find more information on how to enter on [page 39](#) ✨ and at [britishscienceweek.org/plan-your-activities/poster-competition](https://britishscienceweek.org/plan-your-activities/poster-competition) ✨.



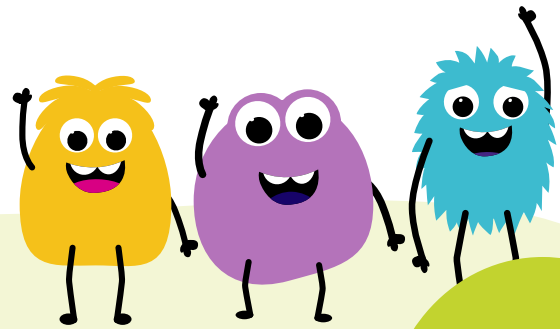
- Try a game, give an audio-visual presentation, explore a mystery or special object or create a pop-up display which communicates the theme of 'Connections'. These activities are great to use as fun warm-ups, and are a fantastic way to start British Science Week.
- Engage pupils by discussing how connections are made between people, plants, animals, materials, countries and other things in their everyday lives. What are good examples of connections?
- Invite a special guest or someone from the school community to share with pupils their own experience of connections (for example, how they have made connections with other scientists and learned from them), showing how connections between people can help the study of connections in science. [See page 5](#) ✨ for information on how to get volunteers.

Here are some other ideas to include at the beginning of British Science Week:

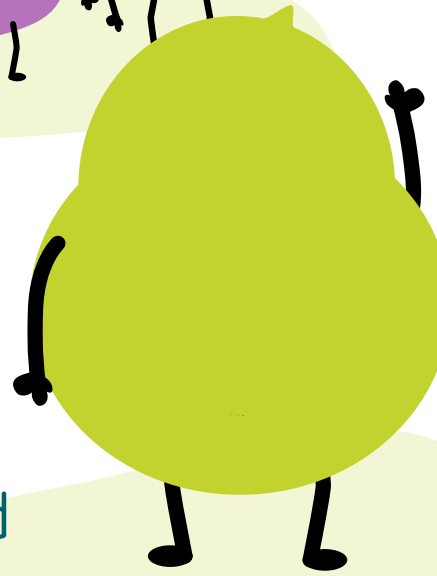
- Tell pupils about the plan for the Week and give them a challenge related to the theme. If you are sending home a family experiment, maybe you could introduce or demonstrate it at your school first.
- Connections are all around us. Where has the topic of connections been in the news or your local area? What are examples of good and bad connections? Is there any way you can encourage conversations about this with pupils?



## MAKING THE MOST OF VOLUNTEERS



Face-to-face engagement is a great way to get pupils involved and excited about a volunteer speaker and their topic, but don't forget that there are still opportunities to get volunteers and presenters to engage with pupils online.



**S**TEM Ambassadors are volunteers who offer their time and enthusiasm to help bring STEM subjects to life, and to demonstrate their value to young people. It is now possible to request both in-person and remote STEM Ambassador support, meaning that Ambassadors from across the UK can inspire young people wherever they are.

Find out more and make a request for STEM Ambassador support here: [stem.org.uk/stem-ambassadors/find-a-stem-ambassador](https://stem.org.uk/stem-ambassadors/find-a-stem-ambassador) ✨.

You can also look for presenters and volunteers via Science Live ([sciencelive.net](https://sciencelive.net) ✨) or ask parents and carers if they work in STEM-related jobs to describe what they do in more detail.

You could also try some of the following things:

- Schedule two or three different guests for careers talks during the Week, if possible, to get pupils anticipating who the next guest will be and what they do. These sorts of experiences can inspire pupils to think about what they want to be in the future. Remember, they are never too young to explore their career options!
- Where available, choose volunteers/Ambassadors who challenge stereotypes about scientists the pupils might have absorbed, and promote positive attitude towards science, like female engineers. Let the volunteers/Ambassadors share how their job is making

a difference in the world, or an anecdote of a science activity they loved to do as a child.

- Book your visitors early (as many speakers get booked up during British Science Week). Have a clear idea of what you want them to do and communicate this with them ahead of time.

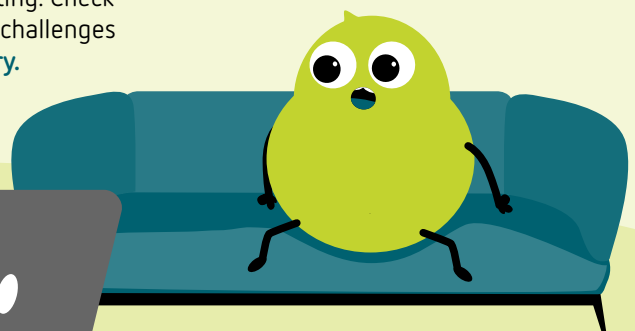
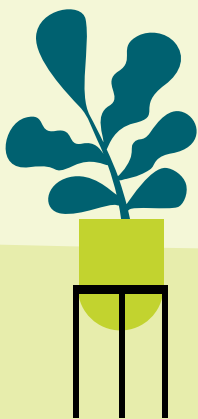
Volunteers come from a range of careers and experiences, from engineers, designers and architects to scientists and technicians, so get pupils looking forward to inspirational career talks which broaden their choices and develop their job interests!

Visit the Inspiring the Future website ([inspiringthefuture.org](https://inspiringthefuture.org) ✨) for some helpful ideas for using volunteers.

# BRITISH SCIENCE WEEK AT HOME

Do you want to help pupils carry on participating in British Science Week at home, but are not sure how? Here are our top tips for engaging parents and carers with the Week.

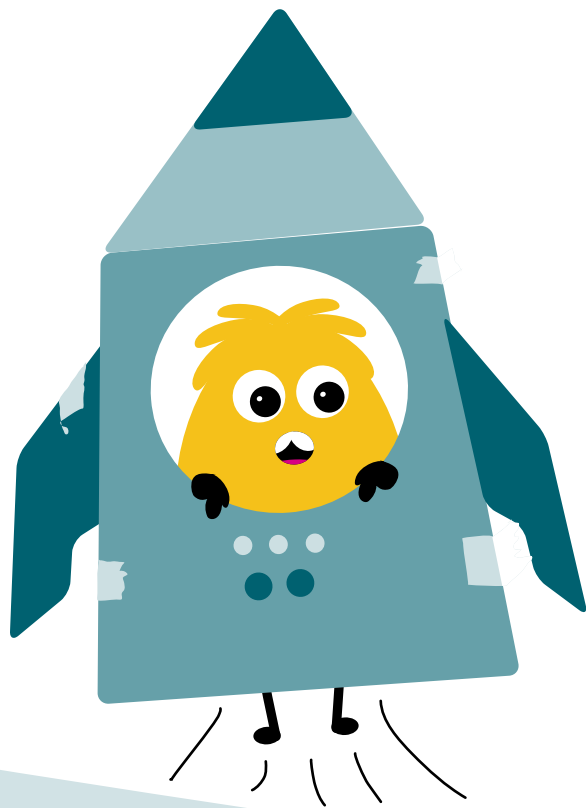
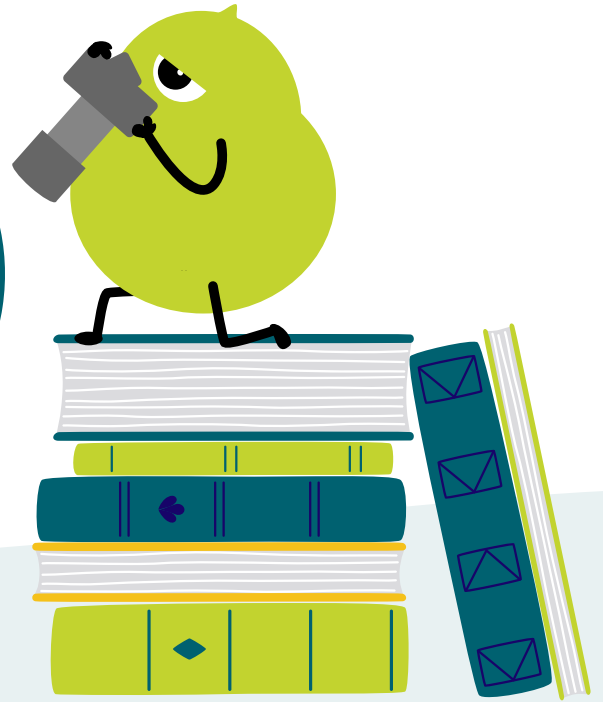
- **Make the most of parent newsletters**, the Parent-Teacher Association (PTA), chat group and text messaging services, if you have them. Let all the parents and carers know at least a month in advance of the Week what you have planned, and how you'd like them to be involved. They might be able to collect or donate materials for use during the Week, and if you want them to get involved in any experiments at home they may need time to plan and collect materials themselves. The PTA may be able to support you financially to run activities during the Week or help to drum up parent volunteers.
- **Get parents and carers thinking** about how their own jobs might link to STEM subjects and encourage them to chat with their children about this. You could do this via a newsletter or send pupils home with activities they can do with their families, which may then lead onto further conversations.
- **Encourage exploring outdoors**, in the community or in local cultural spots. This could be anything from going on a nature walk around local parks, to spotting STEM in action on the streets around children's houses. You might want to check out the free resources available through CREST Awards. The Star and SuperStar activities have been designed for primary school pupils and many can be done in an outdoor setting. Check out the CREST primary challenges collection: [primarylibrary.crestawards.org](https://primarylibrary.crestawards.org) ✨.
- **Send an experiment idea home** during the Week to perhaps spark mealtime discussions around science. Try to make it as low-resource as possible. It can help if it's something the pupils have tried or seen at school first so that they feel like the 'experts' when they do it at home with family, allowing them to lead the learning. Some of the activities in this pack have been adapted to be easily run at home, so they are a great place to start! There are also a range of science-based home activities requiring few resources in the CREST Home learning collection: [bsa.sc/collectionslibrary-crestawards-low-resource](https://bsa.sc/collectionslibrary-crestawards-low-resource) ✨.





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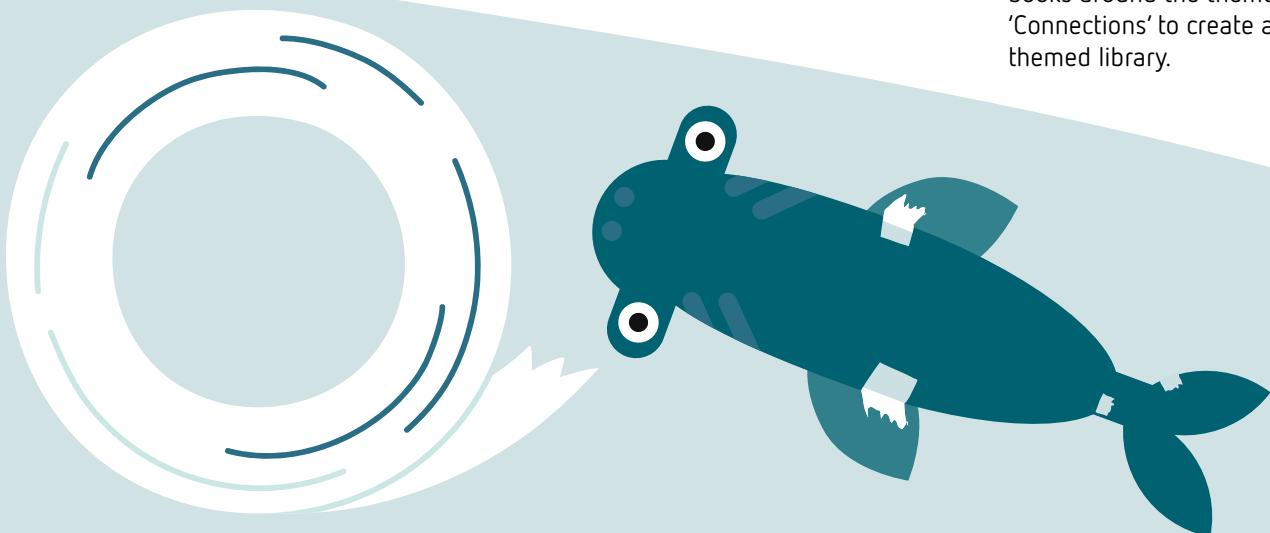
## GATHERING RESOURCES FOR THE CLASSROOM OR HOME



If you can, try to collect materials throughout the year for use during British Science Week. Alternatively, check to see whether there is a scrap shop/store/club open in your local area. These places are often membership based and can be a brilliant, inexpensive or free resource for card, fabric and other bits of material. Salvaged materials can be turned into spaceships, trees, sea creatures and more; you name it - the kids will think of it! Look at [childrensscrapstore.co.uk](http://childrensscrapstore.co.uk) to find a UK directory of scrap stores.

**Take photographs** when out and about and share these with the pupils to foster discussion and raise their level of understanding about the connections happening all around us, in plants, building structures and so on. The more colourful, the better! The photos can be a reference point for future activities, for example a version of the guessing game 'I spy', where you can describe your observation of a connection and the pupils can attempt to guess it.

**Collect story books** and reference books around the theme of 'Connections' to create a themed library.







## Exploration and curiosity don't have to end once British Science Week is over!

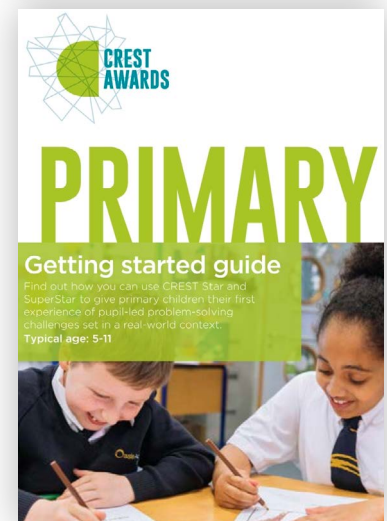
Some of the following ideas could help you to expand the learning beyond the Week.

Have pupils take part in a CREST Award. CREST is a scheme that encourages young people to think and act like scientists and engineers. Pupils can complete eight activities to achieve a Star or SuperStar Award, which will see them receive a certificate and badge. Older pupils could also work towards a higher-level CREST Award. Take a look at the different primary CREST challenges here: [primarylibrary.crestawards.org](http://primarylibrary.crestawards.org)

Consider sharing your British Science Week learnings by running a Continuing Professional Development (CPD) session for other teachers in your school or, where relevant, academy chain. Think about incorporating the Science Capital teaching approach into your methods: [ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/science-capital-research/science-capital-teaching-approach](http://ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/science-capital-research/science-capital-teaching-approach)

If you have the opportunity, consider running a STEM club or curiosity lab. You can find supporting resources at [stem.org.uk/stem-clubs](http://stem.org.uk/stem-clubs)

Look out for the 'Inspired? Find out more about CREST' logo, shown below, on some of the activities in this pack. This logo indicates that this activity is a perfect jumping off point for designing your own CREST Awards project!

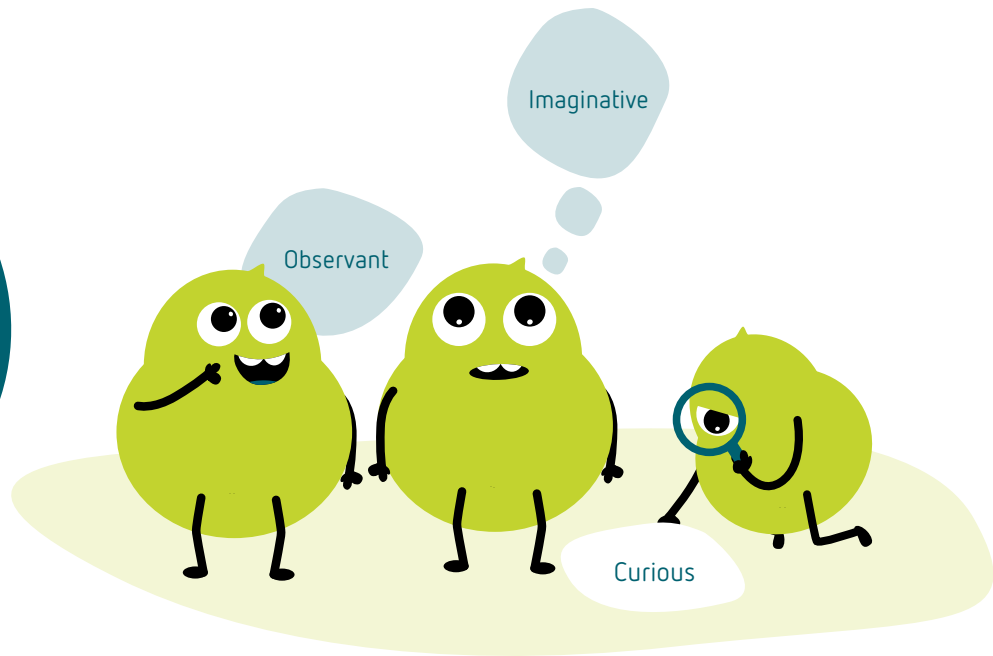






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## UNLOCKING SKILLS



A fantastic way to encourage pupils to take an interest in STEM is to introduce transferable skills used by those working in STEM-related jobs.

These skills will strengthen positive attitudes and reduce stereotypes of those working in the field.

You could, for example, engage pupils in this **STEM Person of the Week** ✨ activity from NUSTEM at Northumbria University. Ask pupils to identify what attributes people working in STEM need. These might include being observant, creative, patient, good at communication, or curious. Look out for the skills unlocked tags for each activity in this pack.

See the table below for the complete list of skills developed by NUSTEM to use as a talking point or to share with other teachers. Or, as a little bit of motivation, why not award each of the students with a certificate for a STEM skill which they demonstrate very well during the Week?

### Get pupils leading the way

A great way to encourage STEM interest in young people is by letting them lead the way. Here's how you can help them along:

- **Encourage pupils to run their own activities** during British Science Week. They could either run activities for other members of the class or run some CREST at home activities with their family, taking photos to present back to their class. Check out the CREST SuperStar activities for inspiration: [bsa.sc/primarylibrary-crestawards-superstar-homelearning](https://bsa.sc/primarylibrary-crestawards-superstar-homelearning) ✨.
- **Get pupils to run their own CREST projects** and then use them as inspiration for a mini science fair in class. There are lots of handy CREST resources on the website: [library.crestawards.org](https://library.crestawards.org) ✨.

- **Ask pupils to research** how connections have influenced the way we live our lives today and then write a report for the school newsletter or website.
- **Encourage pupils to design and create** their own display, such as a display of scientists through time. This could be a photo exhibit that emphasises the diversity of scientists, and which helps to overcome the 'scientist in a white lab coat' stereotype.



Observant	Open-minded	Committed	Curious	Logical
Creative	Imaginative	Patient	Self-motivated	Collaborative
Resilient	Communicator	Passionate	Hard-working	Organised

# BRIDGE BLUNDER

This activity is designed to get you thinking about the connections between weights, forces and measures.

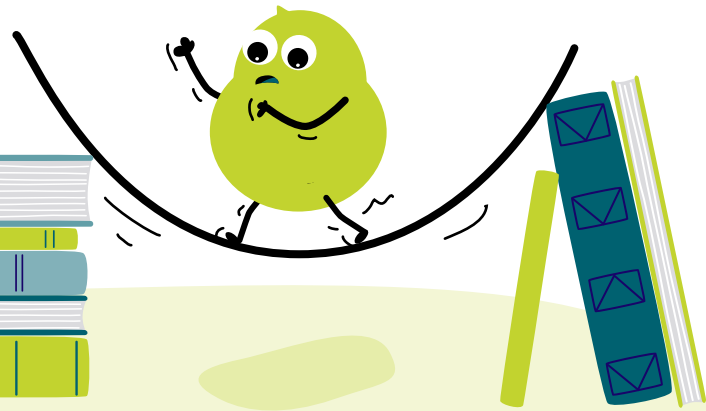
Check out our video demonstration here:

[bsa.sc/YouTube-CREST-Bridge-blunder-demonstration](https://bsa.sc/YouTube-CREST-Bridge-blunder-demonstration)

Can you build a model bridge that supports heavy weights?

45 – 60 minutes

**Skill set:** Creative, Imaginative, Logical



## Kit list

A4 paper

Weights or other equipment to act as 'weights' (like coins, blocks)

Blocks or similar to create the gap for the bridge – or gap between chair and tables

Sellotape



## Instructions

You are going to test the best design for a bridge. Think about which shapes are the strongest.

- 1 Using paper and a small amount of tape, make your bridge. You can cut, roll, or fold the paper if you wish. This is not your final bridge, just a way to try out your ideas!
- 2 Test your bridge with weights. Think about how to make this a fair test; does it matter where you put the weights?
- 3 Record the maximum weight your bridge could hold. What could you change to make the bridge stronger?
- 4 Using your findings from the first test, make one final model and test with the weights again.
- 5 Show your bridge to the rest of the class. You could take pictures and add notes about what you think might make your bridge stronger and more stable.

## Watch out

- Avoid weights falling from a height.
- If bridges are high, you will need a bucket of sand or cardboard box filled with crumpled paper underneath to catch falling weights.

## Next steps

This activity is one of the CREST SuperStar challenges. Why not try some of the other fun activities here: [primarylibrary.crestawards.org/#SuperStar](https://primarylibrary.crestawards.org/#SuperStar)

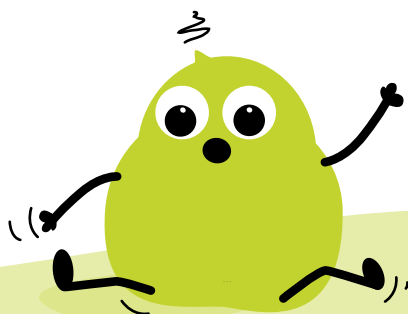
If you are an adult wanting to run CREST Awards with your pupils, visit the website for advice on how to get started: [crestawards.org](https://crestawards.org)

## At home

What did people in ancient times use to build bridges? How does this compare to bridges built today?

## Career options


- Architects design bridges and buildings, if you are creative this could be the job for you!
- Engineers work out how to bring these designs to life. This could be a great career if you like problem solving and are good at making things, such as the models in this activity.




Take it home:

# FANTASTIC FINGERPRINTS

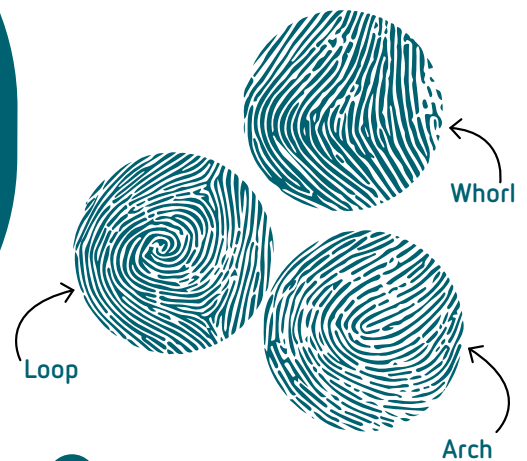
This activity is designed to get you thinking about fingerprints. Check out the video demonstration here:

[bsa.sc/YouTube-CREST-Fantastic-fingerprints-demonstration](https://bsa.sc/YouTube-CREST-Fantastic-fingerprints-demonstration) 

Find out if everyone's fingerprints really are different.

 45 – 60 minutes

**Skill set:** Curious, Observant, Patient



## Kit list

Dust (flour, chalk, talcum powder, cocoa powder)

Soft pencils

Blank paper (white paper for pencil and cocoa prints; black paper for white powder prints)

Sellotape

Scissors

Magnifying glasses



## Instructions

You will be comparing different fingerprints and seeing if you can identify any patterns. What do you know about fingerprints? Look at your own fingerprints using a magnifying glass.


- 1 Now you are going to take your fingerprints. Rub a pencil onto a piece of paper or sprinkle a small amount of dust on a table.
- 2 Now put your thumb on the pencil rubbing or in the dust. Then place your thumb firmly on the sticky side of a piece of sellotape.
- 3 Stick your sellotape onto a piece of paper. You should be able to see your fingerprint. Experiment to see what works best to get clear prints.
- 4 Look at your fingerprints, are the patterns like the ones at the top of the page?
- 5 Compare your prints with other people. Are they all different? Can you work out which are yours?
- 6 Can you find other ways to collect fingerprints?


## Watch out

Check if anyone has wheat or nut allergies before using flour and cocoa.

Remember to keep fingers out of your mouth and eyes during this activity and to wash your hands thoroughly at the end of the session. **Do not use permanent markers.**

## Next steps

This activity is one of the CREST SuperStar challenges. Why not try some of the other fun activities here: [primarylibrary.crestawards.org/#SuperStar](https://primarylibrary.crestawards.org/#SuperStar) .


If you are an adult wanting to run CREST Awards with your pupils, visit the website for advice on how to get started: [crestawards.org](https://crestawards.org) .

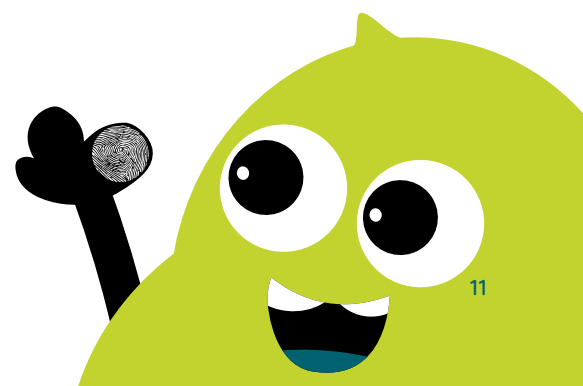
## At home

Look for fingerprints on surfaces such as glass (e.g. drinking glasses, mirrors or windows). Can you identify who made them?

Can you find out other ways of identifying individuals?

## Career options

 Forensic scientists will collect evidence from crime scenes and take it to a laboratory for testing. These tests, like the activity you have just done, help police identify who committed the crime. If you have a lot of patience and like solving problems, this could be a career for you!



# PROTECTING HABITAT CONNECTIONS

Why do scientists wait around in old buildings in the middle of the night? They are protecting the connections in a food web which keep the habitat around the building healthy. In this activity you will explore what happens if these connections are broken.

🕒 30 minutes

Skills unlocked: Observant, Patient, Organised

## 🧰 Kit list

2 species sheets  
(see next page)

Large piece of paper

Scissors

Access to the  
internet or  
reference books

Pen or pencil

Lined paper



## 📖 Instructions

What do you know about food chains and food webs? BBC Bitesize has a good video and quiz to jog your memory!  
[www.bbc.co.uk/bitesize/topics/zx882hv/articles/z3c2xnb](http://www.bbc.co.uk/bitesize/topics/zx882hv/articles/z3c2xnb) ✨

- 1 Cut out the species cards.
- 2 Write FARM at the top of your poster paper.
- 3 How many different food chains can you make? Draw arrows between the species to show the connections. You may need to look some up.
- 4 Which species fit into more than one food chain?
- 5 Can you make a food web?
- 6 Barn owls and bats roost in an old barn on the farm. What will happen to them if the barn is knocked down?
- 7 Remove the bats and barn owls from your food chains or food web.
- 8 Write a short letter to the farmer to tell them what will happen on the farm if the barn is knocked down. What should they do?



## ⚠️ Watch out

Use scissors safely.

## ➡️ Next steps

Research how scientists are protecting these habitat connections.

Note to teachers: The Bat Conservation Trust has lots of information about bats here:  
[www.bats.org.uk](http://www.bats.org.uk) ✨

## 🏠 At home

Find out what a bat surveyor does. Draw a picture of a bat surveyor at work. What times do they work? What equipment are they using?

## ↔️ Career options

- 👉 Ecologists study how animals and plants interact with their environment, investigating the connections between species in a habitat, and helping to protect the environment and natural resources.





Apple tree



Barn owl



Hawk



Beans



Bee



Farmer



Ladybird



Cow



Clover



Sheep



Oats



Midges



Moth



Beetle



Grass



Grasshopper



Bat



Blue tit



Sheep



Aphid



Earth worm



Blackbird



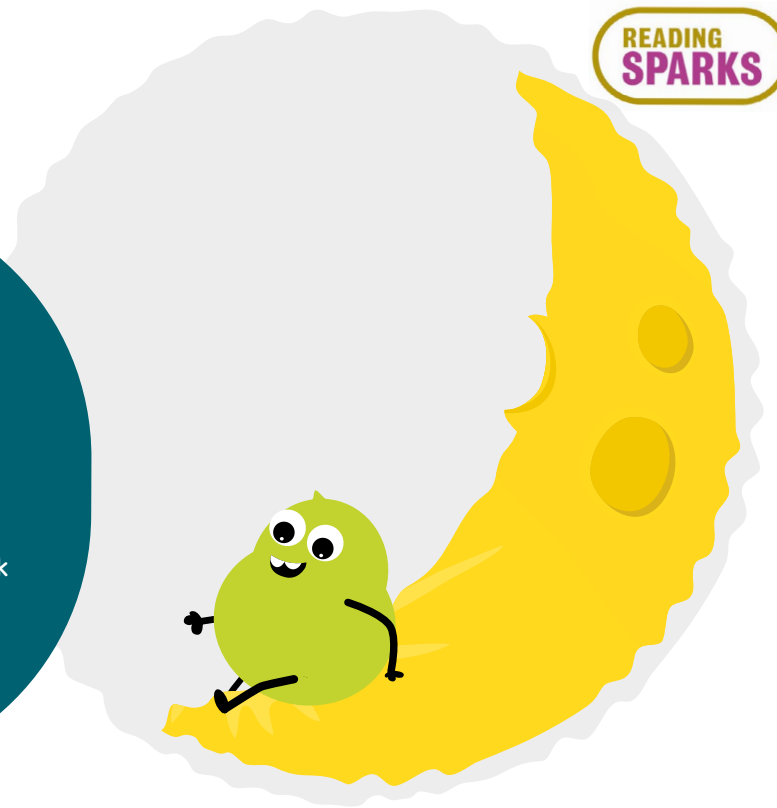
Cabbages

# MAKING A MOON DIAL

In this activity you will be finding a book about the moon, then making your own moon dial to track the phases of the moon. You can use your school library, or go to your public library and ask a librarian to help you find the right book.

🕒 1 hour

Skills unlocked: Curious



## 🧰 Kit list

A copy of the moon dial discs printed onto thin card (see next 2 pages)

A paper split pin

Scissors

A pencil and some modelling clay (to make a hole)

Access to a library

## 📖 Instructions

- 1 Find a book about the moon. This could be a picture, non-fiction (information) or story book. You might find a book on space with a chapter about the moon. Have a browse and see what you can find.
- 2 Read the book and see if you can find a picture of the moon in the book. Was it a full, quarter or crescent moon? Use Disc 1 (see next page) to help you decide.
- 3 You can now make your own moon dial to help you track through the different phases of the moon.
- 4 Cut out Discs 1 and 2 (see next 2 pages).
- 5 Place some modelling clay under each of the blue dots then use a pencil to push through and make a hole.
- 6 Place Disc 2 on top of Disc 1 and put the paper split pin through the holes to secure the discs together. You can now track the phases of the moon!

## ⚠️ Watch out

- Take care when you are pushing the paper split pin through the card.
- Use scissors safely.

## ➤ Next steps

At Reading Sparks, they love making connections between books and STEM. Some Reading Sparks groups of young people have been making films about books they read. Have a look and find out more at: [www.readingsparks.org.uk](http://www.readingsparks.org.uk) ✨

## 🏠 At home

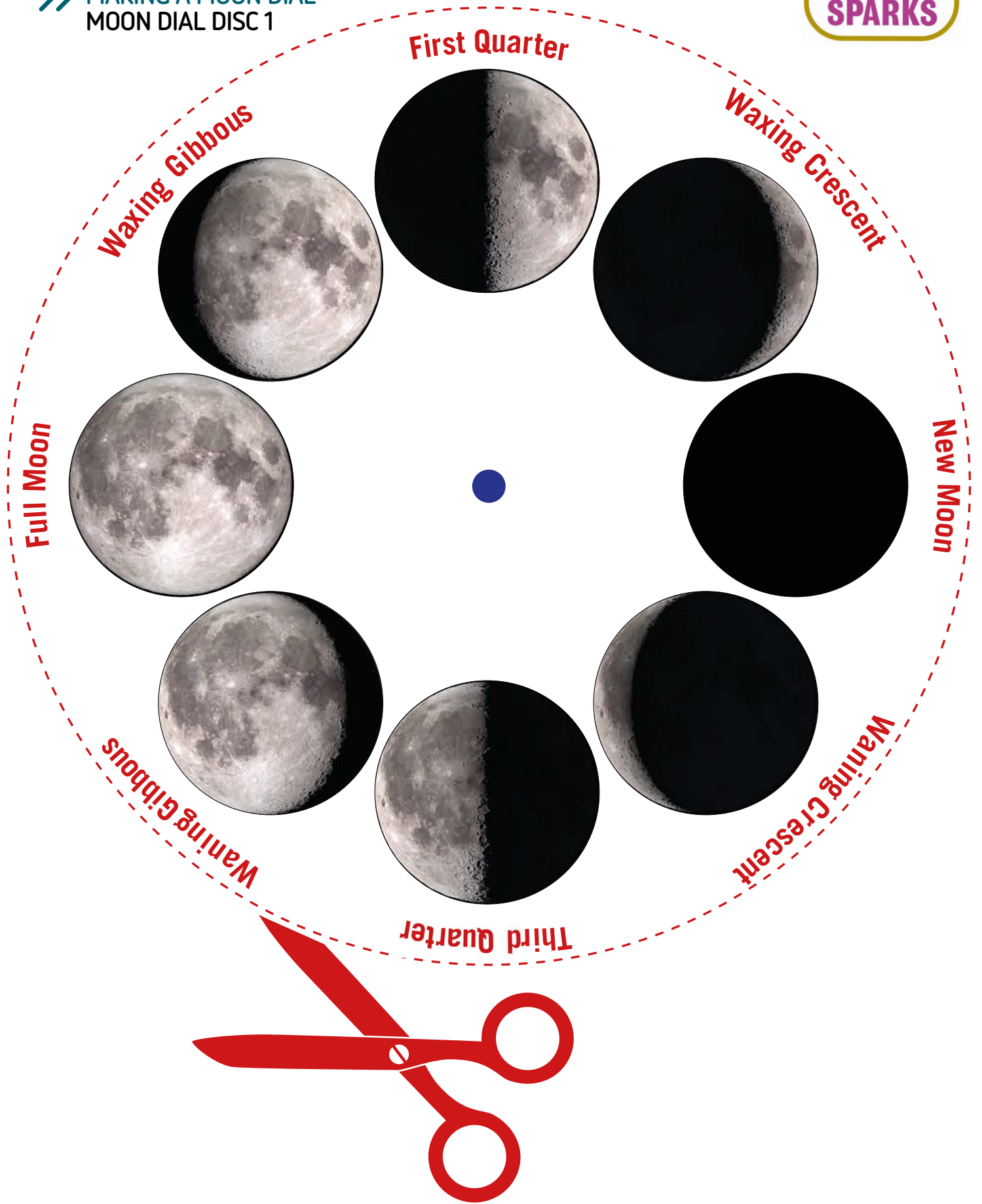
Some people talk about “the man in the moon”, others see a rabbit. What shape(s) can you see on the surface of the moon?

## ↔️ Career options

Books are a great way to share your ideas and stories. People involved in creating books include:

- authors who write
- illustrators who draw
- publishers who make everything into a book for us to read
- librarians who help make these books freely available for you to enjoy!







» MAKING A MOON DIAL  
MOON DIAL DISC 2



# PLANT YOUR PANTS!

Humans are connected to soil. We depend on soil for food (for us and other animals), plant-based fibres like cotton and linen, for some building materials and even for medicines. Healthy soil locks up carbon, holds water and is full of life. Use your senses to explore soil and discover what it can do!

🕒 30-45 minutes, plus follow up in 8 weeks

Skills unlocked: Observant, Curious, Patient

## 📋 Kit list

Spade or trowel

Tray

"Hands in the Soil" sheet (see next page)

Water

2 pairs of clean cotton underpants or other 100% natural fibre clothing or material

Colouring pencils

Weighing scales



## 📖 Instructions

- Choose 2 locations with different soil.
  - Use a trowel/spade to remove the surface layer of soil and then lift a spadeful of the soil underneath into the tray.
  - Inspect the soil, using the "Hands in the Soil" sheet.
- Soil-dwelling creatures digest food (other creatures and plant matter) in the soil. Good soil has more life in it. To find out how much life there is in your 2 soils, you are going to bury some cotton pants!
  - Describe and draw what you are burying; think about their colour, texture and weigh them.
  - Bury pants in each location. Put a marker in the soil so you can find them later!
  - You are going to leave the pants for 8 weeks. Predict what might happen. Will they have changed? How?
- After 8 weeks dig up your pants. Were your predictions correct? Why might they have changed?

## ⚠️ Watch out

- Ask for permission before you dig up lawns and playing fields.
- Dig carefully. Look out for any litter, glass or sharp items in the soil.
- Wash your hands carefully after touching soil.
- Once you have dug up your underpants at the end of the 8 weeks, dispose of in non-recycling rubbish.

## ➡️ Next steps

To find out how to record and share your findings, when to dig up your pants, and other 'plant your pants' worksheets and activities, go to [countrytrust.org.uk/plantyourpants](https://countrytrust.org.uk/plantyourpants) 🌟

## 🏠 At home

Find food or clothes that started their lives in soil. Look in ingredient lists and clothes labels. What would life be like without soil?

## ↔️ Career options

- Soil scientists study how soil impacts our lives including: food production, water storage, nutrient cycles, carbon capture and waste disposal.
- Agronomists work with farmers to help them grow healthy crops.
- Wildlife and Environment Officers look after wild plants and animals.
- Horticulturists grow food, flowers and vegetables.



# >> PLANT YOUR PANTS! HANDS IN THE SOIL WORKSHEET

Soil is a mixture of rock minerals, fungi, millions of tiny living creatures (from bacteria to earthworms), dead and decaying organic matter, air and water. Different soils have different amounts of each of these. Get your hands in the soil and explore it with your senses to see if you can work out what makes soil good and healthy.

- Think about which locations a farmer might prefer to grow crops and why.
- Which location do you think has the better quality soil?
- What do you think humans can do to change the soil quality?

	Soil location 1	Soil location 2
<p><b>Describe the location</b></p> <p>Is it sheltered or in the open? Is anything growing there? Do people regularly tread on it?</p>		
<p><b>Colour</b></p> <p>Colour in the box to show the colour of the soil.</p>		
<p><b>Treasures</b></p> <p>What is in the soil?</p> <p>e.g. roots, stones, minibeasts, earthworms, leaves, pine needles, seeds</p>		
<p><b>Smell</b></p> <p>e.g. fresh, damp, sweet, sour, mouldy, earthy</p>		
<p><b>Appearance</b></p> <p>e.g. gritty, clumpy, fine, coarse, lumpy, stony, shiny, dry, wet, sparkly, soft, hard</p>		
<p><b>Sound</b></p> <p>Rub a little of the soil between your fingers next to your ear.</p> <p>e.g. silent, quiet, gritty, squeaky, loud, crunchy</p>		
<p><b>Texture</b></p> <p>Add a little water and roll the soil into a ball.</p> <p>e.g. sandy, clay, chalky, spongy, slippery, soapy</p>		

# INVENT LIKE A VICTORIAN

The Victorians were keen inventors. Everyday people used their own life experiences to design new inventions. Connect to these inventors and ideas from the past and develop your creativity and problem-solving skills. Channel your inner inventor and design something to make life at home easier.

🕒 1 hour

Skills unlocked: Creative, Observant, Imaginative

## 📋 Kit list

Coloured pencils  
or pens

Paper

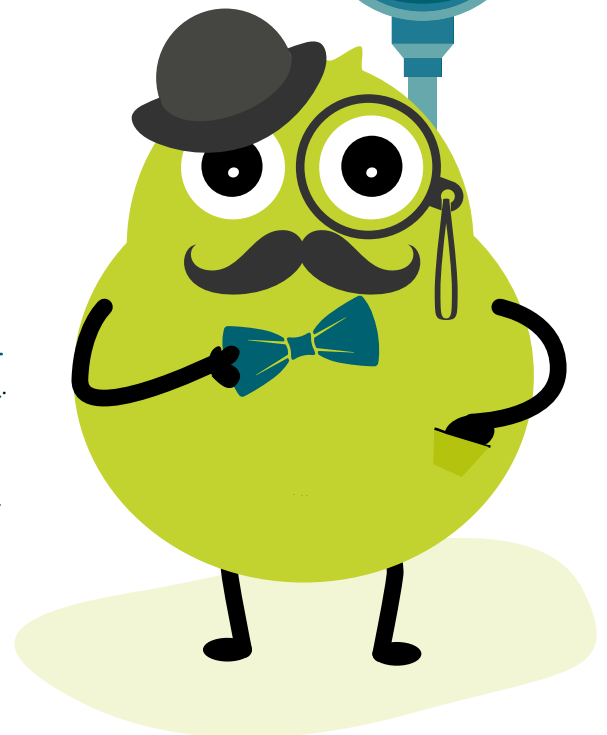
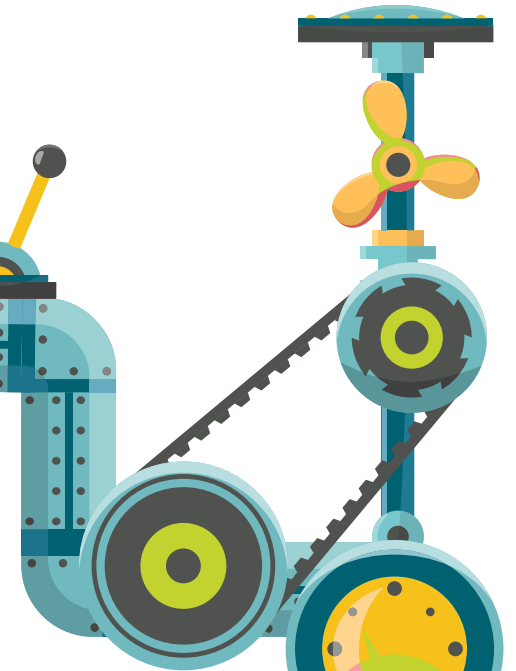


## 📖 Instructions

- 1 Create a mind map of problems you may have in your own home that could be solved by an invention. These could be related to cooking, cleaning, heating, sleeping, getting dressed, getting out of bed, gardening, losing things etc.
- 2 Visit The National Archives' webpage on some of the weird and wonderful inventions designed by ordinary people in the Victorian era that were intended for use in the home and garden: [blog.nationalarchives.gov.uk/the-spirit-of-invention-in-the-victorian-home/](https://blog.nationalarchives.gov.uk/the-spirit-of-invention-in-the-victorian-home/)
- 3 Inspired by these Victorian designs, use coloured pencils or pens to draw an invention to solve a problem in the home. Draw in as much detail as you want!
- 4 Don't forget to include views from the front, rear and side, as well as measurements, materials and colours.
- 5 Include a sentence about what your invention does, why it is unique and why you decided to design it.

## ➤ Next steps

Submit your design online for the chance to have your design displayed in 'The Spirit of Invention' exhibition at The National Archives, or even brought to life by a talented maker!  
[www.smartsurvey.co.uk/s/SubmitInvention](https://www.smartsurvey.co.uk/s/SubmitInvention)




## ↔ Career options

- The inventors whose ideas are captured in the design registers used their imaginations to solve problems in their own lives and work.
- They were surgeons, gardeners, farmers, tailors and veterinarians. Lots of STEM careers require the creativity and problem-solving skills used in this activity, not just inventing and engineering!

# YEAST GROWTH AND TEMPERATURE

When baking bread, yeast is added to dough as a raising agent to make it rise. The 'bubble' structure that can be seen in cooked bread is caused by a gas (carbon dioxide) that yeast produces as it consumes sugar and grows. This activity tests at which temperature yeast grows best.

 1 hour

Skills unlocked: **Observant**



## Kit list

(per experiment)

90g dry yeast

90g sugar

3 small plastic bottles with lids

3 water containers

3 balloons

Weighing scales

Thermometer

Flexible tape measure



## Instructions

- 1 Weigh 30g yeast and 30g sugar and place in a bottle.
- 2 Repeat step 1 for the other 2 bottles.
- 3 Measure 30ml of water using a mixture of hot and cold water. Use a thermometer to obtain 3 different temperatures for each bottle: 15°C, 30°C and 45°C.
- 4 Add the water to the mixtures of yeast and sugar in the 3 bottles.
- 5 Put the lids back on bottles and shake all 3 bottles to mix.
- 6 Take lids off the bottles and attach balloons to the top of each bottle immediately.
- 7 Leave each bottle for 10 minutes.
- 8 Use a tape measure to measure around the widest part of each balloon.
- 9 Record the results in a table that shows the water temperature and circumference of each balloon.
- 10 The larger the balloon, the more gas is being produced and the more the yeast has grown.

## Watch out

- A mixture of hot and cold water is needed to obtain the correct water temperature. You should not work with water over 45°C. To avoid this risk, ask a teacher/adult if they can prepare flasks of water for you.
- Be careful not to get any of the yeast mixture in your mouth or eyes. If you do, rinse immediately with water.
- Do not store beyond the end of the lesson, pour yeast/sugar/water mixtures down the drain with lots of water.

## Next steps

Head to the BBC Teach website to see a short film about this investigation: [bsa.sc/bbc-what-temperature-does-yeast-grow-the-most-video-demo](https://www.bbc.com/teach/primary-science/yeast-growth-temperature) ✨

## At home

Find out what yeast needs to grow. Why do bakers need to check their yeast is alive before they use it in baking?

## Career options

- Bakers and chefs need to understand how yeast grows to help their baking and cooking.
- Fermentation scientists study fermentation (which involves yeast) and use this knowledge in food and medicines.
- Chemists explore how different chemicals react when mixed together and under different conditions.



# SUSTAINABLE SOAP

In this activity you will compare solid and liquid soaps. You will think about whether they are both as effective at washing hands, and whether one is more environmentally friendly.

🕒 1.5-2 hours, plus 4 weeks of observation

Skills unlocked: Curious, Patient



## ⚠️ Watch out

- Mould spores can exacerbate lung conditions such as asthma. Once the bread is sealed in the bag do not open it again.
- Once the investigation is complete, seal all of the bags of bread in another sealed bag before disposing in the the non-recycling rubbish.
- Do not store bread beyond 4 weeks.
- Adults may need to warn colleagues that you are deliberately growing mould so that the investigations are not thrown away too soon. [primary.cleapss.org.uk/Resource-File/P006-Growing-fungi-on-food.pdf](https://primary.cleapss.org.uk/Resource-File/P006-Growing-fungi-on-food.pdf)

## 🧰 Kit list

Fresh white bread

Clear new sealable bags

Pen

Liquid hand wash

Bar of soap

Access to hand washing facilities

## 📖 Instructions

- 1 Get into a group of 3.
- 2 One person will wash their hands with the liquid soap, one person will use the bar of soap, and one person will not wash their hands.
- 3 Each group member should pick up and handle a piece of bread.
- 4 Next, seal your piece of bread in a clear plastic bag. Label your bag to show which type of soap was used.
- 5 Put the sealed bags of bread somewhere warm and dark. Make sure that they don't get too hot, or they will dry out.
- 6 Look at the bread through the bag every few days and record what happens. After a while you should see mould start to grow.
- 7 Do you notice any differences between the amount of mould growing on the bread? What does this tell you about the importance of handwashing? What does it tell you about how well different types of soap work?

## ➤ Next steps

This activity is taken from CIEC's 'Sustainable stories and solutions for our planet' resource. CIEC would like to thank Innospec for adding new activities in 2022, and to Thomas Swan and Co. Ltd for funding the initial development of this publication, which can be downloaded free of charge at [ciec.org.uk/sustainability.html](https://ciec.org.uk/sustainability.html)

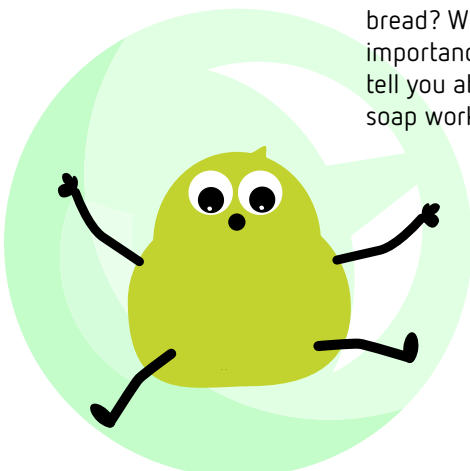
## 🏠 At home

Have you ever thought about how much more volume there is in a bottle of hand wash compared to a bar of soap?

What other liquid products do you have at home? How many of them do you think would work in a solid formulation?

## ↔️ Career options

Companies like [innospecsustainability.com](https://innospecsustainability.com) are helping us to live more sustainably by developing a wider range of solid products, such as shampoo.



# NOISY NEIGHBOURS

This activity explores how sounds travel and begins with an everyday common experience.

This is then followed up with hands on activities so you can experience hearing sounds in different ways.

🕒 15 minutes to 3 hours

Skills unlocked: Creative, Communicator, Collaborative



## 🧰 Kit list

Paper

Metal coat hangers

2 pieces of  
60cm string

Paper cups

20m of string (kite  
string/fishing line  
is best)

A compass

## 📖 Instructions

- 1 Discuss the following questions in groups:
  - Have you ever heard your neighbours in the next house or flat?
  - Was the door or window open?
  - How do you think the sounds travel from your neighbour to your ear?
- 2 Draw labelled diagrams of how you heard your neighbour(s), indicating all the different materials the sound had to travel through to get to your ears.
- 3 Tie one piece of 60cm length string to one side of a metal coat hanger and the second piece to the other side of the hanger. Wrap the other end of each piece of string around each forefinger and then put your forefingers in each ear. Listen as you gently swing the coat hanger so it hits an object like a desk. How did the sound travel to your ears? How does the sound differ when you repeat this without putting your fingers in your ears?
- 4 Investigate string telephones – poke a hole in the bottom of 2 paper cups, threading a piece of string 20m long through each cup, and knotting the ends to stop it pulling through the cup. Ensuring the string is taut, get a partner to talk into the cup whilst you listen. What can you hear?

## ⚠️ Watch out

- Be careful when poking holes in the paper cups.

## ➤➤ Next steps

Extend this activity by using different lengths of string.

Note to teachers: This activity is based upon the primary science capital approach, which uses children's experiences to enhance their learning and enables them to become the experts. Further information can be found here: [explorify.uk](https://explorify.uk) ✨

## 🏠 At home

Why do some animals have larger ears than others? Find out by making a cone with A3 paper. Try listening with and without a cone.

## ↔️ Career options

- Sound is everywhere. Sound engineers and technicians are needed to ensure good sound quality at concerts. They help make TV and radio programmes, design quieter machines and buildings, as well as voice-activated devices.
- Audiologists test people's hearing and fit hearing aids.

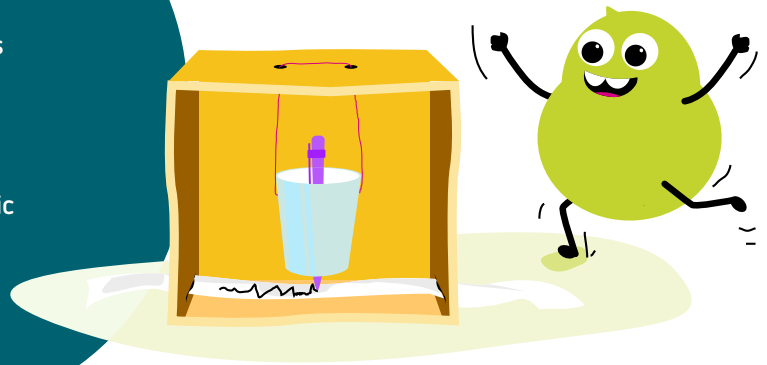


# GOOD VIBRATIONS

In 2020, most countries imposed a lockdown. It was difficult for people to connect with others and less movement made the world quieter. This was good for scientists investigating connections between underground vibrations (seismic waves, similar to sound waves). Learn how scientists measure seismic vibrations by making a simple seismometer.

🕒 45 minutes

Skills unlocked: Curious, Collaborative, Resilient



## 📦 Kit list

A cardboard box  
(a shoe box is ideal)

A paper or  
plastic cup

A felt tip pen

Scissors

String

Tape

A long strip of paper



## 📖 Instructions

- 1 Look at the diagram on the following page.
- 2 Remove the lid of a shoe box.
- 3 Make slits on opposite sides of the box, so paper can be threaded slowly through at the bottom.
- 4 Make one hole in the bottom of the cup and push the tip of a felt tip pen through this hole.
- 5 Make 2 holes on opposite sides of the rim of the cup and tie some string to each hole.
- 6 Attach the other end of each string to the top of the box so that the cup is dangling inside the box and the pen is resting on the paper strip.
- 7 Now you are ready to measure seismic events. Remember - the larger the movement of the box (caused by seismic activity), the larger the pen scribble.
- 8 You could investigate seismic activity created through jumping on a PE mat. Which types of jumps create the greatest seismic activity?
- 9 Have someone slowly pull the paper through the bottom of the box, whilst you jump on the mat.

## ⚠️ Watch out

- Take care when making holes in the box and the cup. You might want an adult to do this for you. You might prefer to use tape to attach the different parts.
- Paper will need to be pulled slowly through the box.

## ➡ Next steps

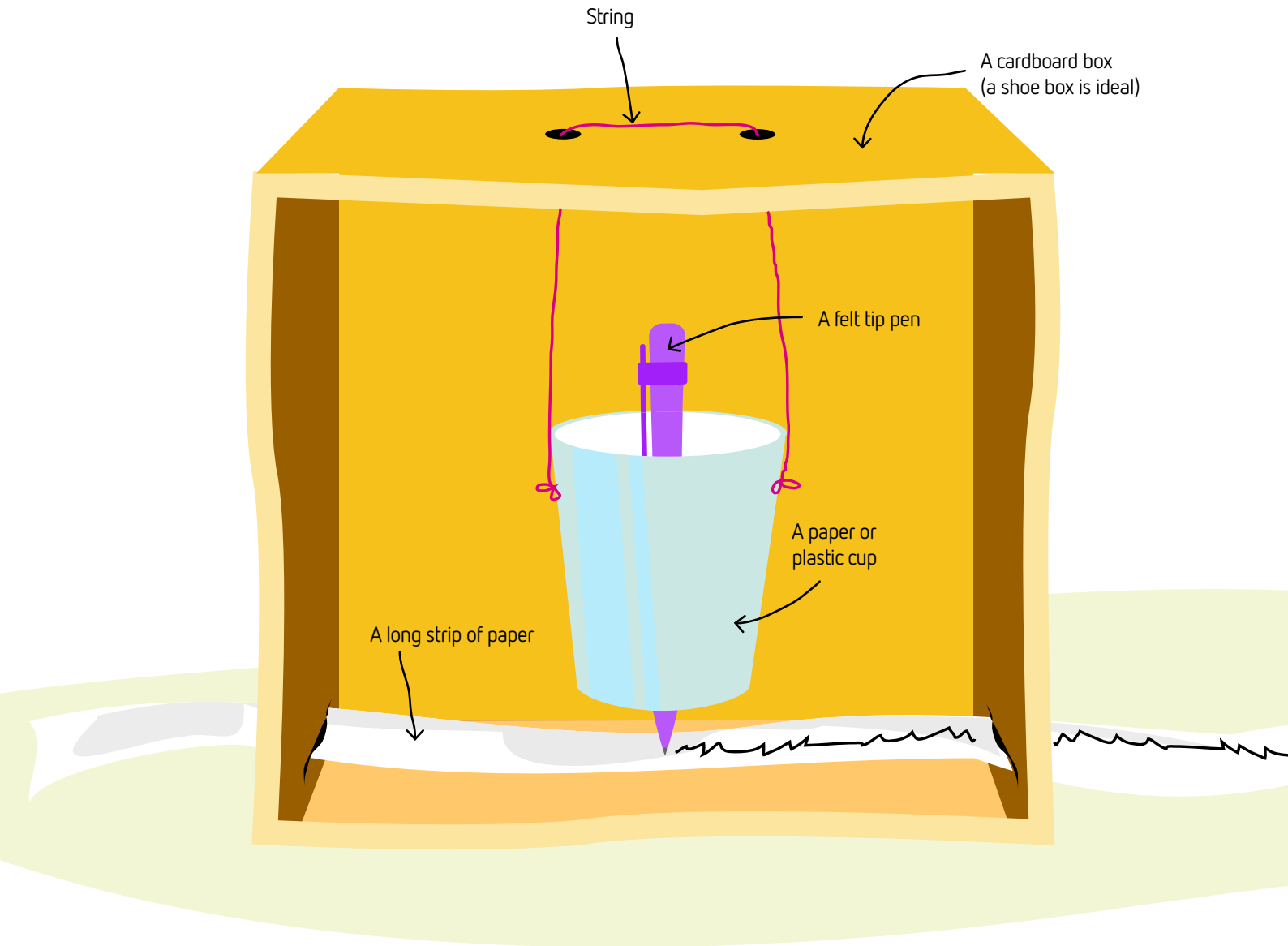
To find out more about seismic activity, you might like to read PSTT's *I bet you didn't know...* article, 'What happens underground when humans stay indoors'. You might like to try other related activities described in the associated Teacher Guide. Both can be found here: [pstt.org.uk/resources/curriculum-materials/cutting-edge-science-primary-schools](https://pstt.org.uk/resources/curriculum-materials/cutting-edge-science-primary-schools) ✨

## 🏠 At home

Where can you see or feel vibrations in your home? What causes them? Can you record these vibrations using your seismometer?

## ↔️ Career options

- Seismologists measure vibrations travelling underground to help to find out where there is significant seismic activity and to predict where potential earthquakes might happen.
- You could visit PSTT's resource - *A Scientist Just Like Me* – to find out about other science-related jobs: [pstt.org.uk/resources/curriculum-materials/ASJLM](https://pstt.org.uk/resources/curriculum-materials/ASJLM) ✨



# BUILD YOUR OWN BAROMETER

Antarctica is like the Earth's barometer: what happens there tells us how the world's climate will change in the future. A barometer is used to measure atmospheric pressure. This influences rainfall, temperature, winds and storminess. In this activity you will make your own barometer to measure the atmosphere around you.

🕒 1 hour

Skills unlocked: Observant, Creative, Collaborative

## 🧰 Kit list

A 2-litre see-through plastic water bottle (empty)

Clear plastic tubing (approx. 50cm)

Ruler and pen

Sticky tape and blu tack

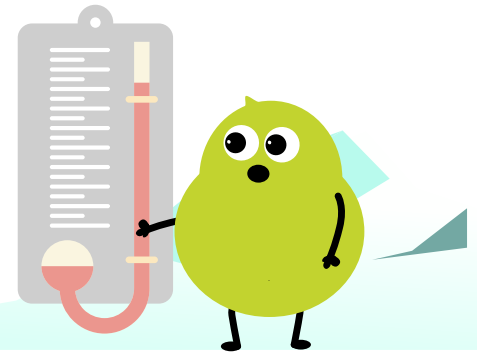
Water

Food colouring

Scissors

## 📖 Instructions

- To build your own barometer:
  - Cut off the curved upper part and neck of the bottle.
  - Fix the ruler on the inside with the numbers going up.
  - Tape the tube inside the bottle a few centimetres from the bottom to allow water to be sucked through it. Secure the tube near the top of the bottle using tape, making it in line with the ruler. The rest can be left to hang loose.
  - Fill the bottle up to the halfway mark with water and add food colouring to make it easier to see.
  - Suck water halfway up the tube and trap it with your tongue. Use blu tack to seal the end of the tube and lock the water in. You are now ready to measure!
- The water level will rise and fall depending on the air pressure. When there is higher pressure, the water will rise. This means there is increased chance of clear weather. When air pressure lowers, the water will fall. This means there is increased likelihood of clouds and rain.
- Monitor the changes for a set period of time – this could be a week, a month or a whole term. Make a note of what the weather was like following the reading. How good is your barometer at predicting changes in the weather?



## ⚠️ Watch out

- Take care when using materials, particularly when cutting the plastic bottle and using glues and tapes.
- Ensure the equipment you make is used safely and responsibly.
- Store somewhere secure and not liable to being knocked over.
- In the interest of hygiene, choose one person to suck water through the tube rather than passing this around.

## ➡️ Next steps

The UK Antarctic Heritage Trust (UKAHT) is a unique charity working to help everyone discover, understand, value and protect Antarctica. They care for 6 historic bases on the Antarctic Peninsula representing the birthplace of British climate science on the continent. Find out more at [www.ukaht.org](http://www.ukaht.org) 🌟

## 🏠 At home

You can make your own barometer and carry out your own weather monitoring at home. Do you get different measurements at home compared to school?

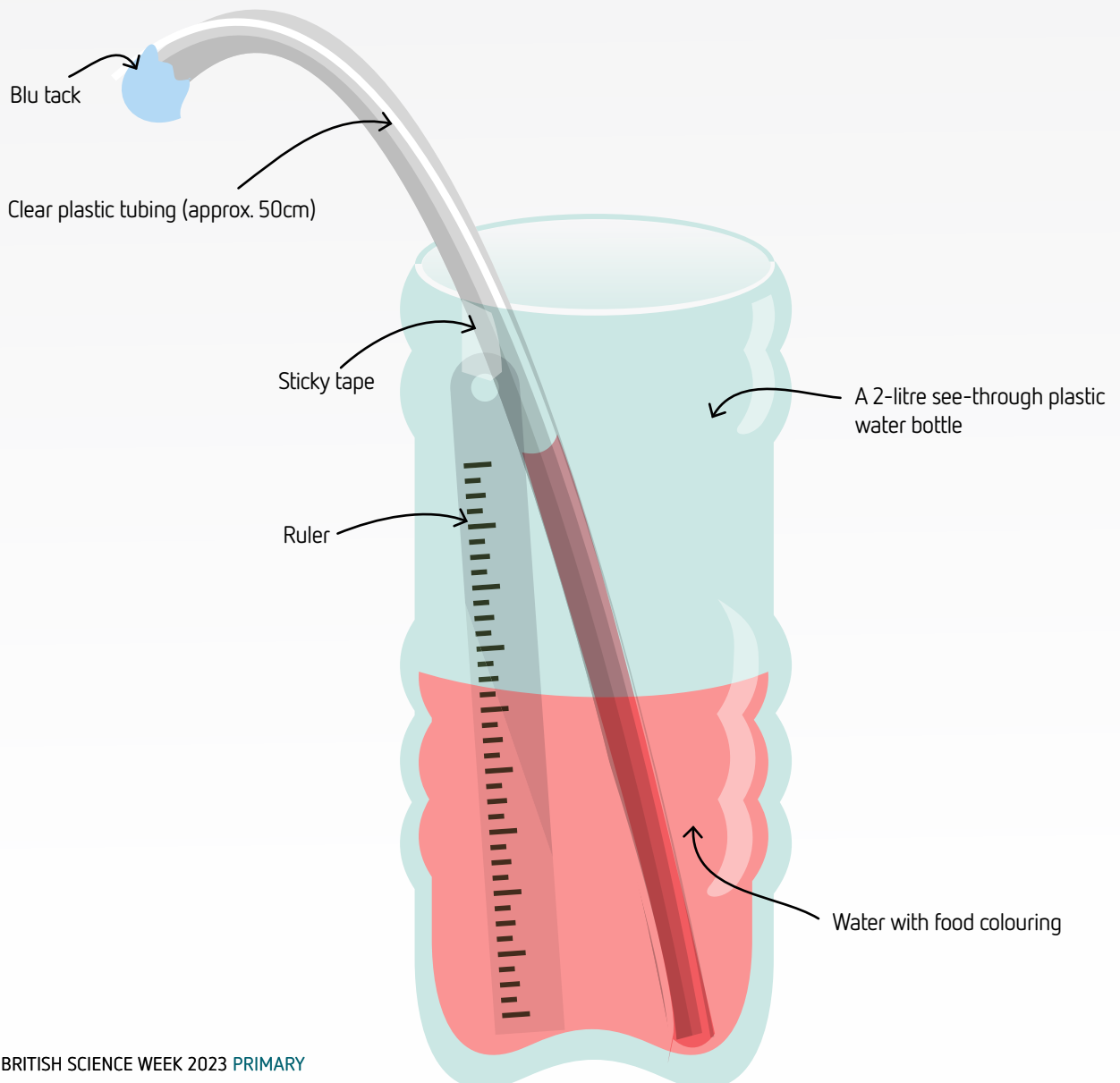
## ↔️ Career options

Lots of different types of people are needed to monitor and protect the climate in Antarctica:

- Biologists, geologists and meteorologists collect and study data.
- Conservators, carpenters and electricians look after the historic bases.
- Architects, engineers and inventors design new buildings and equipment.



# BUILD YOUR OWN BAROMETER DIAGRAM



# SEE & EAT VEGETABLES



In this activity, you will explore the connection between how vegetables grow and how they end up on your dinner plate. You will see the field to fork journey of one vegetable – broccoli – and create your own storyboard about a different vegetable, showing the different stages of its journey from field to fork.

🕒 1+ hours

Skills unlocked: Observant, Creative, Curious

## 📦 Kit list

Paper/card

Pencils or paint

Scissors

Glue

Craft materials  
(e.g. junk, felt,  
foam, tissue, clay,  
lolly sticks, paper  
plates, wool, foil)

Activity template  
(see next page)

Optional: computer,  
iPad or tablet to  
look at See & Eat  
resources

## 📖 Instructions

1 Look at the activity template (see next page) that shows the 6 steps of broccoli's field to fork journey: *growing, harvesting, shopping, preparing, cooking and eating*.

Optional for teachers: Visit [seeandeat.org](https://seeandeat.org) ✨ to see broccoli's field to fork journey in pictures and share this using your interactive whiteboard.

2 Choose another vegetable and research its field to fork journey:

- How does it grow?
- How does it get to the supermarket?
- How do you prepare and cook it?
- What might you serve it with for dinner?

3 Make a storyboard of your vegetable's field to fork journey using paper and colouring pencils or craft materials. Try to include each of the key stages.

4 Share what you have discovered with the rest of your group or class.

## ⚠️ Watch out

- ✎ Please follow your school's guidelines when using electronic devices for the research activity.
- ✎ Use scissors carefully.

## ➡️ Next steps

Visit [seeandeat.org](https://seeandeat.org) ✨ for more activities to help you learn about vegetables and where they come from. Download the See & Eat vegetable ebooks or use the [Our Story 2 app](#) ✨ to make your own ebook about a vegetable's field to fork journey.

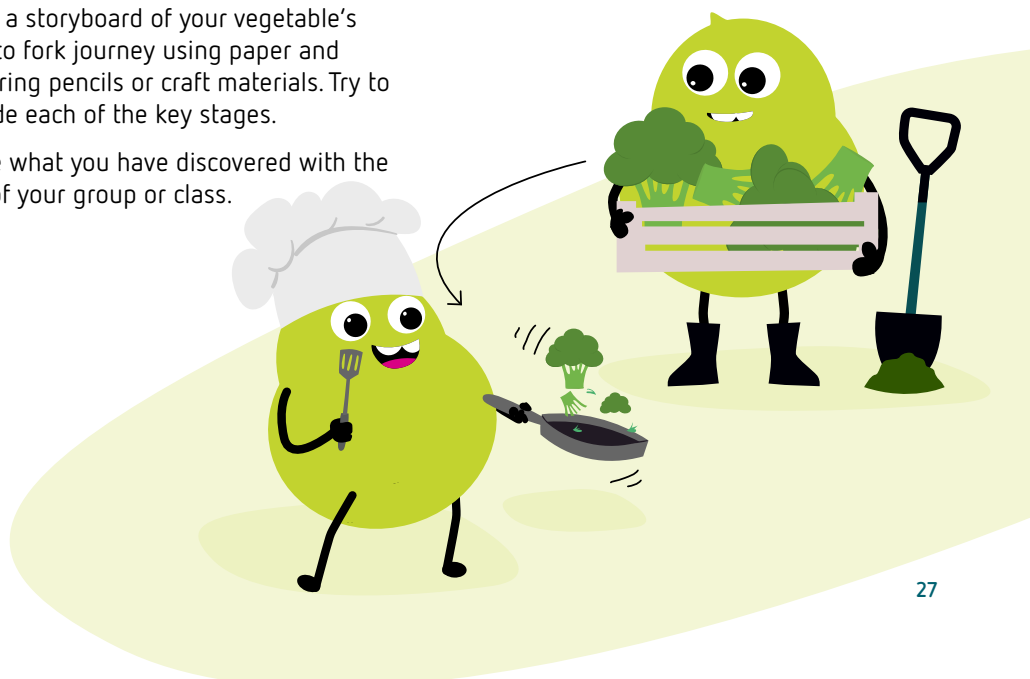
Plant vegetables in the school's garden and use these for cooking activities.

## 🏠 At home

Why not visit a farm to see how vegetables grow, or go to the supermarket to see all the different shapes, sizes and colours vegetables can be?

## ↔️ Career options

- ✎ This activity teaches you how to find and use relevant information to learn more about the world. This is a key skill used by all scientists.
- ✎ The See & Eat books were created by psychologists interested in how we can help people choose healthy foods to eat.





# SEE & EAT VEGETABLES BROCCOLI FIELD TO FORK

Please go to the end of this pack for an A3 version with cutting guide.



1. Growing



2. Harvesting



3. Shopping



4. Preparing



5. Cooking



6. Eating

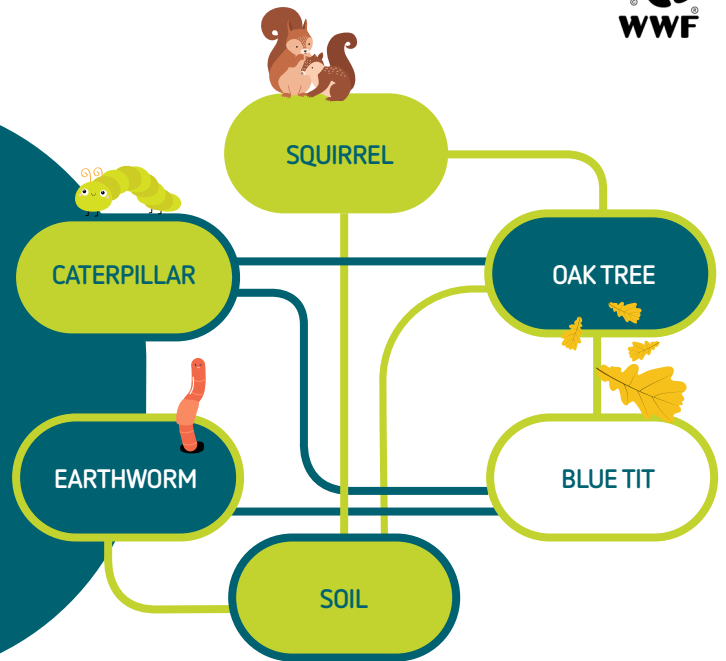


# NATURE CONNECTIONS

Ecosystems are communities of living and non-living things in an environment. They can include things like animals and plants as well as water and soil. This fun activity shows you how everything in an ecosystem is interdependent, and that the loss of one connection has knock-on effects...

20 minutes

**Skills unlocked:** Collaborative, Observant, Imaginative



## Kit list

Scissors (to cut out ecosystem elements, see next page) OR white boards and board pens (to write out ecosystem elements)

Ball of string



## Instructions

- 1 Everyone forms a circle and chooses one 'ecosystem element'.
- 2 One player holds the string and tells the group their ecosystem element. If you have a connection to this element, explain why. The player with the string decides which connection best fits and lets out the string to that player.
- 3 The next player does the same. As the game progresses a web of ecosystem connections will form.
- 4 Keep strings tight and stop when you run out of connections or string!
- 5 Now, choose one human action (e.g. climate change) and think about how it might impact your ecosystem. Tell the group if you think your ecosystem element would be affected. The group decides which is most affected and that player leaves the circle dropping their strings.
- 6 As each player leaves, what happens? As you lose connections, how will the remaining plants and animals be affected?

## Watch out

- Be careful not to trip over the string it or tangle anyone up in it.
- Use scissors safely.

## Next steps

Conduct a nature survey around school and replicate this activity with the wildlife you find! You need to find 12 different animals, plants, or resources. You can use the Seek app to help identify wildlife [www.org.uk/discover-nature-seek-app](http://www.org.uk/discover-nature-seek-app) ✨

Find further resources on nature, climate change and sustainability at [www.org.uk/schools](http://www.org.uk/schools) ✨

Check out this biodiversity video: [youtube.com/watch?v=b6Ua\\_zWDH6U](https://youtube.com/watch?v=b6Ua_zWDH6U) ✨

## At home

Why not help to improve habitats for local nature around your home by making an apple bird feeder to feed local birds? [www.org.uk/sites/default/files/2019-03/WWF\\_Apple\\_Feeder\\_Activity\\_Sheet\\_0.pdf](http://www.org.uk/sites/default/files/2019-03/WWF_Apple_Feeder_Activity_Sheet_0.pdf) ✨

## Career options

- Ecologists advise construction companies on where they can build so they don't disrupt important habitats.
- Environmental policy advisors give expert advice to the government and other organisations on issues like climate change and habitat loss.
- Sustainability officers work to make their organisations more environmentally friendly.







**Blackbird**  
Eats earthworms, caterpillars, spiders, fruits and seeds



**Blue tit**  
Eats caterpillars, fruits and seeds



**Earthworm**  
Eats soil, rotting leaves and roots



**Oak tree**  
Needs sunlight, water and nutrients from the soil  
  
The leaves and branches provide food for many animals.



**Slug**  
Eats leaves. Can be found in damp, dark places



**Brambles**  
Animals can eat the leaves or berries of the bramble plant.



**Spider**  
Eats insects



**Tawny owl**  
Eats small birds and mice



**Centipede**  
Eats insects, likes dark damp places



**Common frog**  
Eats insects, worms and slugs



**Wood pigeon**  
Eats seeds and fruits



**Red fox**  
Eats mice, rabbits, slugs,  
frogs, fruits and berries



**Dandelion**  
Needs sunlight, water and  
nutrients from the soil  
  
The leaves are eaten by  
animals and bees get  
nectar from the flowers.



**Hedgehog**  
Eats slugs, worms,  
insects and berries



**Caterpillar**  
Eats fresh green leaves



**Grey squirrel**  
Eats acorns and  
other nuts  
  
They make their homes  
in trees, piles of leaves  
or in buildings.



**Woodlouse**  
Eats rotting leaves and  
fungi, likes dark damp  
places



**Honeybee**  
Drinks nectar and eats  
pollen from flowers



**Water**  
Plants and animal need  
water to survive. Frogs  
and newts lay eggs in  
water.



**Soil**  
Plants need water and  
nutrients in the soil to  
grow. Worms eat soil  
and live in it.

# UNBOXED: DRAW A SCIENTIST

Growing up you will learn and develop lots of new skills. Whilst some jobs, like a bus driver and a dentist, are very different to each other, you will find that many skills needed are the same.

In this activity you will explore the skills and creativity in STEM.

🕒 30–45 minutes

Skills unlocked: Open-minded, Collaborative



## 📋 Kit list

Plain A3 paper  
or a couple of  
sheets of A4

Pencils

Crayons

Job profiles  
(see next page)

Optional: ruler

## 📖 Instructions

- 1 Look at the job profiles of the different scientists involved in UNBOXED (see next page).
- 2 In the middle of your paper, draw a scientist. Be as creative as you want! Remember, all scientists look different and do different jobs.
- 3 Next, think about what skills your scientist needs to do their job. Write these around your drawing. Try to think of as many skills as possible.
- 4 Now think about an artist. What skills do they need? Put a tick by the skills you think an artist also has.
- 5 Did you list 'creativity'? Both scientists and artists need to think creatively. Discuss why that may be.
- 6 In a different coloured pen/pencil, put another tick by the skills that you have.
- 7 If you are doing this activity at school or in a group, you could all share your pictures. Are there similarities between the skills you all listed?

## ➡ Next steps

This activity is part of the UNBOXED Creations CREST Discovery Award.

View the full resource here:

[bsa.sc/CREST-Awards-Discovery-projects](https://bsa.sc/CREST-Awards-Discovery-projects) ✨

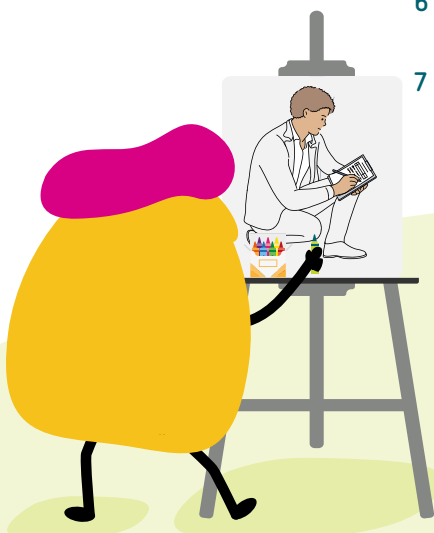
If you want to investigate more scientists and the skills they use, check out the 'Smashing Stereotypes' webpage: [britishscienceweek.org/plan-your-activities/smashing-stereotypes](https://britishscienceweek.org/plan-your-activities/smashing-stereotypes) ✨

## 🏠 At home

Discuss at home what skills your parents, carers or other people you know have. Do they have to be creative in their jobs? Do they have to work with people with different skills?

## ↔ Career options

UNBOXED: Creativity in the UK saw STEM and arts professionals working together to create 10 exciting projects across the UK. This included a magical forest-garden in Birmingham city centre and an art sculpture of a SEE Monster in the sea! Skills learnt in these STEM subjects can be applied to many different jobs.





**Name**

Dev Joshi

**Job title**

Technical Director



**What is my job?**

I work on the technology of the Dreamachine. This project is a magical experience that uses light and music to let visitors 'see' a wonderful, colourful world in their mind. We created Dreamachine to stimulate people's brains, allowing every person to use their brain and conjure up their own world of colour.

**How is my job linked to creativity?**

I make sure the light and sound do the right thing, which is to make visitors' brains conjure up wonderful images that they 'see' with their eyes closed. We test these and come up with different combinations of sound and light too.

**Name**

Leah Gowing

**Job title**

Architectural Trainee



**What is my job?**

An architect's job is to notice tiny details, and make sure everything is built correctly. For the Polinations project (a man-made city-centre forest) I created computer images of it to see how it would look in real life. I also get involved in the building and decorating.

**How is my job linked to creativity?**

I needed to think creatively when designing the Polinations forest. I had to ask myself, how can I design a structure that fits in with the surroundings, but is also beautiful like a forest?

**Name**

Annabelle Ohene

**Job title**

Engineer



**What is my job?**

I worked on bringing together the technology to create Geolights. These are a type of rechargeable, handheld LED light which can be controlled remotely, depending on where it is located, to change colour. The technology included: real-time location tracking (like the maps on a smartphone) and battery charging.

**How is my job linked to creativity?**

Artists who work on large-scale outdoors exhibitions and events will use Geolights, so I had to understand their ideas and use creative problem solving to create working light designs.



# UNBOXED: DRAW A SCIENTIST JOB PROFILES

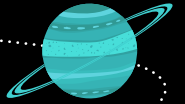
## OUR PLACE IN SPACE



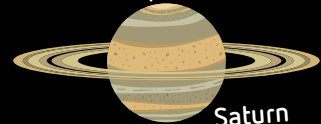
Pluto



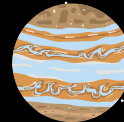
Neptune



Uranus



Saturn



Jupiter

### Name

Luke Blakely

### Job title

Educator/Performer



### What is my job?

I do a number of things! I run circus workshops but also work as a street theatre performer, which can be science themed. I try to make science as fun and magnificent through stunts and tricks.

### How is my job linked to creativity?

I combine performing and science, which means I have to constantly think of new, exciting, creative and unique ways to 'show' science with my voice, gestures and body. I am always thinking about the connections between what I can physically perform and science, to do this.

### Name

Nicole Stott

### Job title

Astronaut, Aquanaut and Artist

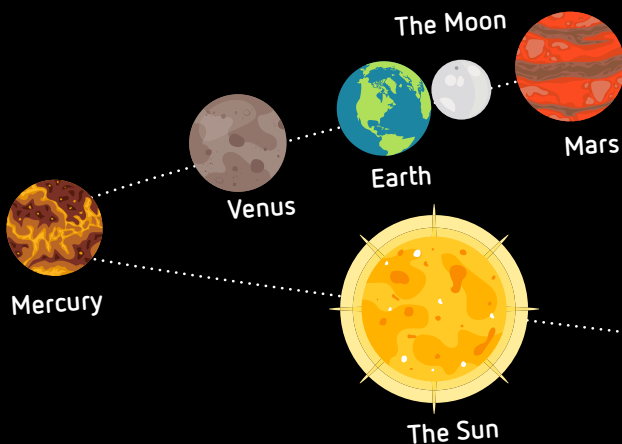


### What is my job?

I have been lucky enough to explore both outer space and the deep oceans. I study the areas, and conduct experiments too. I take things from Earth, and find out how they act in space, where the surroundings are different. I also study the marine environment.

### How is my job linked to creativity?

I'm an artist too! So I love using the beauty of space and sights beneath the sea as inspiration for artwork that I do such as paintings or making jewelry.



# IMMUNOTHERAPY DARTS

This activity demonstrates how cancer immunotherapy works. Immunotherapy is a treatment that uses the body's immune system to prevent, control and get rid of cancer. Immunotherapy targets cancer cells by taking advantage of how the immune system recognises different cells in the body through different shaped molecules on their surface.

🕒 30 mins

Skills unlocked: Patient

## 🧰 Kit list

Magnetic dartboard/  
noticeboard

Magnetic darts

Different cells of  
different shapes  
made of paper stuck  
on the dartboard/  
noticeboard  
(see next page)

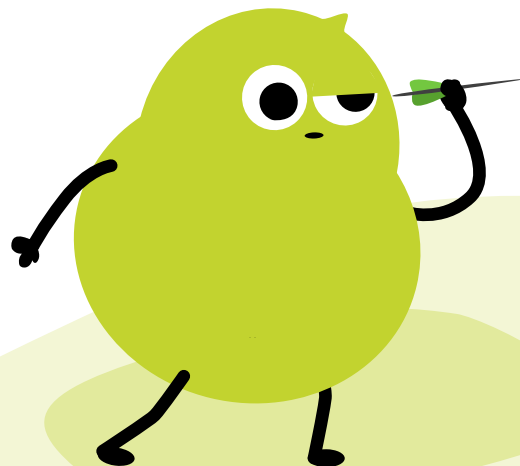
Double sided tape  
or blu tack

A way of keeping  
score

Scissors

## 📖 Instructions

- 1 Print off the worksheet. Cut out the cells and stick them to your dartboard. Healthy cells (pink) should be evenly spread across the dartboard. Cancer cells (green) are found less frequently and are harder to hit. Cancer cells should be placed close to healthy cells.
- 2 Use the darts to try and hit as many cancer cells as you can. But watch out, if you hit healthy cells, you'll lose points.
- 3 Cancer cells are worth 100 points, healthy cells are -20 points. Make sure you keep score and add up your points at the end of your turn.
- 4 Did you find that hard or easy? We can boost our immune system through immunotherapy. Move closer to the board and try again. Does that make it easier?



## ⚠️ Watch out

- Make sure the dartboard is secure and won't fall when hit with darts. Make sure you do this activity in a safe area where you can't hit anyone or anything which might be knocked over! Ensure no one is standing near the dartboard when darts are being thrown.
- Use scissors carefully.

## ➡ Next steps

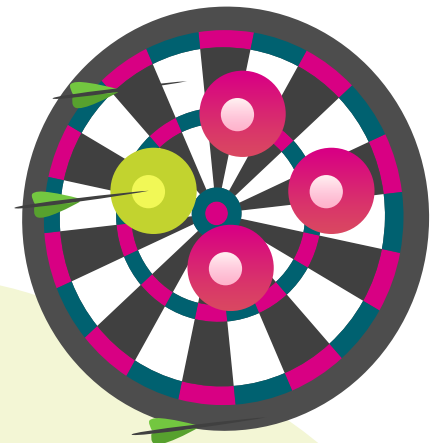
If you enjoyed this activity, take a look at some other activities: [bsa.sc/immunology-org-related-activities](https://bsa.sc/immunology-org-related-activities) ✨

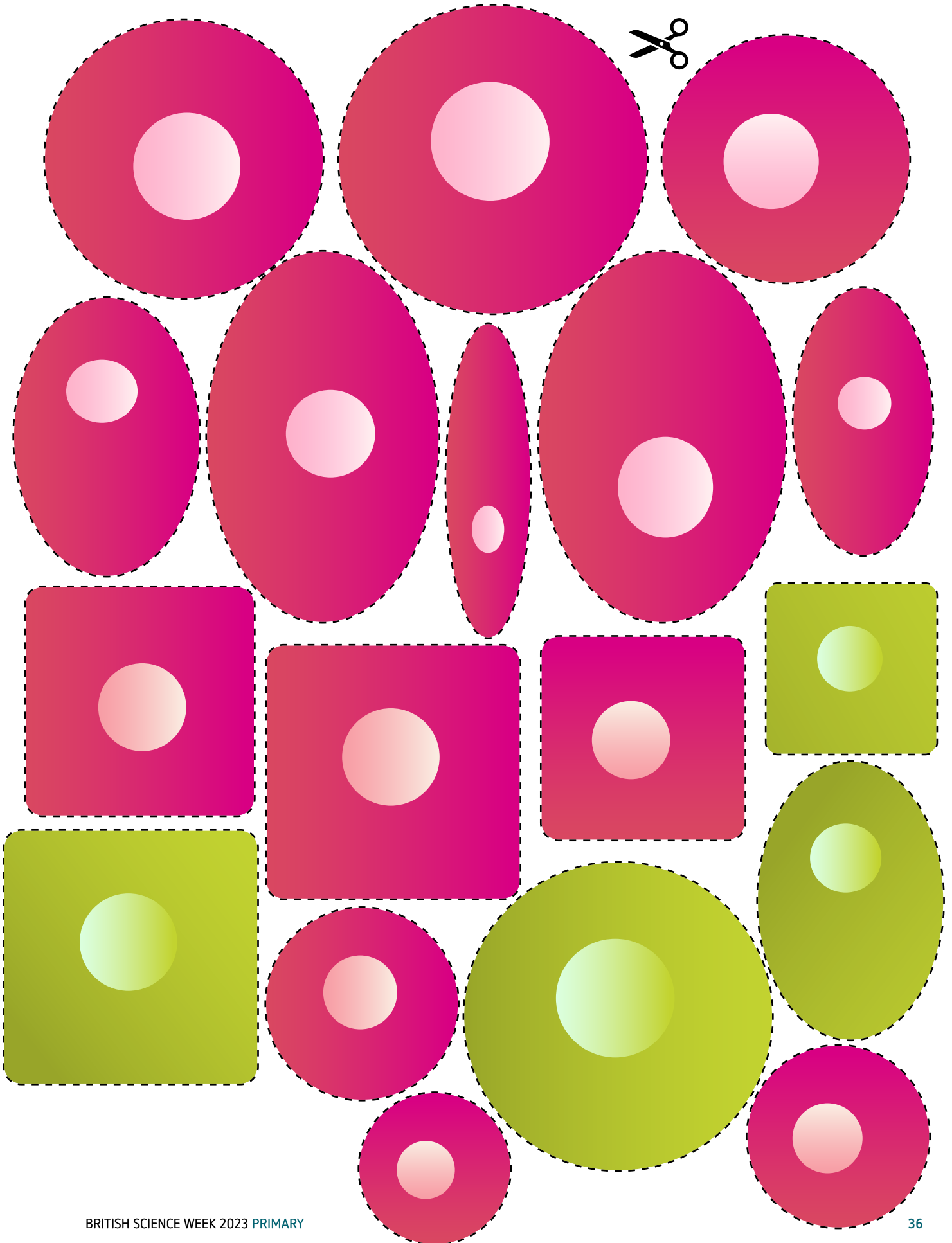
## 🏠 At home

Do you know that cells of the immune system interact with many other diseases? Can you find out more about the immune system and these diseases?

## ↔ Career options

- Immunologists study the immune system, which helps us understand how to treat lots of different health issues. Many immunologists work in a laboratory focusing on research, such as developing immunotherapies against cancer, and others are "clinical immunologists" – doctors who diagnose and manage diseases of the immune system.





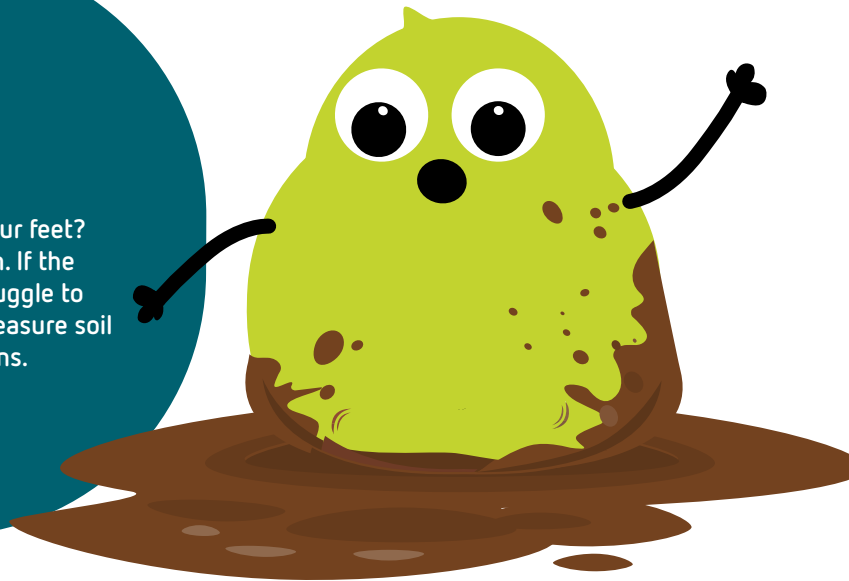


# BUILD A PENETROMETER

How connected are you to the ground beneath your feet? The food we eat is reliant on the soil it is grown in. If the soil is too squashed, or compacted, plants will struggle to grow. You are going to build a penetrometer to measure soil compaction and compare soils in different locations.

🕒 1 hour

Skills unlocked: Observant



## 🛒 Kit list

A knitting needle or skewer

Cotton reel

Rubber band

Permanent marker

Ruler



## 📖 Instructions

- 1 On a hard surface, use a permanent marker to draw a line on the knitting needle at the same height as the top of the cotton reel.
- 2 Wrap a rubber band around the top of the needle.
- 3 Put the needle inside the cotton reel and slide the rubber band to the top of the cotton reel.
- 4 Choose a range of soil locations around the school – which do you think will have the most compacted soil and why?
- 5 At each location, place your penetrometer and carefully push the needle into the ground. Once you can no longer push the needle into the ground, remove the needle from the spool and measure the distance between the line and the rubber band with a ruler.
- 6 Record the reading at each location. The smaller the distance, the more compacted the soil.

## ⚠️ Watch out

- Remember that the end of the needle/skewer is sharp. Keep the sharp end away from your face and never point it at anyone else.
- Be very careful when pushing your needle/skewer into the ground. Do not apply excessive force.
- Wash hands thoroughly after handling soil.

## ➡ Next steps

Visit [www.engineeringeducates.org](http://www.engineeringeducates.org) ✨ to take part in the 'Engineering Educates: Farmvention Challenge' and discover how you can use your STEM skills to design a farm of the future.

Sign up for Science Farm LIVE!, engaging live lessons that will be beamed from the farm to the classroom during #BSW23: [livestream.co.uk/science-farm-live-2023](http://livestream.co.uk/science-farm-live-2023) ✨.

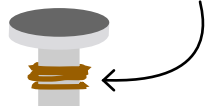
## 🏠 At home

Compacted soil stops plant roots from growing properly, meaning farmers have fewer crops. Can you design an invention to solve this real-life problem?

## ↔ Career options

- Agronomists advise farmers on what to grow and where to grow it. They are soil experts and tools, such as penetrometers, help them to do their jobs.
- Lots of professionals use penetrometers to help them investigate how machinery affects soil including:
  - soil scientists
  - engineers
  - farmers.

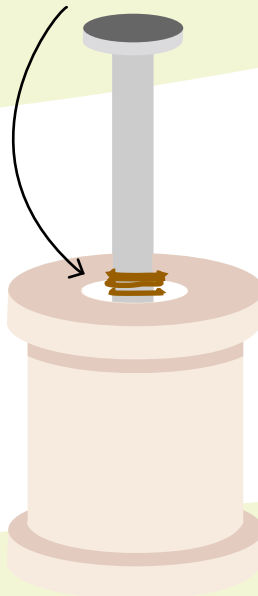
Wrap a rubber band around the top of the knitting needle.



On a hard surface, use a permanent marker to draw a line on the knitting needle at the same height as the top of the cotton reel.



Put the needle inside the cotton reel and slide the rubber band to the top of the cotton reel.



Remove the needle from the spool and measure the distance between the line and the rubber band.





BRITISH  
SCIENCE  
WEEK  
2023

# POSTER COMPETITION

Pupils can get creative and enter British Science Week's annual, UK-wide poster competition! They can make a poster about any 'Connections' that appear in the world of science they like, and be in with the chance of winning an array of prizes. Each school can enter the 5 best posters!



## Kit list

Paper (A4 or A3)

Creative materials, such as:  
pens  
pencils  
scissors  
glue  
watercolours  
paints  
crayons  
felt  
thread  
wool  
foil  
clay  
string  
beads  
stamps  
foam  
pompoms

## Instructions

### Research your poster

Get the pupils thinking about ideas to include in their poster. They could investigate and imagine 'Connections' and everything that makes them special. Here are some topic ideas to help you get the inspiration started:

- Ask them to think about their personal experiences of connections - from learning about how their body parts are connected, to connecting with their classmates, teachers and family members to help them learn more about science. Has it helped them become stronger, braver, kinder or more accomplished?
- Is the world built on connections? Why not think about connections in terms of the ancient family tree that connects all animals, how atoms connect or bond to make up our surroundings and connections in construction. What are examples of good connections?
- Is there someone pupils have connected with who inspired or helped them? It doesn't have to be someone they know, it can be any role model! Why not have them create a portrait that demonstrates this? Connections are everywhere. From the friends we make who share new ideas, to the connection between eco-friendly behaviour and a better future, there is so much to see all around us.

### Make your poster

Once the children have done their research, it's time to get creative! The poster must be:

- A4 or A3 size and you need to be able to take a photo of it to send to us online for judging.
- Pupils 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 they fit the theme, how well the poster has been made or drawn, and how engaging they are. Once the poster is complete, take a photo and complete the online form with your entry details.

## 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](https://britishscienceweek.org/plan-your-activities/poster-competition) 🌟



Look out for the activities in this pack marked with a paintbrush symbol, they can be a source of inspiration for the poster!



We want to hear from you!  
Tell us what you think of the  
activities using our survey...



Visit [bsa.sc/activitypacksurvey](https://bsa.sc/activitypacksurvey) 

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BRITISH SCIENCE WEEK 2023 PRIMARY



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5. Cooking



6. Eating