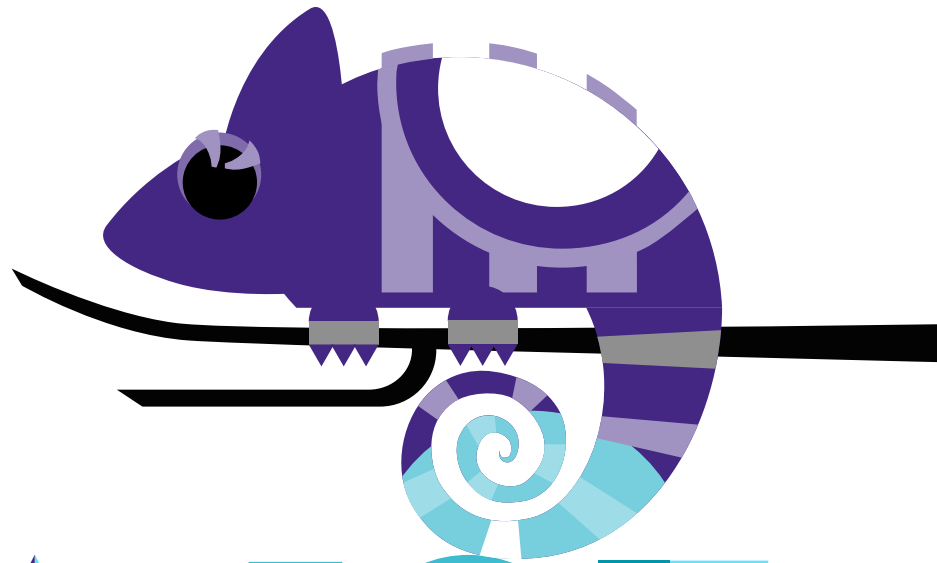




BRITISH  
SCIENCE  
WEEK

7-16 March 2025



CHANGE  
& ADAPT

CHANGE & ADAPT

Delivered by



BRITISH  
SCIENCE  
ASSOCIATION

Supported by



UK Research  
and Innovation

## SECONDARY ACTIVITY PACK

A range of activities to be run with  
students aged 11-14 (approx.)

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



# Welcome to the British Science Week 2025 Secondary pack!

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 students' own backgrounds, lives, and interests.

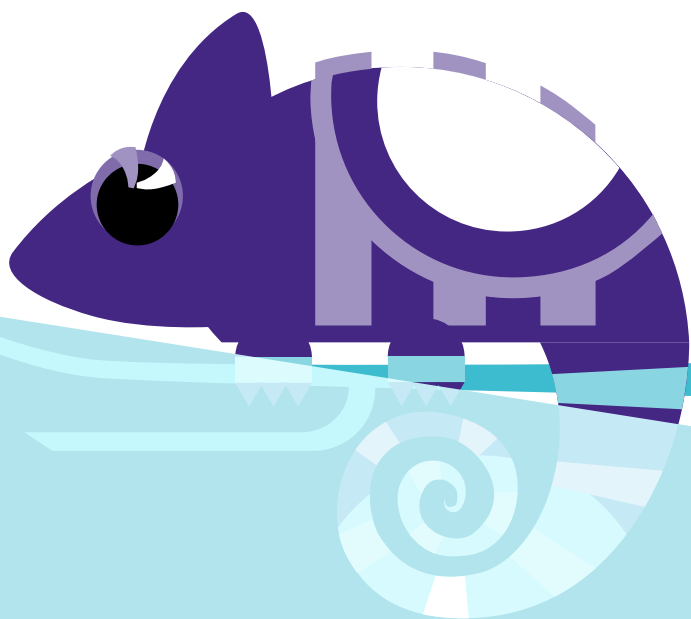
We have included activities for students to complete in any setting, whether that is their school, a club, an organisation, or at home with their families.

You can 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 X ([@ScienceWeekUK](https://twitter.com/ScienceWeekUK)) and using the hashtag [#BSW25](https://twitter.com/ScienceWeekUK) across all social media platforms.



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# This year's theme

Each year there is a new theme for British Science Week, and for 2025 it's 'Change and adapt'.

As British Science Week enters its fourth decade, it's a great time to think about how the world is changing and how we can adapt to those changes.

You can also think about all the types of change and adaptation we see in STEM – the options are endless!

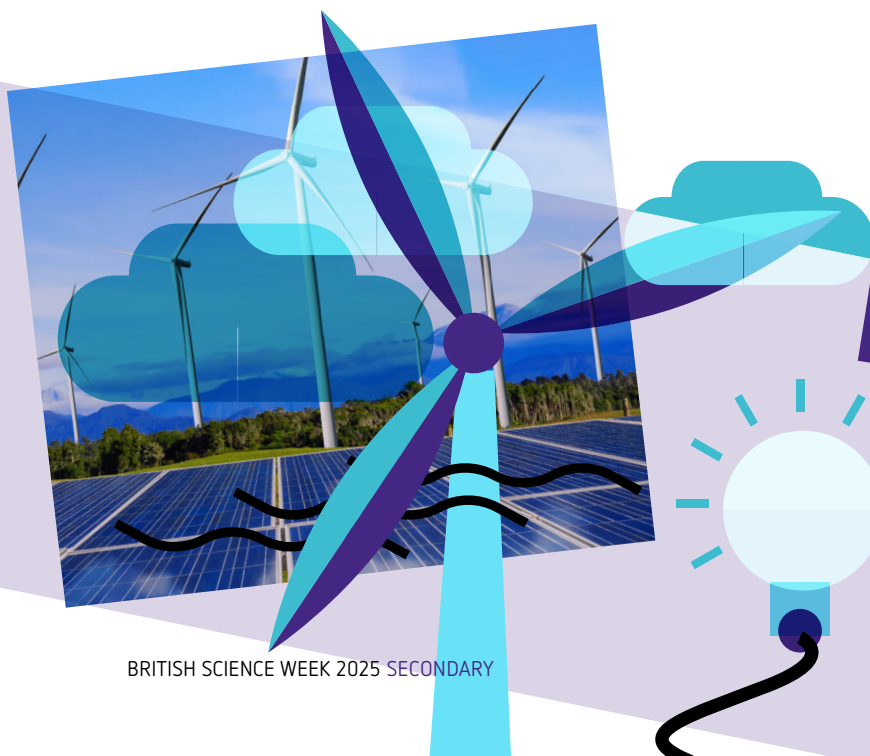
Here are some ways you can introduce the theme to students in a fun, imaginative way to get them excited about the Week:

## Poster competition

Design a poster and enter our annual competition for a chance to win some fabulous prizes. It's a very special competition this year – scientists at University College London need your help! Find out more about their work and how your ideas could inspire new scientific research on page 32. You can also find more details about how to enter on our webpage: [www.britishsienceweek.org/poster-competition](http://www.britishsienceweek.org/poster-competition) ✨.



- Talk about what change and adaptation mean. How have you noticed the world around you changing, and how have you adapted? Think about your favourite science experiment or activity, did it involve change? How have animals and people adapted to new environments over time? Is ever-changing technology making our lives easier, or are we adapting to fit it in?
- If you work in a school or with a community group, invite a special guest to share their own experience of change and adaptation. Are there any STEM professionals local to you, or museums to visit? Maybe a city planner could talk about how the places we live have changed and adapted to technology and growing populations?



CHANGE & ADAPT



# CREST Awards

CREST Awards is a scheme run by the British Science Association that inspires young people to think and behave like scientists and engineers.

CREST projects are hands-on, student-led investigations that allow young people to develop STEM skills, communication and teamwork, and discover how STEM is relevant to their lives.

CREST Discovery Awards are typically completed by students aged 10-14 and they can be run at both primary and secondary level. Students earn a Discovery Award by taking part in a five-hour group project. Discovery projects are perfect to run during one school day, but they can also be spread out across a week or term.

You can find a range of Discovery projects in our resource library: <https://discoverylibrary.crestawards.org> ✨. All the resources are free to download and use with your students.

At secondary level, teachers or parents/carers can submit young people's project work for a CREST Award on the students' behalf. Secondary projects require between



10 and 70 hours of work depending on the level. Bronze projects can be teacher-assessed, while Silver and Gold are sent to expert, external assessors. On completion, the students receive a Bronze, Silver or Gold Award, recognised with a certificate.

## What impact does CREST have?

We have found that there is around a 50/50 split of boys and girls completing CREST Awards, helping to smash the stereotype of science being 'for boys', and driving towards a more representative future STEM workforce.

Three in five schools who run CREST are in challenging circumstances, and earning a CREST Award can be particularly beneficial for children from disadvantaged backgrounds.

Students eligible for free school meals who complete Silver CREST Awards see an improvement of two-thirds of a grade at GCSE science, and are 38% more likely to study STEM subjects at AS level.

Find out more in the [CREST Impact Report \(2021-22\)](#) ✨

You can find all the secondary resources free to download: [secondarylibrary.crestawards.org](https://secondarylibrary.crestawards.org) ✨.



# CREST Awards: What do CREST projects look like?

CREST projects can cover any STEM topic you can think of! Young people can design their own projects or they can choose an existing project to complete, running their own investigations based on an idea from our large resource library:

[library.crestawards.org](http://library.crestawards.org)

Some projects from our resource library include:

- **Stop the spread** ✨ a Discovery activity that involves researching changing hygiene practices to help reduce the spread of infectious disease (typically completed by 10-14-years-olds)
- **What makes bread rise?** ✨ an investigation into how changing the recipe can result in better bread for a Bronze Award
- **Which crisps are the healthiest?** ✨ an investigation into positive dietary changes that secondary students could complete for a Silver Award
- **Hydrology** ✨ challenges older students to think about water solutions in a changing climate for a Gold Award

For inspiration for student-designed projects, check out some of our case studies:

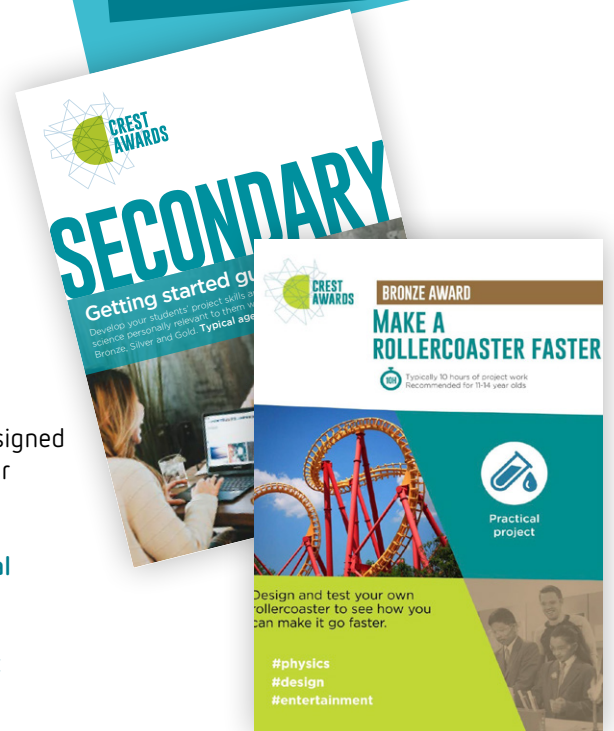
- **George and his mechanical biscuit dunker** ✨
- **Nikola and her adolescent mental health room** ✨
- **Richard and his nutrition app** ✨
- **Mara and her essay on the underrepresentation of women in STEM** ✨

## Tips for educators

Discovery projects can be easily incorporated into British Science Week. As group projects that take around five hours, they could be done in one day – a Discovery Day – or run across the Week.

Secondary school projects usually cannot be completed within a week, but part of British Science Week at your school could involve students coming up with ideas for their projects and kicking them off to be worked on across the school year.

CREST projects are designed to be student-led and inclusive, allowing children and young people to explore relevant, real-life STEM



challenges through practical, hands-on investigation and discussion at their level. CREST can be done by anyone! You may like to adapt or scaffold the activities, depending on the needs of your students.

Educators working with SEND students at secondary level may like to try our accessible **Design and make a pizza box** ✨ Bronze Award project, which can be found in our resource library.

# UNLOCKING SKILLS

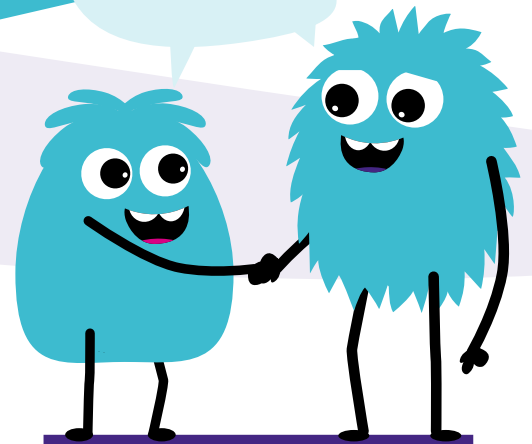
A fantastic way to encourage young people to take an interest in STEM is to introduce transferable skills used by those working in STEM-related jobs.

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

You could, for example, use the **STEM Person of the Week** ✨ activity from NUSTEM at Northumbria University or introduce a scientist from the British Science Association's **Smashing Stereotypes** ✨ campaign. Ask students to identify what characteristics 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.

The table opposite has a complete list of attributes developed by NUSTEM to use as a talking point or to share with other teachers. As a little bit of motivation, why not award students with a certificate for each STEM characteristic they demonstrate well during the Week? You can download and print the resources from [britishscienceweek.org/plan-your-activities/marketing-materials](https://britishscienceweek.org/plan-your-activities/marketing-materials) ✨.

Collaborative



Observant

Open-minded

Committed

Curious

Logical

Creative

Imaginative

Patient

Self-motivated

Collaborative

Resilient

Clear communicator

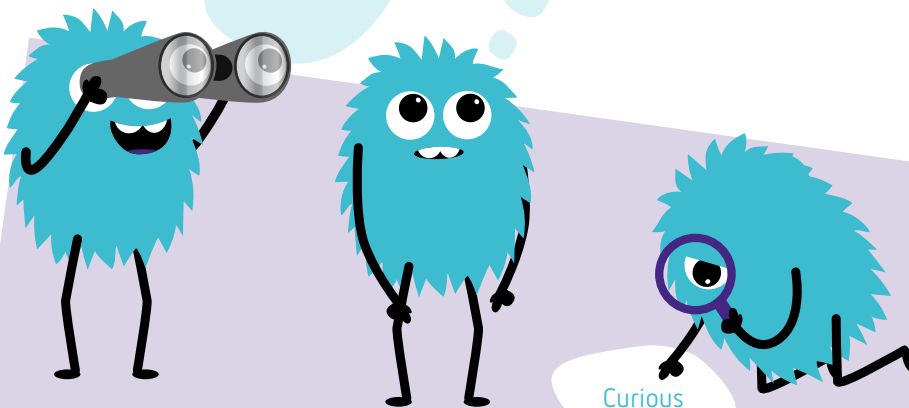
Passionate

Hard-working

Organised

Imaginative

Observant



Curious



# AMAZING ANIMAL ADAPTATIONS!

How do polar bears survive in such chilly climates without freezing? How do tigers sneak up on their prey without being heard?

In this activity you will explore some of the remarkable adaptations that allow animals to thrive in different habitats around the world.

🕒 1 hour



## 📋 Kit list

Animal adaptation cards

Scissors

Pencil/pen and colouring pencils

Books/tablet/computer for research

## 📖 Instructions

- In this activity you are going to explore different animal adaptations. As a class, discuss the following questions:
  - What does 'adaptation' mean?
  - How might animals be adapted for living in the following habitats: polar regions, desert, ocean, rainforest?
  - How might animals be adapted for the following lifestyles: predator, prey, burrowers?
  - How can animal adaptations cause evolution over time?
- In pairs, cut out all the animal adaptation cards on the following pages and mix them up.
- Move the cards around to match the animals to their correct habitats and adaptations.
- Choose one animal from the cards. Draw a diagram labelling all of its adaptations and explain how each of these are suited to the animal's habitat and/or lifestyle. Make sure to include at least three physical adaptations (e.g. small ears) and at least one behavioural adaptation (e.g. ambushing prey).



## ➤ Next steps

It's not just animals that have amazing adaptations, plants do as well. Choose one of the following plants: baobab tree, acacia tree, desert cactus, pitcher plant, Venus fly trap. Using books or online research, write a fact file including the plant's name, where it's found and the adaptations that allow it to thrive in its habitat.

## 🏠 At home

Create your own animal or plant adaptation cards at home and play a game of pairs with your family and friends.

## ↔ Career options

- Wildlife conservationists help protect important habitats and endangered species in the UK and across the world.
- Zoologists are scientists that study animals, their behaviours, their body parts and the ecosystems they are part of.
- Environmental educators teach other people about the importance of protecting different habitats for wildlife and people.

## 🔒 Skills unlocked

Observant, curious





African elephant



Hummingbird



Bumblebee



Emperor penguin



Fennec fox



Green turtle



Polar bear



Sidewinder adder



Tiger



Red-eyed tree frog

### Animal adaptations

- 1 Forward-facing eyes
- 2 Thick fur
- 3 Small ears
- 4 Large paws
- 5 Sharp teeth and claws

### Animal adaptations

- 1 Broad powerful flippers
- 2 Can slow down its heart rate to stay underwater for up to 5 hours
- 3 Hard shell
- 4 Serrated beak
- 5 Can dive to deep depths to avoid predators

### Animal adaptations

- 1 Forward-facing eyes
- 2 Stripes
- 3 Large paws
- 4 Good sense of hearing
- 5 Strong bite force

### Animal adaptations

- 1 Large eyes
- 2 Long legs, powerful jump
- 3 Webbed sticky toes
- 4 Green skin colour
- 5 Nocturnal

### Animal adaptations

- 1 Large ears
- 2 Wrinkly skin
- 3 Long trunk
- 4 Tusks
- 5 Can spray mud or water over their body

### Animal adaptations

- 1 Sting
- 2 Brightly coloured, yellow and black stripes
- 3 Long tongue
- 4 Legs covered in tiny sticky hairs
- 5 Excellent vision, can see UV light

### Animal adaptations

- 1 Two layers of feathers, one downy and one waterproof layer
- 2 Streamlined body shape
- 3 Huddle with others
- 4 Long, sharp beak
- 5 Brood pouch

### Animal adaptations

- 1 Protective scales on eyes
- 2 Sandy brown coloured scales
- 3 Sideways S-shaped movement means that only a small part of its body touches sand at one time
- 4 Sharp teeth
- 5 Can bury itself in sand

### Animal adaptations

- 1 Large ears
- 2 Sharp claws
- 3 Mostly nocturnal or crepuscular (active at night or at dusk and dawn)
- 4 Kidneys can retain water for long periods of time
- 5 Pale coloured coat

### Animal adaptations

- 1 Thin, long beak
- 2 High speed flight
- 3 Iridescent feathers
- 4 Can dive at predators when threatened
- 5 Can go into torpor (extremely deep sleep) to slow heart rate and conserve energy

Desert

Rainforest and meadows

Forest and grassland

Grasslands, gardens and parks

Arctic sea ice and coastal areas

Rainforest

Antarctic sea ice and ocean

Desert

Forest and grassland

Ocean

# GUESS WHAT'S FOR DINNER IT'S US!

In this activity you will investigate bedbugs and the ways they have adapted to become successful parasites. What you find out may change the way you see feeding relationships – humans aren't always at the top of the food chain!

🕒 1 hour

## 🧰 Kit list

Hand lenses

Rulers

Paper

Pens and pencils

Materials for making a poster

## 📄 Instructions

Bedbugs are parasites, feeding on blood. It doesn't have to be human blood, but we do very nicely! Bedbugs have mouthparts like little saws and saliva that contains pain killers and anti-coagulants, which stop blood from clotting. They are attracted by carbon dioxide and warmth but can survive by feeding once a week. They don't like light. The bites can be irritating and unsightly. Adults grow up to 5mm in length but can squeeze into cracks not much more than 1mm wide.

- 1 Think about what makes bedbugs well-suited to living off human blood. Discuss your thoughts with your classmates.
- 2 Think like a bedbug – where would you choose to live and why? Hint: it's not just beds! Look around the room you are in and think where might be good. Your hand lens and ruler might help. Create a poster displaying what you discover.

- 3 Insecticides are becoming less effective against bedbugs but heat treatment always works. Suggest what this tells us about bedbugs.

## ➤ Next steps

Collins KS3 Science Now has many ideas and questions to introduce you to aspects of science in the first part of your secondary education. It includes, for example, ideas about the kind of careers you might go into if a particular area of science attracts your interest.

[collins.co.uk/KS3ScienceNow](https://collins.co.uk/KS3ScienceNow) ✨

## 🏠 At home

What are the kind of things you could do to make your home less attractive to bedbugs, without reducing its appeal to you?

## ↔ Career options

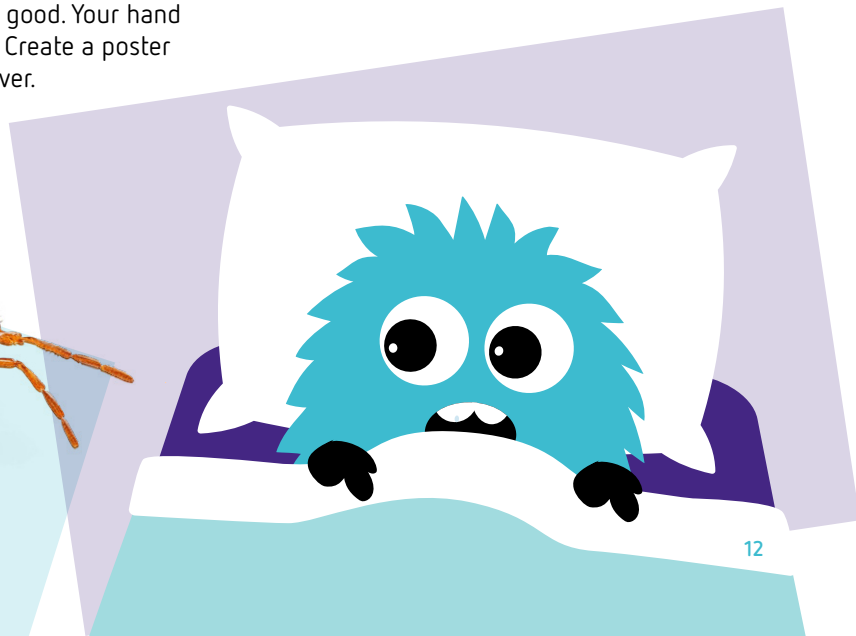
The pest control industry is a significant employer and does a useful job. Infestations can make people's lives miserable and clearing them brings genuine relief. To work in this profession, you need to understand the nature of the pest and how it lives in order to apply treatments.

## 🔒 Skills unlocked

Clear communicator, imaginative



BRITISH SCIENCE WEEK 2025 SECONDARY



# MAKE A FOOTPRINT TUNNEL TO MONITOR MAMMALS

UK mammals must adapt to environmental changes like urbanisation and climate change. By creating small mammal monitoring tunnels and conducting a tracks and signs walk, you'll track local mammals and understand their behaviour. These methods help scientists study how mammals adapt to their changing habitats.

🕒 2 hours



## Kit list

Cardboard

Charcoal powder

Vegetable oil

Paper

Scissors

Masking tape

String

Paper clips

Small bowl/dish

Wet pet food  
(e.g., cat or dog  
food) or fresh fruit

Waterproof covering

Notebook and pen

Mammal Tracks and  
Signs guide (optional)

Smart phone/tablet  
with the Mammal  
Mapper App installed

## Instructions

- 1 Cut and fold a large sheet of cardboard into a triangular tube, 90cm long and 30cm wide on each side. Insert a cardboard base and secure it with tape. Attach a small shallow dish in the centre with masking tape.
- 2 Place plain white paper on either side of the bait dish, leaving a 10cm gap. Fill the gap with masking tape strips.
- 3 Add pet food or fresh fruit to the bait dish to attract mammals like hedgehogs, badgers, and shrews.
- 4 Mix charcoal powder and vegetable oil (50:50) and apply to the masking tape to create an ink trap.
- 5 Position the tunnel in areas mammals frequent, like hedgerows or near water.
- 6 Camouflage the tunnel with vegetation or stones and waterproof with plastic wrap.
- 7 Check daily, replacing paper and bait. Record mammal tracks using the Mammal Mapper app.
- 8 Relocate tunnels based on mammal activity.

## Next steps

Get involved in the School's Mammal Challenge! Continue your mammal monitoring by setting up more tunnels, using camera traps, and recording sightings. Find out more here: [mammal.org.uk/for-schools/schools-mammal-challenge](https://mammal.org.uk/for-schools/schools-mammal-challenge) ✨.

## At home

Find out more about local mammals by researching their habitats, behaviours, and diets on Mammal Societies website ([mammal.org.uk](https://mammal.org.uk) ✨). Use your findings to decide where to place your footprint tunnel and what bait to use, then monitor the small mammals in your garden if you have one.

## Career options

Explore careers in ecology, scientific research, and environmental policy. Opportunities also include advocacy (public support for an issue) and campaigning for conservation efforts, as well as science communication to raise awareness about wildlife issues. Each role contributes to protecting and understanding our natural world.

## Skills unlocked

Patient, organised





Paper held  
down with  
paper clips

strips of  
masking tape

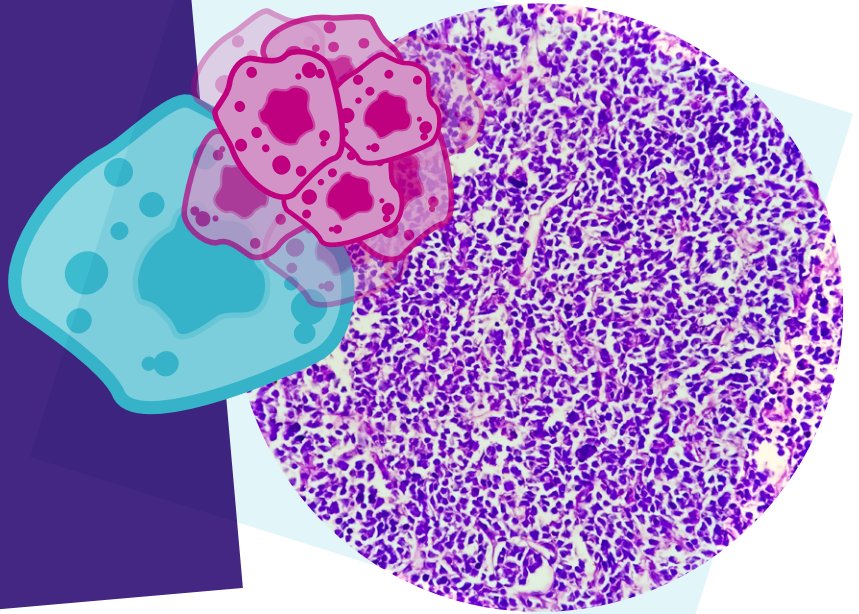
Charcoal  
powder and  
vegetable oil

Bait  
bowl

# DEFEAT THE TUMOUR

Cancer can change and adapt in your body. In this activity you will be trying to defeat the tumour using treatment cards, but watch out! Hidden amongst these cards are also genetic change cards which cause the tumour to adapt. Try and get the right combination to defeat the tumour.

🕒 15 mins



## 📦 Kit list

Board game  
worksheet

Game cards

Counters

## 📖 Instructions

- 1 Print off all the resources included on the following pages. Cut out the game cards and circle counters.
- 2 You can play this game in pairs or by yourself.
- 3 Place 12 counters (cells) in one of the four grid sections on the board game worksheet. This is your initial tumour.
- 4 Shuffle the game cards and place them face down on the table.
- 5 Pick a game card and follow the instructions on the card.
- 6 If you still have counters on the board following the game card, add 2 more counters (cells) to your tumour. This is because tumours are fast-growing cells, even during treatment. If your tumour has spread, add the counters (cells) to the largest tumour. If your tumours are the same size add one to each section.
- 7 Repeat steps 5 and 6 four more times.
- 8 Once you have done these five cycles, you now have your final tumour.
- 9 Work through the questions in the 'Next steps' section to discuss your result.
- 10 Play the game again and see if you get the same outcome.

## ⚠️ Watch out

Be aware that cancer and tumours may be sensitive topics for some students.

## ➡️ Next steps

Describe how your tumour has changed from the start of the game. If you played this game again, did you get the same result? What was different/the same each time? Why do you think it's important for us to understand how cancer cells change and adapt? How might researchers use this knowledge to create new treatments?

## 🏠 At home

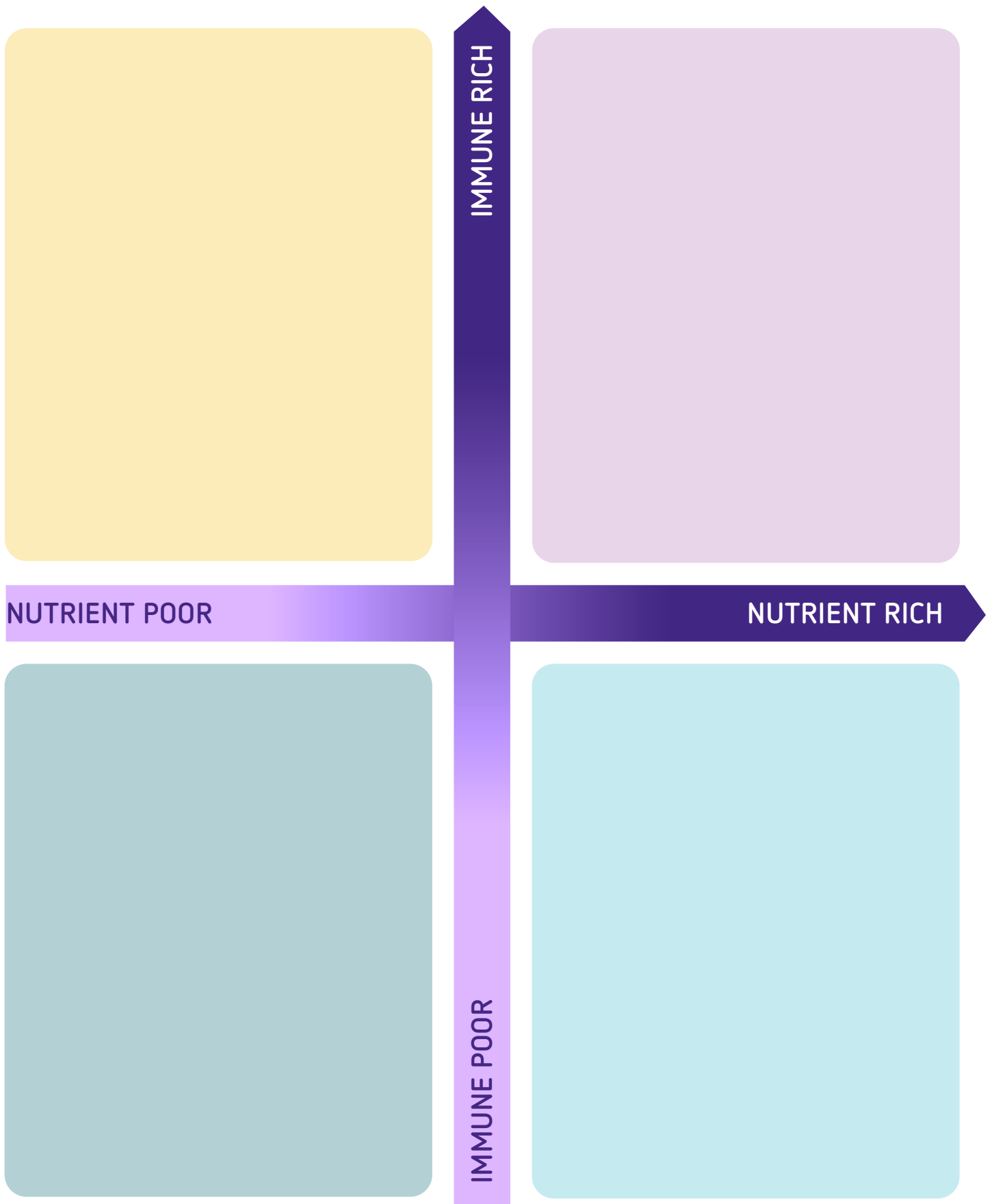
Discuss with friends or family whether you think there will ever be a cure for cancer. Explain whether taking part in this activity has changed your opinion.

## ↔️ Career options

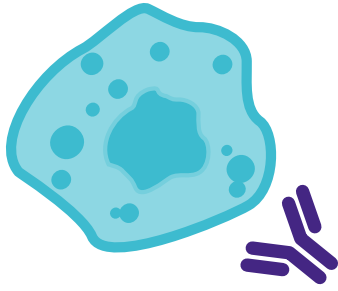
There is a whole world of opportunity within STEM. If your interest has been sparked, find out more about careers in cancer research by reading the ICR careers booklet and watching the video at [icr.ac.uk/schools](https://icr.ac.uk/schools) ✨. Meet the real-life scientists who are making the discoveries that defeat cancer.

## 🔒 Skills unlocked

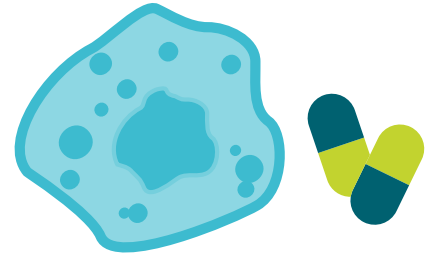
Observant, logical



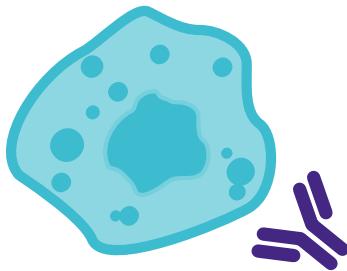




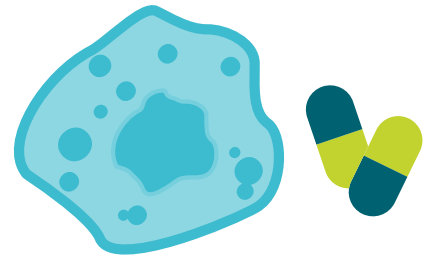
Single high-dose **IMMUNOTHERAPY**  
Kill half of the cells from the immune rich area



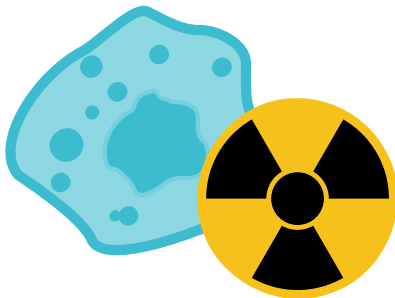
Single high-dose **CHEMOTHERAPY**  
Kill half of the cells from the nutrient rich area



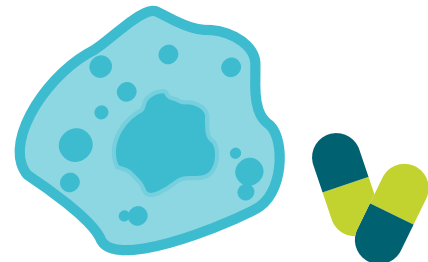
Long term **IMMUNOTHERAPY**  
Kill all but one cell in the immune rich area



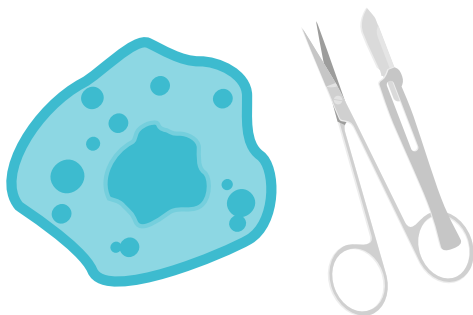
Long term **CHEMOTHERAPY**  
Kill all but one cell in the nutrient rich area



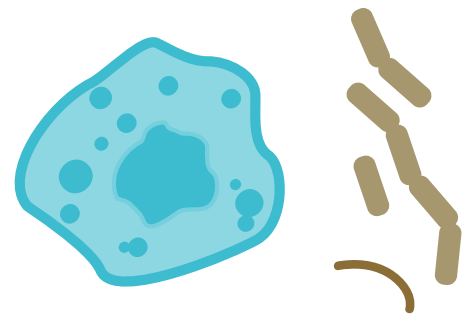
**RADIOTHERAPY** treatment  
Kill all but one cell in the original location



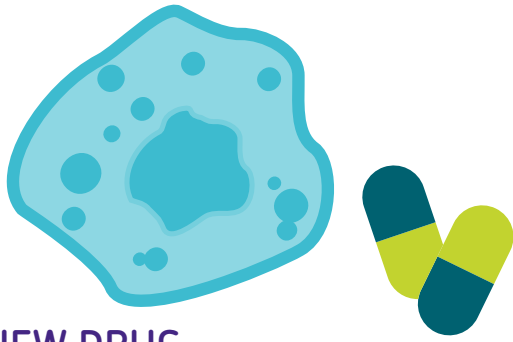
Combined **CHEMOTHERAPY**  
Kill all the cells but one



**SURGERY**  
Kill all the cells that are in the original location

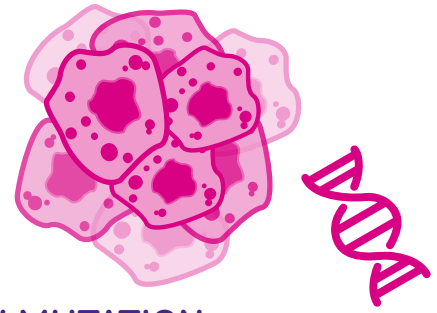


**MICROBIOME**  
Kill all the cells from two different colours



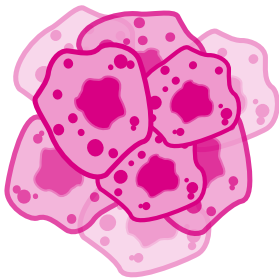
### A NEW DRUG

Kill all the cells with a mutation, if you have had the mutation card before



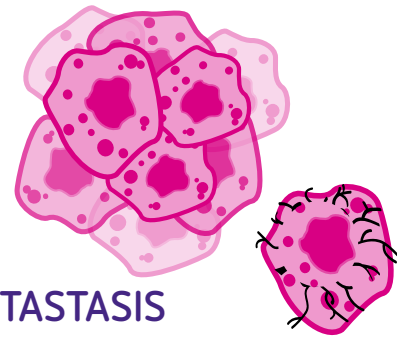
### NEW MUTATION

Move cells of one colour to a different area



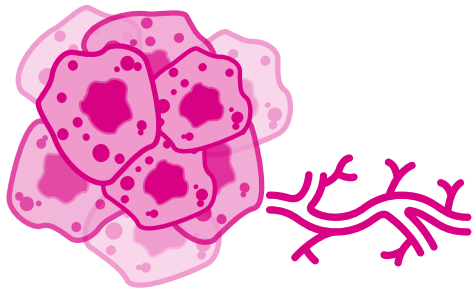
### RESISTANT CELLS

Double the number of cells from one colour and kill the rest



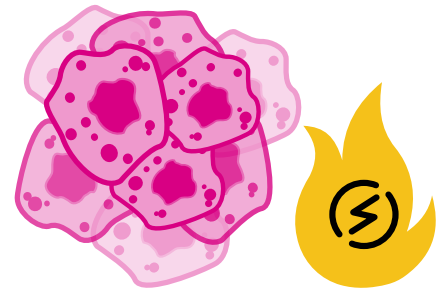
### METASTASIS

Add four new cells in a different area



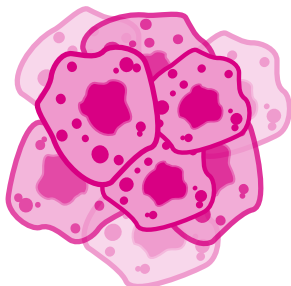
### NEW BLOOD VESSELS

Move cells to nutrient rich region and grow the tumour twice as fast from now on



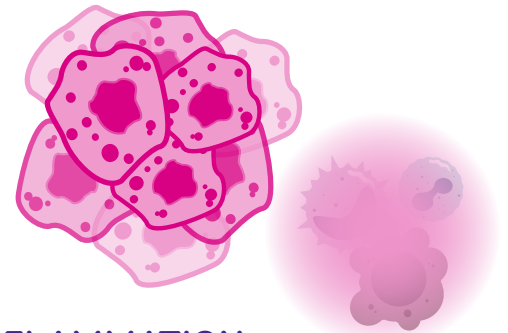
### METABOLISM CHANGE

Move the cells to a different nutrient area



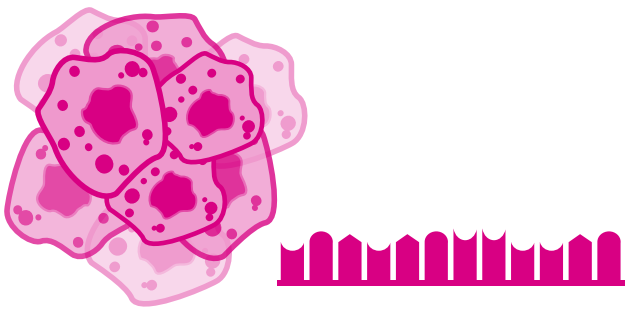
### EVADING IMMUNE SYSTEM

Move the cells to the immune poor area and add one cell per colour



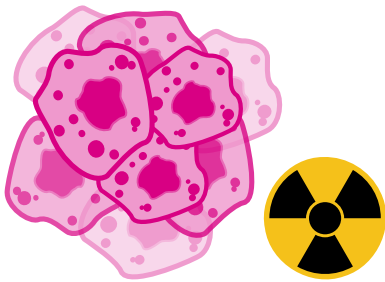
### INFLAMMATION

Move the cells to the immune rich area and add one cell per colour



Changes to  
**GENE EXPRESSION**

Cells are growing faster now,  
double the number of cells

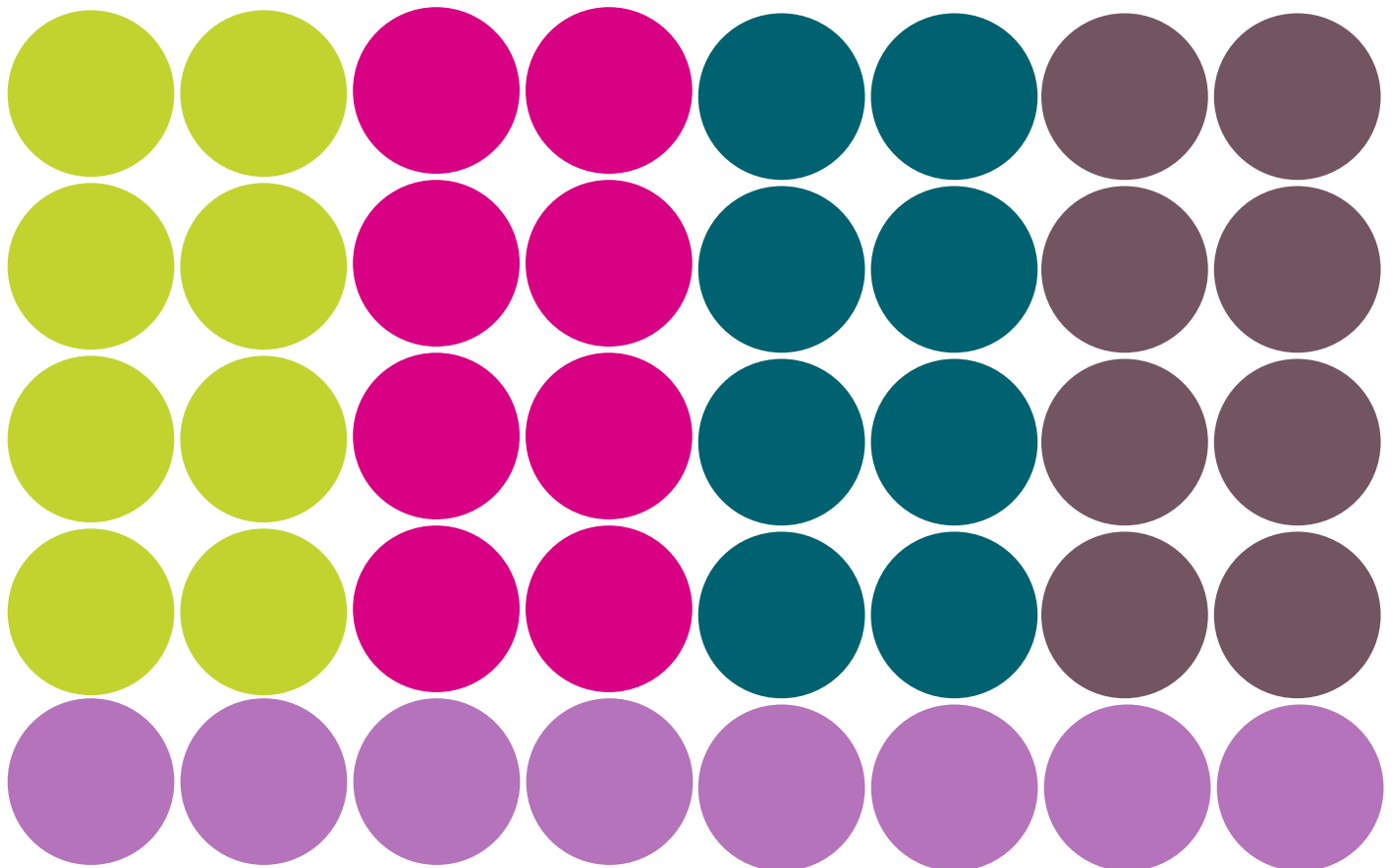


**UV RADIATION**

Cells acquired new mutations, move cells of  
one colour to a different area

**ICR** The Institute of  
Cancer Research

**BRITISH  
SCIENCE  
WEEK**



# HOW CAN ARTIFICIAL INTELLIGENCE (AI) HELP WITH HEALTHCARE?

How is healthcare changing and adapting to new technology? This activity will help you to learn about generative and predictive AI. You'll learn how AI is used in healthcare, using real world examples. You'll then discuss and debate the use of AI in healthcare and think about the jobs it might create in the future.

🕒 30 mins – 1 hour

## 📁 Kit list

Worksheet on applications of AI in healthcare (on pages 21-22)

Pen/pencil/  
highlighters/  
coloured pencils

Optional: Scissors

## 📄 Instructions

- 1 Read through the definition of generative and predictive AI on the next page. Which do you use in your everyday life? Are they helpful or not?
- 2 Read through the case studies on the worksheet 'AI: How can it Help with Healthcare?' These are all examples being currently used in healthcare by doctors, nurses, or in hospitals. To investigate them further select and complete any two of the following activities to develop your skills:
  - Organised and clear communicator: Cut out each example to make a pack of six cards and place them in order of what you think is the most helpful to healthcare and the least helpful. What are your reasons?
  - Observant: Highlight examples of predictive and generative AI that you can see.

- Logical: What problems would these examples help solve?
- Curious and open-minded: Are there any of these ways that AI is being used that you think some people wouldn't like? Why?

## ➤ Next steps

Understanding resilience: Discover more about the story of the software engineer Ellis Parry: [thisisengineering.org.uk/projects/supporting-people-with-brain-injuries-through-tech](https://thisisengineering.org.uk/projects/supporting-people-with-brain-injuries-through-tech) ✨

Innovation: Discover more about the story of the robotics engineer Eneni Bambara-Abban: [thisisengineering.org.uk/people/eneni-bambara-abban](https://thisisengineering.org.uk/people/eneni-bambara-abban) ✨

Creativity: Practice your coding skills to understand how a software engineer programmes AI. [makecode.microbit.org](https://makecode.microbit.org) ✨ [scratch.mit.edu](https://scratch.mit.edu) ✨

## 🏠 At home

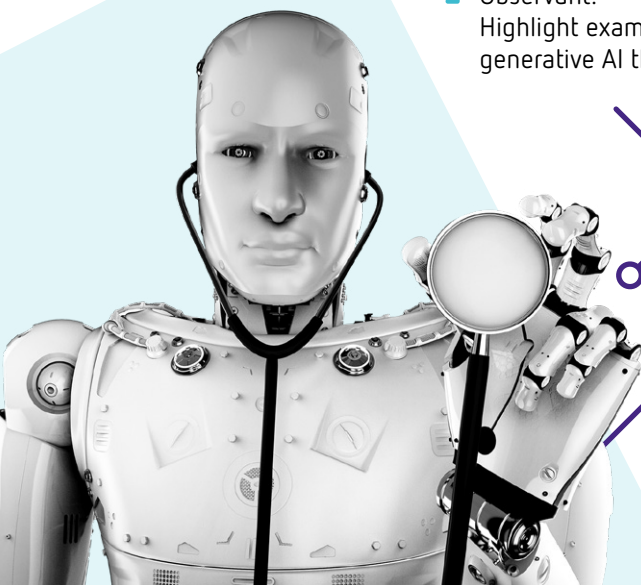
Problem Finding and Solving: What other problems do you know about or have experienced in healthcare that AI could help with? What would your solution do?

## 🔄 Career options

- Software Engineer - programmes AI to do a specific task
- Robotics Engineer - programmes AI to instruct a robot to do a task
- Data Engineer - programmes AI to collect huge amounts of data and make it usable
- Medical Engineer - looks for solutions to problems in medicine. They could use AI in a solution
- AI Technician - maintains and fixes any problems with AI programming and systems

## 🔒 Skills unlocked

Hard-working, self-motivated



## Think and Talk About

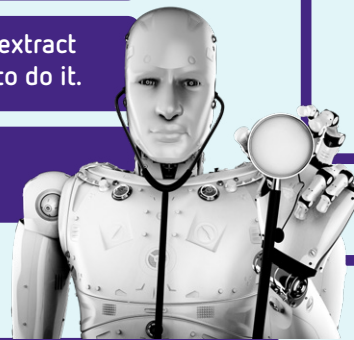
What do you think about these potential future uses of AI in healthcare?

How do you feel about them? What are the positives and negatives of each?

Predictive AI giving you a diagnosis instead of a doctor.

AI recommending the best way to extract a tooth and programming a robot to do it.

Generative AI listening to you to help you with any problems.



The two types we are focusing on are predictive and generative.

## Definitions

**Artificial Intelligence is:** the replication of human intelligence by machines.

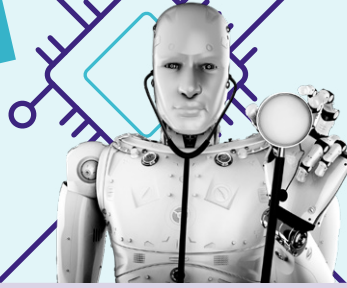
**AI can be programmed** to search through huge amounts of data quickly, make recommendations and create content.

### Predictive AI

This makes a prediction, recommendation or decision using data or past information, and learns from this to give you something you will like. Real world examples include voice assistants, online search engines or facial recognition.

### Generative AI

This uses all available data to generate and make music, text or images in answer to a question or prompt. It looks for patterns to make what is asked for and requires huge amounts of information. Real world examples include OpenAI and ChatGPT.



### AI creating notes



Doctors and nurses take notes from each meeting with a patient. AI can be used instead, by recording the conversation and taking notes, meaning the doctor or nurse does not have to do this.

### AI helping people recover



The Neumind App helps people with brain injuries. It was developed by a software engineer called Ellis Parry when his twin brother suffered a brain injury. Ellis created it to help his brother live an independent life. It recommends exercises to do and learns which you prefer, it provides step-by-step instructions to life skills like cooking and sends prompts throughout the day to remind you to do tasks.

### AI diagnosis



When you visit a hospital or doctor you may receive a diagnosis to tell you what is wrong. A data engineer can programme AI to take what you say and search across all online information to provide a list of possible diagnoses to help your doctor reach a decision.

### AI monitoring health at home



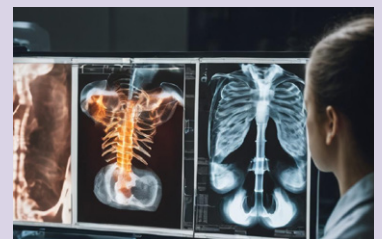
Devices and apps can be set up in a person's home for AI to monitor their health. This means that when leaving hospital a patient doesn't have to wait until a doctor or nurse visits them to provide information. AI can be programmed to gather this information and produce daily recommendations to be sent to doctors and nurses, so they can keep up-to-date with patients' health.

### AI transporting medicines



To help make sure medicines can get to their destination quickly, drones are starting to be used. Robotics engineers, like Eneni Bambara-Abban, use AI to programme drones to take the fastest and safest route possible.

### AI analysing X-rays



When patients have an X-ray AI can scan them and generate reports for radiologists to look at. A software engineer can work with a radiologist to programme AI specifically for this task. AI will look at the X-rays and search for patterns and differences, and the radiologist then decides on the best course of action. This creates more time to speak to patients and helps to make sure nothing is missed on X-rays.

# WASTE-FREE LUNCH

This activity is designed to get you thinking about how we change our lunch choices to be more eco-friendly. Packed lunches often involve lots of unnecessary plastic packaging. You'll test different containers for crisps, and make a poster encouraging your friends to adapt the contents of their lunchboxes!

🕒 1 hour (plus around 20 minutes to introduce and set-up the investigation)



## 📦 Kit list

Several packets of plain crisps

Tupperware boxes made of plastic and glass if possible, paper bags, plastic sandwich bags, bowls, small cardboard boxes, other containers

Cling film

Paper

Pens and pencils

## 📄 Instructions

- 1 Prepare several different containers that crisps could be stored in, including a bowl covered with cling film.
- 2 Keep one packet of crisps unopened as a benchmark. Place an equal amount of the same type of crisps into all your other containers. Leave overnight.
- 3 The next day, at the start of the lesson, inspect all the crisps from the different containers and open the unopened packet to compare.
- 4 Which containers have kept the crisps the freshest? Would buying a large bag of crisps rather than multipacks and putting portions into these containers reduce single-use packaging in your lunchbox? Are some of the containers more suitable than others? Which one would you choose for a packed lunch and why?
- 5 Think about other ways you could change your lunch choices to reduce waste. Make a poster to display in your school to encourage students (and teachers!) to follow suit.

## ⚠️ Watch out

- Check if students have allergies to any of the ingredients in the crisps.

## ➡ Next steps

This activity can be put towards a Bronze CREST Award. Find the full activity in the CREST resource library. <https://secondarylibrary.crestawards.org/#Bronze> ✨

## 🏠 At home

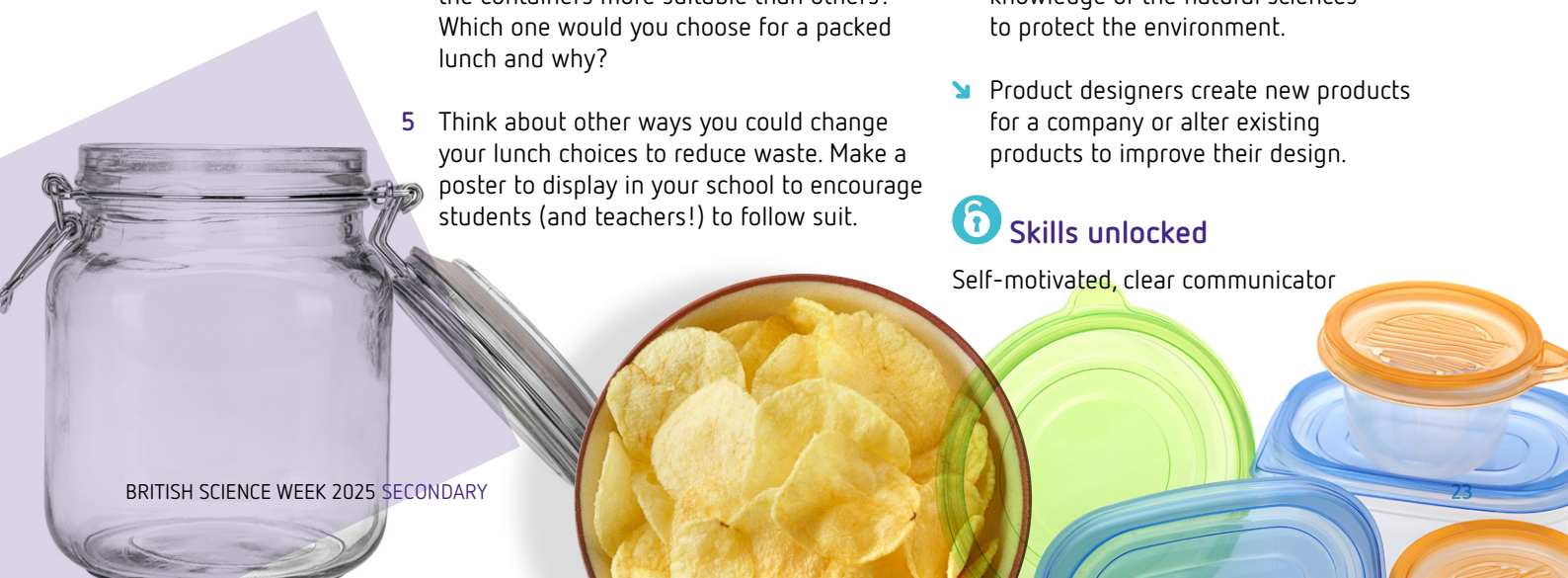
Think about other areas of your life where you could make changes and adaptations to use less single-use plastic.

## ↔ Career options

- Environmental scientists use their knowledge of the natural sciences to protect the environment.
- Product designers create new products for a company or alter existing products to improve their design.

## 🔒 Skills unlocked

Self-motivated, clear communicator



# ENRICH MY CLASSROOM WITH ERGONOMICS

This activity is designed to get you thinking about ergonomics. People who work in ergonomics might study a classroom and make it better by designing new products or ways of doing things. You'll be investigating the design of tools for sitting and writing – something you do a lot of at school!

🕒 1 hour



## 📦 Kit list

**Seating risk assessment**  
(on the next page)

**Desks and chairs**  
(this activity will work best in a classroom)

**An internet-connected device**

**A selection of pens and writing tools**

**Paper**

## 📄 Instructions

- 1 Form teams of two. Use the 'Seating risk assessment' on the next page to assess how your partner is sitting. Workplaces use assessments like this regularly to ensure the furniture provided is suitable for each person.
- 2 Think about all the different types of seating available, for example yoga balls and chairs with different arm or back rests. Use the internet to research other types of seating that might make sitting in a classroom more comfortable.
- 3 What type of seating would you recommend for your partner?
- 4 Ask your partner to try lots of different pens and writing tools. Ask them what they liked or disliked about the pens.
- 5 Design a new pen grip for your partner that would help make any pen comfortable. Sketch your design, labeling the materials you would use and explaining how it would work.

## ⚠️ Watch out

- ➡ Make sure students sit on chairs correctly, no swinging back.

## ➡ Next steps

This activity can be put towards a Discovery CREST Award. Find the full activity in the CREST resource library.  
[discoverylibrary.crestawards.org](https://discoverylibrary.crestawards.org) ✨

## 🏠 At home

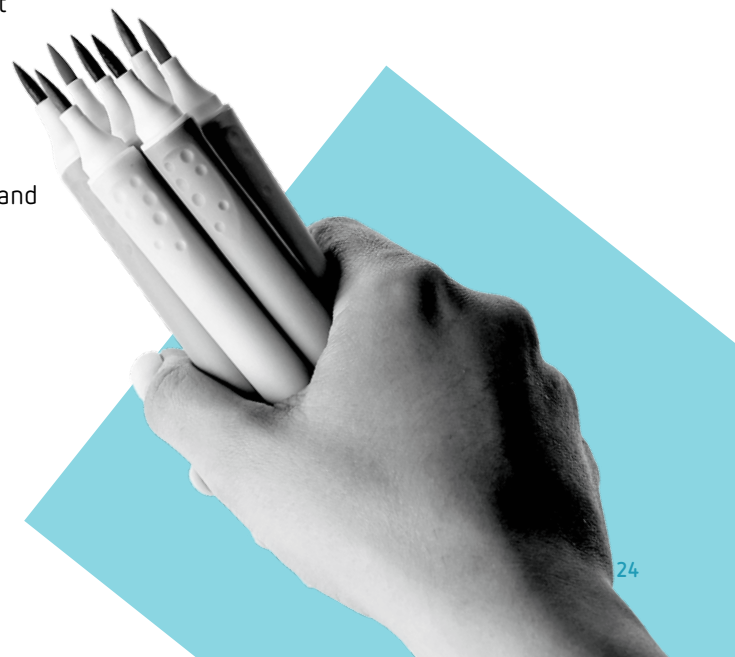
Think about the things you do a lot at home, could the furniture and objects be adapted to make them more efficient and comfortable?

## ↔️ Career options

Product designer, occupational therapist

## 🔒 Skills unlocked

Observant, creative





Name

Assessed by

Date

Average time seated  
(hours per day)

Question

Yes / No

Comments

Is the desk at a satisfactory height? For example, can you sit comfortably and write?

Is there adequate leg room under the desk to sit comfortably?

Is your chair fully adjustable (seat height, back height and back tilt)?

Futher comments

# EVAPORATION IN ACTION

Evaporation is an important process that we can observe in everyday life – and the lab. This activity lets you explore how dissolved substances change and become more concentrated when the liquid they are dissolved in (the solvent) evaporates. If you're patient, you can watch table salt (sodium chloride) form crystals.

🕒 10 minutes to set up, about a week for observations

## 🧰 Kit list

**Two egg cups**  
(or small beakers)

**A plate**

**A teaspoon**

**Natural fibre string,**  
20–30cm long

**Table salt**  
(sodium chloride)

**Hot water from**  
a kettle

## 📖 Instructions

- 1 Add 3 to 4 teaspoons of table salt to each egg cup, then half-fill the cups with just-boiled water from the kettle.
- 2 Stir the water to dissolve as much salt as possible. This will create a saturated solution – that means no more salt can dissolve into the water.
- 3 Set the egg cups about 5cm apart on a plate.
- 4 Place one end of the string into each egg cup and let the middle hang down between them.
- 5 Leave the experiment for several days and observe the effects of evaporation.
  - What has happened to the water? What could speed up this process?

During evaporation, a liquid changes to a gas when particles at the surface of a liquid have enough energy to break away from the other particles. Water on Earth is continually evaporating, condensing, freezing and melting.

## ⚠️ Watch out

Ensure students are careful when handling hot water.



## ➤ Next steps

Why not investigate evaporation further by trying different shapes of containers and/or different locations? Find out more: [rsc.li/evaporation-in-action](https://rsc.li/evaporation-in-action) ✨

Water is vital to life for people, plants and animals. Read about UN sustainable development goal 6: [rsc.li/sdg-goal-6](https://rsc.li/sdg-goal-6) ✨

Take a zoomed-in photo of your crystals and use it in art class.

## 🏠 At home

- Look out for more examples of evaporation in action.
- Water is vital for life - what actions could you take to prevent wasting it?

## ↔️ Career options

Put your observation and critical-thinking skills to good use with a career in chemistry. You have the opportunity to make a difference to society and the planet too. You might enjoy the following roles:

- Marine biogeochemist: [rsc.li/biogeochemist](https://rsc.li/biogeochemist) ✨
- Air quality consultant: [rsc.li/air-quality-consultant](https://rsc.li/air-quality-consultant) ✨
- Analytical chemist for safe food: [rsc.li/food-chemist](https://rsc.li/food-chemist) ✨

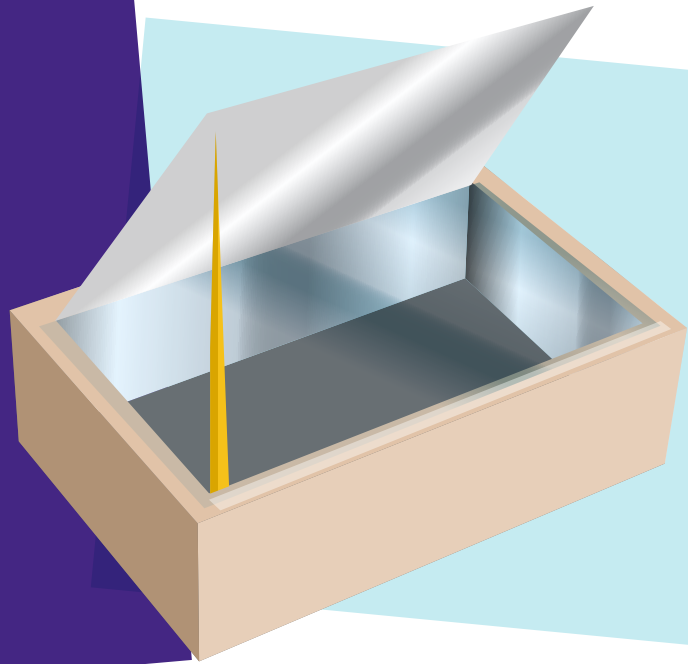
## 🔒 Skills unlocked

Patient, observant

# MAKE A SOLAR OVEN

What if we could capture energy and use it for free? Solar ovens collect and trap energy (light and heat) so that it can be used to warm and cook food, and even sterilise water and equipment. Using renewable, clean energy like this is one way we can help to tackle climate change.

🕒 45-90 mins



## Kit list

**1 cardboard box**  
(a shoe box works well)

**Scissors**

**A roll of sticky tape**

**1 sheet of black card**

**1 wooden skewer**

**Aluminium foil**

**Cling film**

**Chocolate bars**  
(optional, to test the oven)

## Instructions

- 1 Cover the inside of the box, except the lid, with an even layer of foil.
- 2 Trim the black card so it covers most of the bottom of the box and then use sticky tape to fix it there.
- 3 Close the box and draw a square or rectangle on the top about 3cm smaller than the lid.
- 4 Cut 3 sides of this square so you make a flap that can be opened and closed.
- 5 Cover the bottom of this flap with foil.
- 6 Put some cling film over the hole in the lid. Use tape to make it as air-tight as you can.

- 7 Use a skewer to prop the flap open so you can see inside the oven – fix it with tape if you want.

You could test your solar oven on a sunny day with one bar of chocolate inside and one outside. Which one will melt first?

## Next steps

This activity is part of the Climate Schools Programme from EngineeringUK. Sign up for free to get more resources to explore how engineers are changing the world and tackling climate change.

[www.climateschoolsprogramme.org.uk](http://www.climateschoolsprogramme.org.uk) ✨

## At home

Make simple solar air heaters for rooms in your home with pieces of black card on windows that face the sun.

## Career options

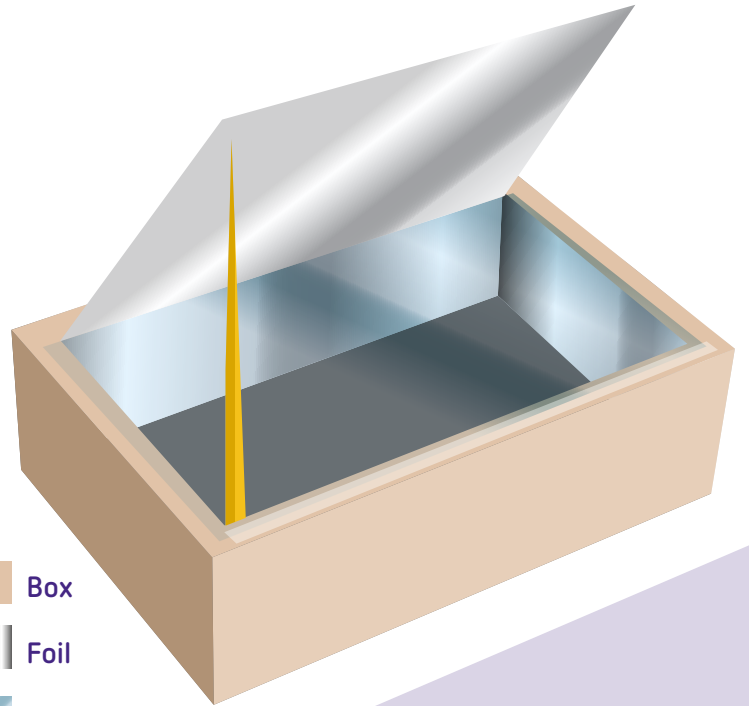
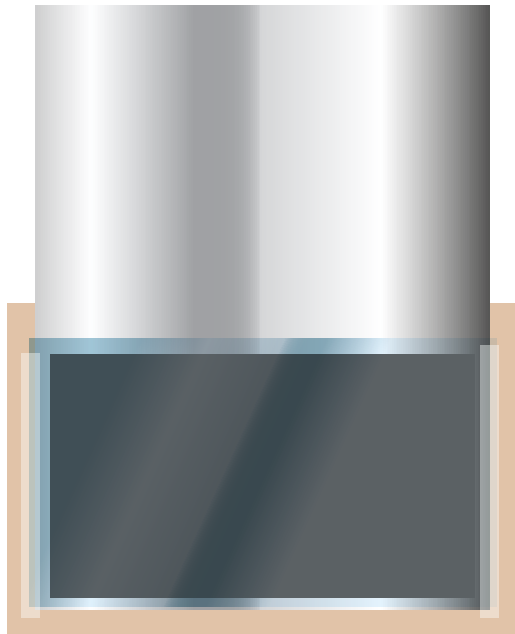
Energy engineers work out how to generate energy that we use to power our homes and vehicles. Some forms of energy generation release greenhouse gases that cause climate change, but there are lots of people out there working out how to use renewable, clean energy like the sun, wind and tides.

## Skills unlocked

Committed, resilient



Image: Knut-Erik Helle



- Box
- Foil
- Cling film
- Tape



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<https://creativecommons.org/licenses/by/2.0/>)



# YOUR PLANET NEEDS YOU!

'Green' skills are any skills that you apply to help reduce emissions, lower the carbon footprint or protect the environment. Find out more about your skills and apply them in Green Jobs to adapt how we live - and save the planet!

🕒 30-60 mins

## 📁 Kit list

Pen & paper

Timer

An internet-  
connected device

## 📄 Instructions

- 1 What are you good at? In groups of two or three, discuss each other's talents and abilities. Include school subjects, but also think more broadly – are they great at telling hilarious jokes? Ace at your favourite video game? Or can they backflip? Create a bubble diagram around your name, pass to the left, think about it for two minutes, then swap, spending the final two minutes adding to your own list.
- 2 Match those ideas to an Essential Skill on the list you'll find here: [www.skillsbuilder.org/universal-framework](http://www.skillsbuilder.org/universal-framework) ✨.
- 3 CVs often have skills sections - pick your top few skills and under each skill heading describe how you've demonstrated that skill. E.g. Speaking – "I'm skilled at telling jokes with good timing to make my friends laugh".

- 4 Explore the Green jobs you could apply your skills in to save the planet: <https://curiosityconnections.net/green-futures/> ✨.

## ➤ Next steps

Use the Skills Builder website to further examine your skills – the site will help you to identify areas to develop and what steps to take.

When applying for jobs, tailor your CV (a document that summarises your education, skills and experiences) to the job description by putting the core skills they ask for closer to the top.

## 🏠 At home

Being green is everyone's responsibility, in whatever job you're in or wherever you live. How could you make your life more sustainable for the planet?

## ↔ Career options

- Head of Sustainability at a sports stadium
- Sustainable Fashion Campaigner
- Ethical Investment Reviewer for a bank
- Reuse Shop manager
- Professor of Future Mobility

## 🔒 Skills unlocked

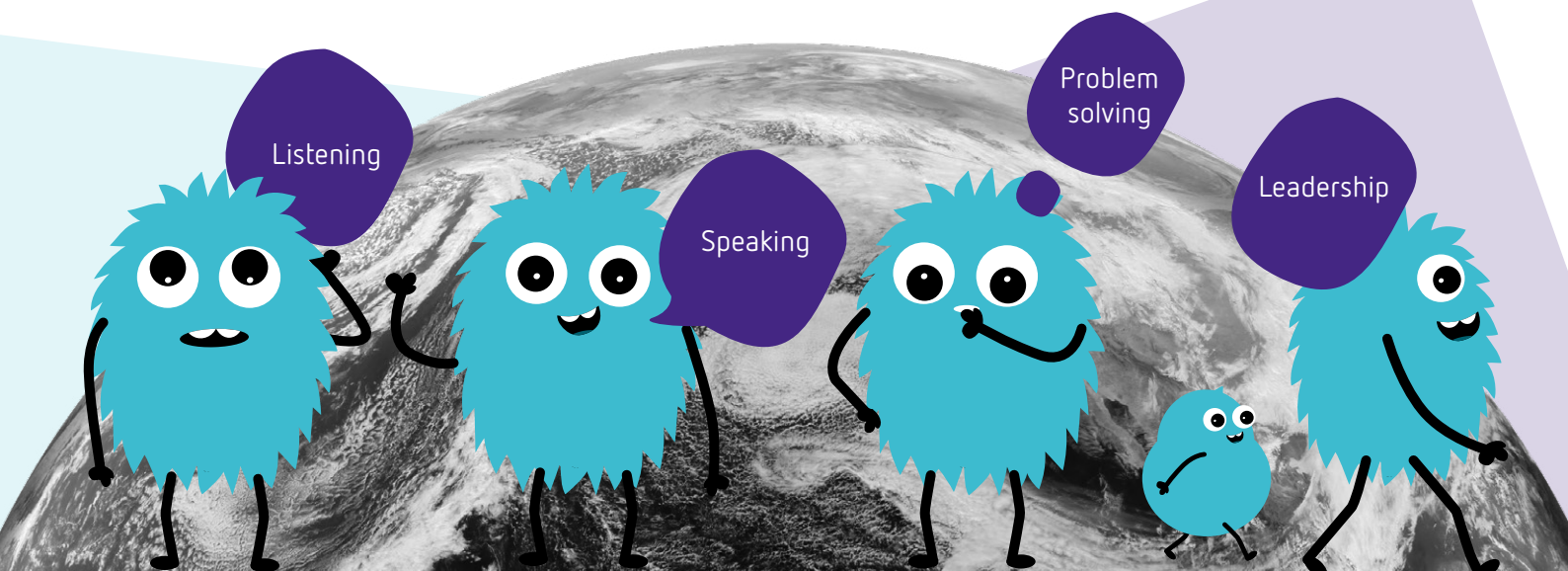
Passionate, self-motivated

Listening

Speaking

Problem  
solving

Leadership



# BATH BOMB CHALLENGE

There are bath bombs of all shapes, colours and scents on the market, but did you know you can make your own? In this activity, you'll make your own bath bombs, changing and adapting your recipe as you go to achieve the perfect bathtime treat!

🕒 2+ hours



## 🧰 Kit list

Two mixing bowls

Whisk

Flexible plastic moulds (clean empty yoghurt pots, silicone ice cube tray or silicone cupcake cases)

### Dry ingredients:

- 100 grams baking soda
- 50 grams citric acid
- 25 grams cornflour

### Wet ingredients:

- 2 tbsp sunflower oil or olive oil
- 2 tbsp water
- 1 tsp food colouring (optional)
- 12-15 drops essential oils of choice (check for allergies)

## 📖 Instructions

- 1 Mix the dry ingredients in one bowl and the wet ingredients in the other bowl.
- 2 Add the wet ingredients to the dry ingredients a few drops at a time while whisking, until the mixture just sticks together when pressed.
- 3 Press the mixture into the mould and leave to dry for at least two hours.
- 4 Make a few bath bombs by changing the recipe – adapting it to get the colour, scent or fizziness you want – and record the differences in them, such as:
  - More or less baking soda
  - More or less citric acid
  - Different oils
  - Different colours
- 5 Remember to keep some elements the same so the bath bomb has the correct consistency.
- 6 Now it's time to test your bath bomb! Put the bath bomb in some water and record:
  - How long it takes to disperse
  - What happens to the water
- 7 Compare your bath bombs and write out the recipe of your favourite one.

## ⚠️ Watch out

- Teachers – please be sure to risk assess practical activities following the advice of your Health & Safety advisor.
- Wear gloves while handling chemicals.

## ➤ Next steps

This activity can be put towards a Bronze CREST Award. Find the full activity in the CREST resource library. [secondarylibrary.crestawards.org/#Bronze](https://secondarylibrary.crestawards.org/#Bronze) ✨

## 🏠 At home

Make more bath bombs at home, creating as many variations as you can think of – the sky's the limit.

## ↔️ Career options

- Cosmetic chemists design formulas for toiletries
- Food scientists work with edible ingredients to create recipes

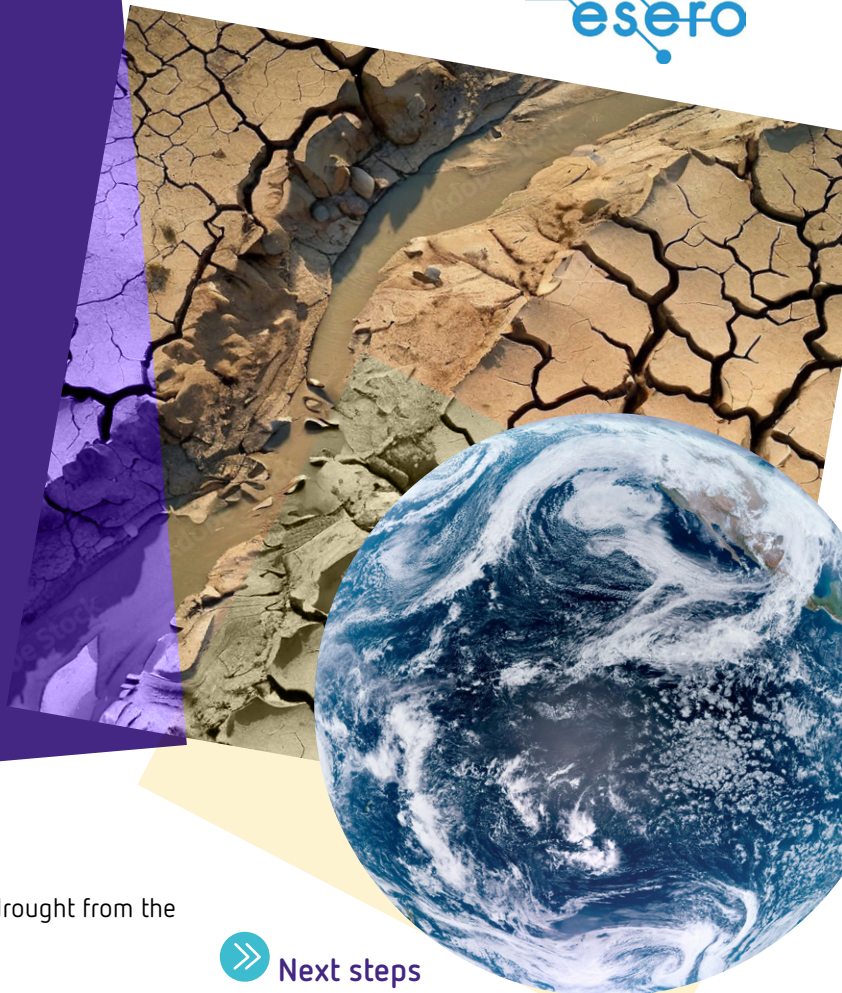
## 🔒 Skills unlocked

Patient, observant

# DROUGHTS AND FLOODS

Droughts and floods over wide areas often make the news and have a considerable impact on people and the environment. In this activity, you'll use apps from the European Space Agency where you can use real space data to investigate floods or droughts across the world.

🕒 3-4 hours



## 📦 Kit list

Access to a computer to use the Climate from Space web application:

[cfs.climate.esa.int](https://cfs.climate.esa.int) ✨

and Copernicus Browser:

[browser.dataspace.copernicus.eu](https://browser.dataspace.copernicus.eu) ✨

## 📄 Instructions

- 1 Research a major flood or drought from the last five years.
- 2 Use the Climate from Space web application to find the soil moisture levels at that time, and see how they differ from normal levels.
- 3 Click on Data Layers in the top right corner and choose Soil Moisture, to do this. You can also use the Moisture Index in the Copernicus Browser.
- 4 Use other information from the internet in your research, such as annual climate data or news reports. Remember to assess the reliability of your sources.
- 5 Create a report, presentation or poster to tell others about the event. Include at least three of the sections listed below as well as images created from satellite data.

- Details of the event: what? when? where?
- Can we say anything about what caused the event?
- What impact did the event have on the area?

(You might include before and after images to illustrate this.)

## ➤ Next steps

Think about:

- How did the event affect people? How many? Over what time scales?
- What was done to help them? Is it likely to happen again?

Find further activities in the full resource Taking the Pulse of Our Planet: [www.stem.org.uk/rxh752](https://www.stem.org.uk/rxh752) ✨

## 🏠 At home

Discuss what you have learned at home or with people outside of school. Do they have any experience of floods or droughts?

## ↔ Career options

- Climate Scientist
- Meteorologist
- Environmental Scientist
- Data Scientist
- App Developer
- Spacecraft Engineer
- Software Engineer

## 🔒 Skills unlocked

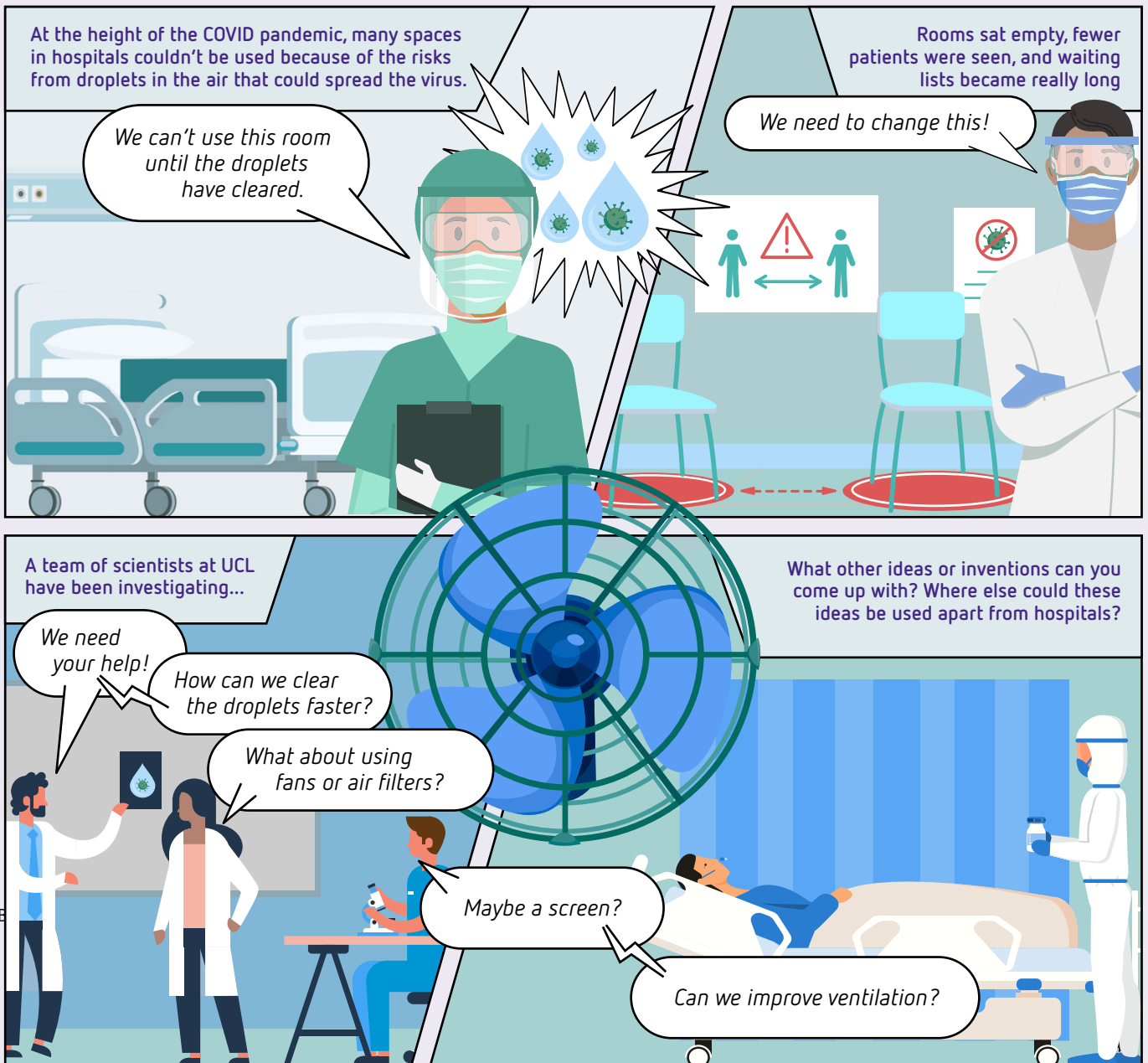
Committed, clear communicator



# Competition:

## The scientists from UCL need your help!

Enter our special competition category this year and share your ideas with a team of top scientists at University College London (UCL)! Can you help them by coming up with a new invention to improve the health of the air in our buildings? Schools should select the five best student entries and submit them for a chance of winning an array of prizes! See the next page for instructions.





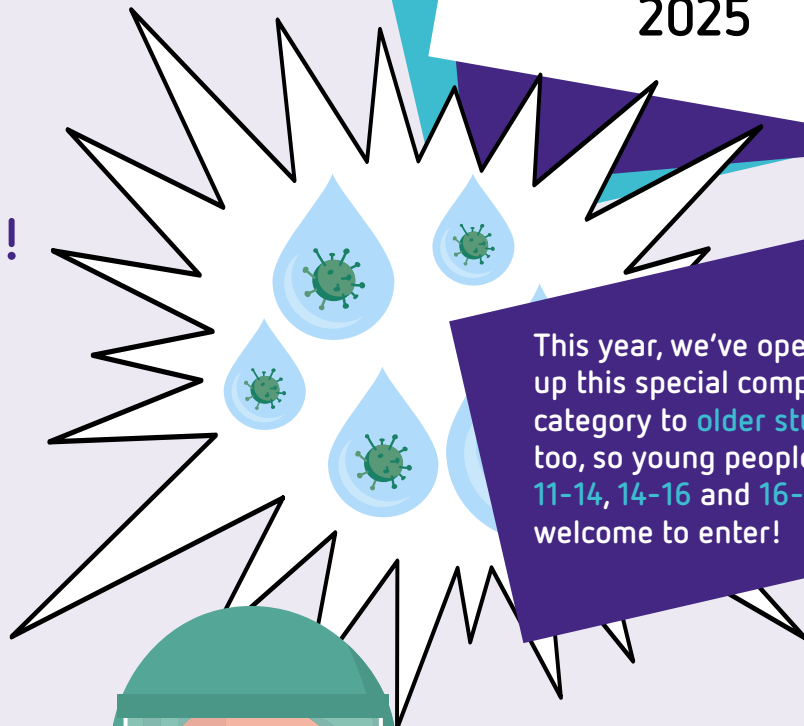
## Competition: The scientists from UCL need your help!

### **i** Instructions

Choose an indoor public space where you often spend time – this could be an area where you learn, or a place you visit regularly like a library, café or cinema. Do you think the air in this space is healthy and clean? Why? Come up with an idea or invention to change the air in your chosen space, making it healthier to breathe. How will it work? Could it be used in other public places too?

You might have a brand-new idea, or you might come up with something that already exists but re-imagined in a unique or creative way. The researchers at UCL have considered lots of different ideas for improving air quality and preventing the spread of viruses in hospitals. For example, you could think about face masks, curtains and screens, ventilation, fans or air filters.

You should carry out some research first, to inform your thinking. Make sure your sources are trustworthy! Your entry should show some scientific understanding in line with your level of learning. Think about what you have learned in your science lessons and how this can be applied to the topic. How do the different states of matter behave? How do viruses affect our bodies? How could your design be physically built?



This year, we've opened up this special competition category to older students too, so young people aged 11-14, 14-16 and 16-19 are welcome to enter!

Then think carefully about how you will lay out and present your idea. You should consider how best to communicate your research so that it is clear and logical. You could create a set of instructions, a detailed diagram or you might like to develop an eye-catching poster! Will you include photos, graphs or other images to illustrate your thinking?

Entries must be A4 or A3 in size and you'll need to be able to take a photograph of your work so it can be sent to us online for judging.

### Send us your entry

Once students' entries are complete, take a photo of them and complete the online form to submit the top five.

For more details, along with the full set of poster competition rules and tips, check out our website: [britishscienceweek.org/plan-your-activities/poster-competition](https://britishscienceweek.org/plan-your-activities/poster-competition) ✨



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

