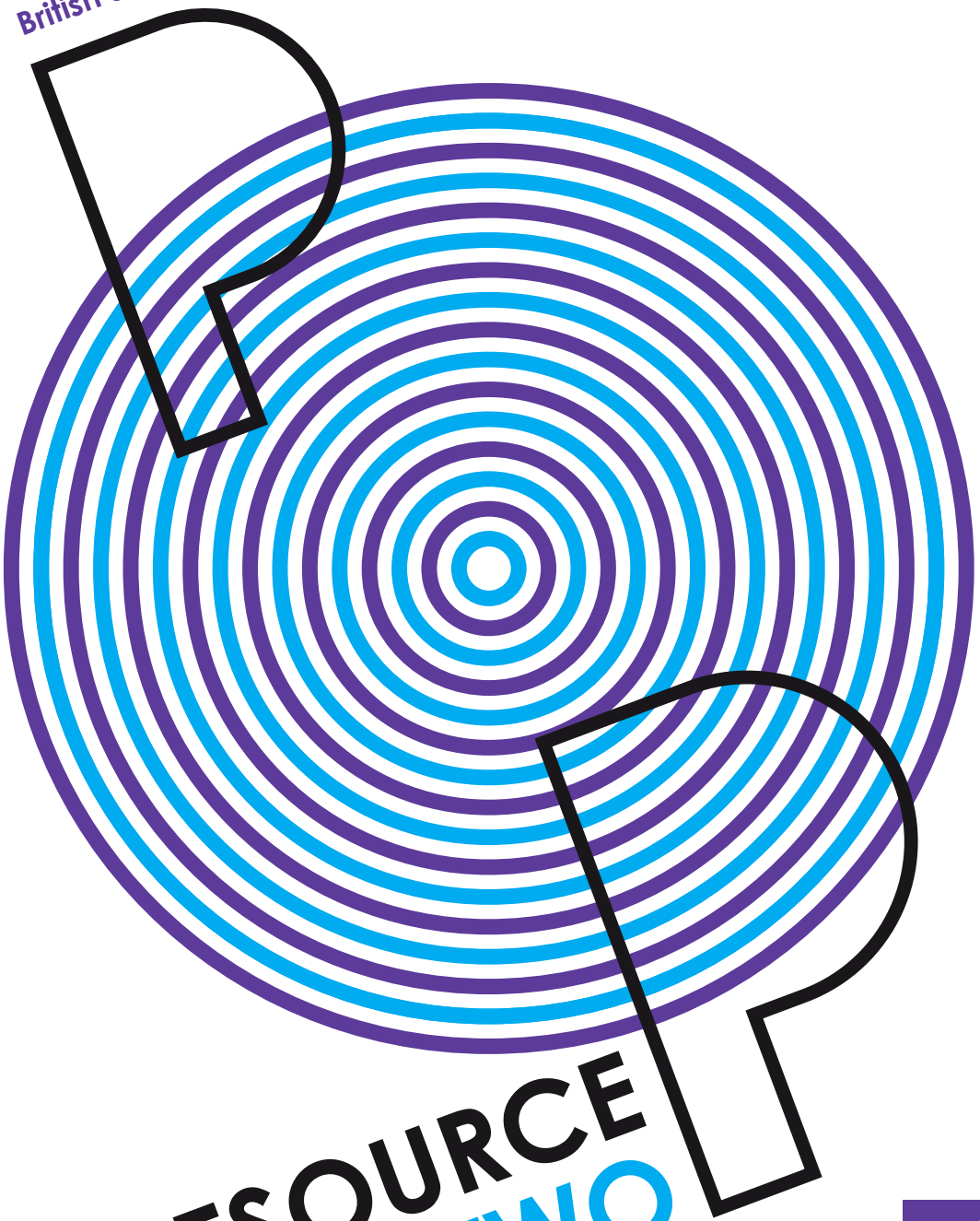
GET READY FOR SCIENCE

British Science Week 11-20 March 2016

BRITISH SCIENCE WEEK 2016



RESOURCE PACK TWO

www.britishscienceweek.org

ACTIVITY PACK

SCIENCE IN SPACES
RESOURCE PACK TWO

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GET READY FOR BRITISH SCIENCE WEEK 2016

British Science Week (BSW) is the largest UK-wide celebration of science, technology, engineering and mathematics. Thousands of activities take place in schools every year as well as events in community spaces; museums; science centres; cultural venues; and public places.

ACTIVITY PACK 2

This resource pack is aimed at supporting you during British Science Week, but can be used at any time of year. Feel free to adapt/extend the activities to suit your students' needs and the curriculum you are delivering. In addition to the activities in this pack, there are lots of other ways to enthuse and engage your students throughout the week:

Don't forget to demo

Demo Day takes place annually during British Science Week and is an opportunity to celebrate the power that hands-on science demonstrations have to inspire, excite and fuel the imaginations of young people. This year's demo day is on 17 March 2016.

We are encouraging all secondary schools to get involved and pledge their participation as part of our national campaign.

Check out **www.britishscience week.org/demo** for ideas, support, resources and to pledge. By pledging and doing a demo, you can also achieve the teacher 'creator' digital badge!

British Science Week events

You can either create your own club, class or school event or search for things happening near you on our website. And don't worry if you are new to organising science events or running science activities with your class - the site also features plenty of support, advice and ideas.

Last year, there were over 5,000 events reaching more than 1 million people. Help us make British Science Week 2016 even bigger and better! **www.britishscienceweek.org**

CREST Awards

Many of the activities can count towards CREST Awards. Further CREST resources can be downloaded for free from **www.britishscienceassociation.org/crest**

The British Science Week 2016 digital badge

All the activities in the pack this year can enable you and your students to achieve special British Science Week 2016 digital badges. Just register for free on the makewav.es platform and students can upload evidence of their British Science Week participation to gain the badges. It's a great way to quickly evidence and reward everyone's hard work. Register at **www.makewav.es/britishscienceweek**

Mix it up

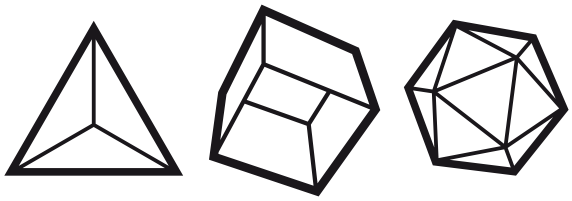
British Science Week is a great time to showcase the role that science and engineering play in all areas of life and put school science into context. It's an ideal opportunity for students to learn through a cross-curricular approach, by linking up science, arts and humanities in a meaningful way. We have a special 'arts collaborator' digital badge to recognise and celebrate cross-curricular British Science Week activities.

The British Science Association is an Artsmark supporter and are encouraging schools to use British Science Week activities as a way to achieve the quality principles laid out in the new Artsmark. To find out more about Artsmark, go to **www.artsmark.org.uk/about-artsmark**

BUILT SPACE

BUILDING A MODULAR CLINIC

WITH MP FUTURES



WHAT YOU'LL NEED

- Computers or books to research healthcare in emergency situations and temporary, emergency structures
- Materials for making a prototype clinic
- Presentation materials – large paper and markers, or a computer and projector

BACKGROUND

Many people around the world don't have access to medical care. Often natural disasters, epidemics, wars and political upheaval can mean that small clinics need to be built quickly and cheaply to help sudden increased demand, displaced people or refugees.

One solution is to build modular medical clinics. Because they are modular (each one is a 'module'), they can be easily linked to another module of the same design in any direction, including upwards.

FIND OUT MORE

This activity is based on the MP Futures CREST Bronze project. To find out more and explore other MP Futures supported CREST projects, go to **www.britishscienceassociation.org/Pages/FAQs/Category/crest-mpfutures**

Part 1
Researching emergency structures and clinics

Before you start designing and prototyping your clinic, you need to find out some information about what your clinic needs, what already exists and what different building methods there are.

Decide what you want to find out and how you're going to conduct your research. It might be a good idea to allocate different research areas to different members of the group. What different areas do you need to research? How will you share what you've found with the rest of the group?

Part 2
Designing the clinic

It's time to design your modular clinic. Make sure you use what you've learned in your research to inform your design process.

Here are some important details to think about in your design:

- What materials will it be made from?
- How will it be transported?
- How will it be quickly and easily built?
- How will it connect to other modules to extend the clinic?
- What makes it suitable for medical use?
- How might it withstand a natural disaster zone? This might include flooding, minor earthquakes, storms and high winds.

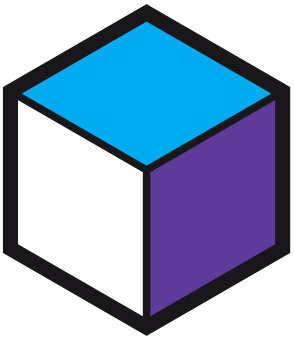
Part 3
Building a prototype

Once you've designed your clinic, test out your ideas by building a prototype model of it. Your prototype should show how your clinic can be transported and built easily.

Part 4
Presenting your design and prototype

Present your designs and your model to the rest of the class or group.

Make sure you demonstrate and explain all the different features which went into your design. You can also explain some of the alternative materials or building methods which you decided not to use, and why you decided to use your method instead.

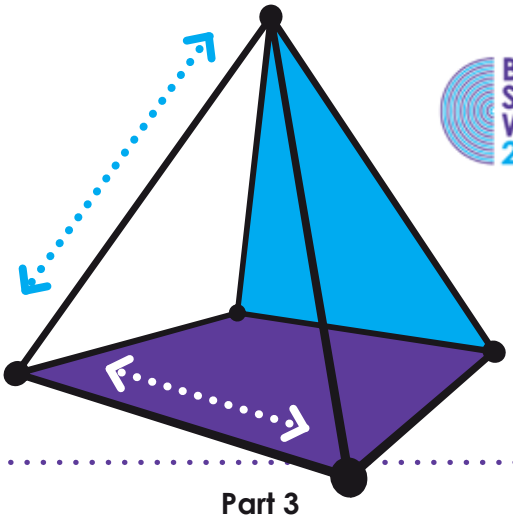


mp-futures

BUILT SPACE

BUILDING A PYRAMID

WITH MP FUTURES



WHAT YOU'LL NEED

- A selection of pyramid building material – e.g. card, paper, wood, plastic
- Scissors, glue, tape and blue tack
- Weights - to test the strength of your pyramid
- A fan - to test how your pyramid stands up to wind

BACKGROUND

In this activity, you'll work in a team of between two and four people to build a pyramid and test its properties. You'll need to consider how you're going to build it and how this will affect things like how easy it is to build, how strong it is and how it looks.

FIND OUT MORE

This activity links to a longer MP Futures CREST Discovery day activity. For a full resource pack on how to run the day, including teacher and student notes, as well as a PowerPoint presentation go to **www.britishscienceassociation.org/Pages/FAQs/Category/crest-mpfutures**

Part 1
Pyramid designs

Before you can build your pyramid, you need to decide and plan what you're going to do.

You need to **make three designs for pyramids** and then test their properties. What will you change between your pyramids? Here are some examples:

- Different materials (e.g. plastic, cardboard, wood)
- Different designs (e.g. hollow, solid, taller, wider)
- Different adhesive methods (e.g. glue, tape, blue tack)

Part 2
Pyramid building

Build your pyramids!

It's time to put your plans into action and build your pyramids.

Decide in your team how you will divide up the work. Do you want to work together to build your pyramids? Do you want to build one pyramid each? How will you make sure you stick to your designs?

Part 3
Pyramid testing

You're going to perform some different tests and produce some data about your three pyramids. Set up a way of recording this data, for example, you might want to design a scoring system for the different features you're going to test.

Choose what you're going to test and record about your pyramids. Here are a few examples:

- How strong it is, using weights
- How well it stands up to wind, using a fan
- The aesthetics of the pyramid – does it look good?
- How easy was it to build?
- The capacity of the pyramid – can you fit much inside it?

Part 4
Analysing

Have a look at your results. What do you think of each of your pyramids? Is one design better than the others?

The different designs probably have different strengths and weaknesses. Think about what different uses the different designs of pyramids might be good for.

mp-futures

BUILT SPACE

ACCIDENT INVESTIGATIONS

Be careful when you're doing these experiments – some things can be sharp when they break! Always make sure you're supervised during these tests and include the safety precautions in your plan.

WHAT YOU'LL NEED

- Sheets of different materials – card, plastic, wood
- Equipment for testing breakages – weights or other heavy stackable objects, a vice or clamp, a knife or saw
- Safety equipment – goggles, a safety screen, gloves

BACKGROUND

Insurance companies often need to investigate how damage was done in order to decide if a claim is valid. In this activity, you're going to examine what happens to some different types of materials when they break in different ways.

If you complete all the parts of this activity, you can submit the project for a CREST Bronze Award!

FIND OUT MORE

Have a look at the British Science Association CREST Awards for more great project ideas.
www.britishscienceassociation.org/crest-intro

Part 1
Planning your tests

Using the materials you have, you need to plan an investigation. You need to decide which materials you're going to test, how you're going to test them and how you'll make sure your tests are safe for you and your team.

Here are some examples of different ways you can test a material to see what happens to it:

- Piling on more and more weights to gradually increase the stress
- Suddenly increasing the weight by dropping it from a height
- Cutting the material with a knife or saw – **be very careful with this option, it may not be suitable for your materials or equipment**
- Bending the material - can you work out a way to fix one end (e.g. in a vice) and then gradually add weight to the other end so it bends?

For each of these tests, you need to make some observations:

- Did the material break?
- Did it dent, crack or split apart completely?
- What did it look like when it broke? For example was it a clean break? Are the edges frayed or splintered?

How will you record your results? Will you make observations? Take measurements? Take photos?

Part 2
Carrying out the tests

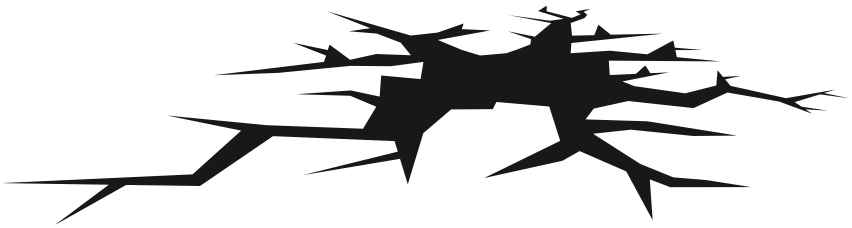
Once you've planned out your tests, get an adult to check over them with you and make sure they're safe and suitable, and then you can start carrying out your tests.

Before you get going make sure you have **all your safety precautions in place**, everyone in the group knows what they have to do and when and make sure you know how you're going to record your results.

Part 3
Advising the insurance company

When you have a set of results, you can put them to use!

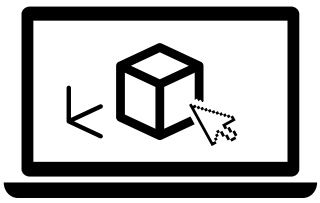
Work out a useful way to present your results to an insurance company for them to use when investigating accident claims. What should they look out for when they're trying to work out how something has broken?



DIGITAL SPACE

THE SOCIAL IMPACT OF 3D PRINTING

WITH THE INSTITUTION OF ENGINEERING AND TECHNOLOGY



WHAT YOU'LL NEED

- A projector or screen and access to the Royal Institution 2014 Christmas Lecture clip: http://richannel.org/3d-printing
- Information on different uses and impacts of 3D printing, for example on 3D printed prosthetic limbs http://bbc.in/169TT33 and 3D printed guns http://bbc.in/1KWSZ9M
- Equipment for brainstorming and sharing ideas – large paper, marker pens, post-it notes etc.

BACKGROUND

3D printing technology is becoming more and more affordable and opening up a whole range of opportunities, both good and bad. In this activity, you'll watch a video from the 2014 Royal Institution Christmas Lectures to learn a bit about 3D printing, and then it's over to you to think about the impact that it could have on society.

FIND OUT MORE

The Institution of Engineering and Technology has lots of information, activities and challenge days you can get involved with.
http://faraday.theiet.org/index.cfm

The Institution of Engineering and Technology

Part 1
What is 3D Printing?

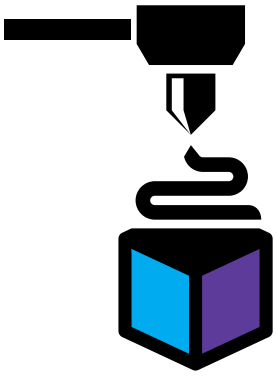
As a whole class/group, watch the clip about 3D printing from the 2014 Royal Institution Christmas Lecture

Part 2
The potential uses of 3D printing

In small groups, discuss and brainstorm using paper, pens and post-it notes what all the different uses of 3D printing could be. Think about how and why 3D printing could be useful.

Use articles and examples of the uses of 3D printing as a stimulus for this section of the discussion, for example, 3D printing prosthetic limbs.

Once you've had five minutes to discuss and brainstorm ideas in small groups, collate all the ideas together as a whole class or group. This could be through each small group explaining their major points, collecting post-its together on the board under different themes, or any other way which might be suitable.



Part 3
The potential problems of 3D printing

Back in small groups, discuss and brainstorm using paper, pens and post-it notes what the potential problems of 3D printing are.

Use articles and examples of the potentially dangerous aspects of 3D printing as a stimulus for this section of the discussion, for example, 3D printed guns.

Again, after five minutes bring the whole class or group together as before to collate everyone's ideas and discuss the potential problems with 3D printing.

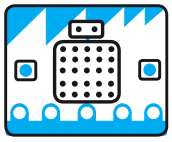
Part 4
Should 3D printers be freely available?

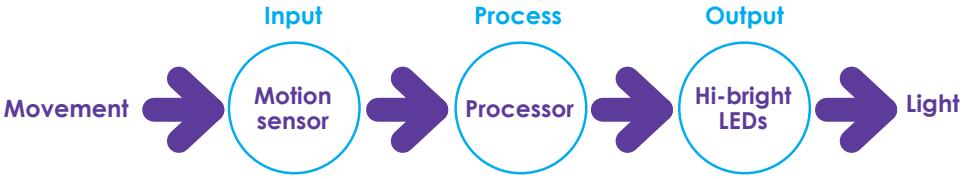
The whole class or group discuss what they've considered about the good and the bad side of 3D printers. Should they be freely available to the public? If not, how should they be licenced? You could have a whole class vote about whether 3D printers should be freely available.

DIGITAL SPACE

AUTOMATIC LIGHTING

WITH THE BBC MICRO:BIT AND THE INSTITUTION OF ENGINEERING AND TECHNOLOGY





WHAT YOU'LL NEED

- A BBC micro:bit
- A motion-sensitive input device
- An internet-connected computer or other device to write and edit your code on

BACKGROUND

Saving energy is good for the environment and for household energy bills. It is estimated that the average UK homeowner could save up to £240 per year alone on the cost of lighting their home by using automatic lighting.
Watch this video to find out more about saving energy with automatic lighting
https://tv.theiet.org/Index.html?videoid=7299

FIND OUT MORE

The Institution of Engineering and Technology have lots of different activities to do with your BBC micro:bit, all with helpful instructions and some code to get you started. Have a look at them here
http://faraday.theiet.org/stem-activity-days/bbc-microbit/resources/index.cfm

Design brief

Using the BBC micro:bit, create a prototype for an automatic lighting system for the home. The system must be able to turn the lighting on when somebody enters a room and turn the lighting off when they leave.

You can use a systems or block diagram to demonstrate the layout of the system. There is an example of this at the top of the page. The blocks represent the physical parts of the system; the arrows represent signals passing between the parts of the system.

Part 1
The input device

There are lots of different options for the input device, depending on what is available in your school. The input devices can be attached to the BBC micro:bit's input ports using crocodile clips.

Possible input devices include:

- Passive infrared (PIR) sensor
- Reed switch (attached to room door)
- Pressure pad (under the floor)
- LDR (light dependant resistor)
- Any other type of motion sensor.

Part 2
Developing the program

Your device, the BBC micro:bit, must be programmed to meet the needs of the design brief (above).

You can use **Block Editor**, **Touch Develop** or **Code Kingdoms** to programme your BBC micro:bit. In each of these editors, some code has been written to help you get started. Visit **www.microbit.co.uk**, click **'create code'** and then choose the code editor you want to use.

- **Block Editor:**
  New project → my scripts → search for 'tedzqxlmhg'
- **Touch Develop:**
  New project → search for 'ppcfxgnaip'
- **Code Kingdom:**
  New project → my scripts → search for 'xvuvpbcjxr'

Each of these programs will **turn on** an output attached to **pin 1** (such as an LED) when a **high input signal** is received on **pin 0**. Input and output devices need to be attached to the appropriate ports of the BBC micro:bit using an appropriate method, such as crocodile clips.

Test and download the programs, and then adapt, change and experiment with them to get the best possible programme for your automatic lighting system.

Part 3
Testing your program

Download your final program on to your BBC micro:bit and test it to see if it works.

You can do this as many times as you like to get your program running as well as possible. Try using different timings between the parts of the system, different code editors and different commands in your code. If you have lots of time, you could also try using different input sensors to determine which works best.

DIGITAL SPACE

WIRELESS SIGNAL BLOCKADE

WHAT YOU'LL NEED

- A Wi-Fi router
- A Wi-Fi - connectable device which displays signal strength
- Materials to test e.g. paper, card, a plate, sheets of wood or plastic, a large metal tin

BACKGROUND

We all know the annoying situation when you can't connect properly to the Wi-Fi! In this activity, you're going to investigate which materials block the signal from your Wi-Fi router. Once you've investigated, you can use the information to help design where is best for it to sit in your home or classroom.

FIND OUT MORE

There are more great investigations and projects you can do on the British Science Association CREST site. **www.britishscienceassociation.org/crest-intro**

Part 1
Signal strength

There are a few different ways that you can determine how strong the Wi-Fi signal is. The simplest way is to use a computer or other Wi-Fi-enabled device and see how many bars appear using the network/connection centre.

You can also download software to precisely measure the strength of Wi-Fi signal.

Place your computer and Wi-Fi router about three meters apart and at about the same height, the best way is to put them on two tables. Check the strength of your Wi-Fi signal here, and make sure you note it down! This is your control.

Part 2
Testing different materials

One by one, hold your different materials up to the router (between the router and the device you're connected to) and see how it affects the strength of the wireless signal. Make sure you leave it there for a good few seconds before you make a note of the signal strength.

- How are you going to record your results?

Tip

Don't stand in front of the wireless router because your body may interfere with the signal!

Part 3
Analysing and using your results

Which materials blocked the wireless signal most effectively?

Can you think of a way to extend your experiment? Does it matter how close you hold the material to the computer or to the Wi-Fi router? Does it matter if you're outside or inside?

How could this information be useful for designing the layout of your house or classroom?

OPEN SPACE

HOW ACID IS MY RAIN?

WHAT YOU'LL NEED

- 1 or more rainwater samples
- Equipment for testing pH level
- Equipment for testing for the presence of nitric acid and sulphuric acid
- Computers for researching acid rain

BACKGROUND

'Acid rain' refers to rainfall which has a higher than usual amount of two chemicals: **nitric acid** and **sulphuric acid**. In this activity, you'll investigate the causes and consequences of acid rain and take some measurements of rainwater samples to determine the pH and acid content of rainfall in your area.

You can do all the parts or pick one or two that you're interested in. If you do all of them, you could submit your project for a CREST Bronze Award.

FIND OUT MORE

Check out CREST Environmental Monitoring project ideas to continue and extend your research. You could move on to a Silver or Gold CREST Award. www.britishscienceassociation.org/Pages/FAQs/Category/crest-project-ideas

Part 1
What causes acid rain?

What is acid rain? What causes it? Do some quick investigations about what causes acid rainfall. Make sure you find out about:

- the chemicals which cause acid rainfall
- the chemical reactions which produce them

Part 2
How acid is your rain?

Using the sample of rainwater you've collected, you're going to examine how acidic the rainfall is in your local area. You need to test your sample in two different ways:

1. Test the pH of your rainwater sample. The UK Government (DEFRA) considers rainwater below pH 5.5 to be acid rain, how does your local rainwater compare?
2. Test for the presence of the two different acids: sulphuric acid and nitric acid

Before you start, you'll need to plan what you're going to do and then make yourself a set of instructions to follow. How are you going to undertake the tests? What equipment and chemicals will you need apart from your rainwater sample? How are you going to record your results?

Part 3
Consequences of acid rainfall

Research how acid rain affects our open spaces. Think about how it affects:

- bodies of water (lakes and rivers) and their ecosystems
- soils, plants, wildlife and their ecosystems
- man-made structures like buildings or statues

Part 4
Preventing acid rainfall

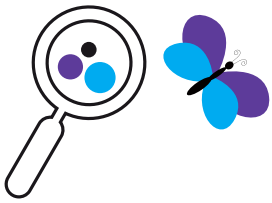
Use all the information you've found out to plan a campaign to help reduce acid rainfall in your area. It could be through posters, a social media campaign, information leaflets, talks hosted at local schools, groups and community centres, a website, or anything else you can think of.

Make sure you make your campaign personal to where you or your school are. For example - if you're near a big lake or river you can concentrate on the effects of acid rain on water ecosystems, if you've found out that the rain in your area is really acidic then it's a good idea to focus on that.

OPEN SPACE

MY LOCAL WILDLIFE

WITH WILDLIFE WATCH



Your job as a researcher is to observe wildlife in its normal, natural situation. You shouldn't try to interfere or change the habitats by picking flowers, touching animals or leaving anything behind.

WHAT YOU'LL NEED

- Wildlife Watch spotting sheets
- Access to an open space to search for wildlife
- Books or computers for research about different organisms.

BACKGROUND

Different wildlife (plants and animals) live in different habitats all over the UK and vary from place to place. Wildlife affects its local area and ecosystem and is in turn affected by these areas and ecosystems.

What wildlife can you find in the spaces near your home or school? Why do they inhabit these areas? What makes them suited to that environment?

FIND OUT MORE

To make your own spotting sheet, find out more about the wildlife and places that are close to you, or to browse through wildlife activity sheets, visit the Wildlife Watch website – the junior branch of The Wildlife Trusts at: www.wildlifewatch.org.uk/

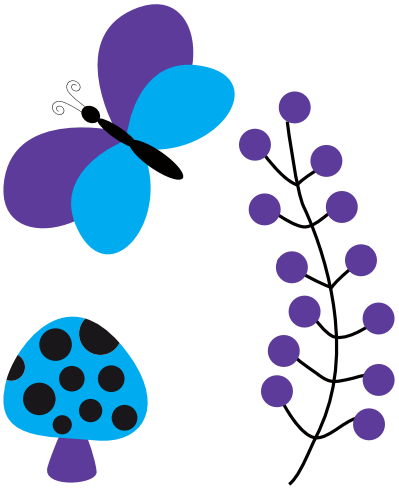
Part 1
Investigating local wildlife

Investigate the area around your school or home. Is there a variety of different habitats? Can you identify the different wildlife organisms you can find? Remember this includes both plants and animals. You can use the Wildlife Watch's spotting sheets to help you.

As the seasons are changing, try looking for **Signs of Spring**, **Spring Flowers** or **Spring Trees**.

If your school or home is in a built-up area you can look for some **Urban Wildlife**, or maybe you can spot some **Pond Wildlife**. Are you nearby a woodland area so you can spot some **Minibeasts**?

There are lots of different wildlife spotting sheets on the **Wildlife Watch site** because there are lots of different habitats and ecosystems around the UK. Have a look at what you might be able to find near your school, home and local area.



Part 2
Researching your wildlife

Pick two of the organisms from your spotting sheets, hopefully, organisms that you managed to spot during your search!

Do some research about these organisms. Try and answer the following questions:

1. What kind of environment does this organism live in?
2. How is this organism adapted to its environment?
3. What is this organism's lifecycle?
4. What other organisms does it rely on? This could include for food, shelter or protection.
5. Is there anything else of note about this organism?

For example: is it endangered? Is it a native or an invasive species?

Part 3
Presenting your findings

Once you've answered these questions, it's time to present your information. Choose who your audience will be and why you need to tell them about your organism. Here are some ideas:

- A presentation to the class to tell them about the organisms they can see when they're walking to and from school
- A document to advise the local government about how to protect local wildlife
- A leaflet about the local wildlife to persuade tourists to come and visit your area.

OUTER SPACE

BUILDING A TELESCOPE

WHAT YOU'LL NEED

- Two cardboard tubes 20cm long, one narrower than the other
- A **convex lens** with a **focal length of 30cm**
- A **concave lens** with a **focal length of 5cm**
- Two pieces of corrugated card larger than the lenses
- Scissors, tape and glue

BACKGROUND

A telescope is used to magnify distant objects by collecting light and other types of wave. Telescopes have been helping us to understand the universe since 1608.

You're going to make a simple telescope that uses two different types of lens to magnify distant objects, and then find out how this works.

FIND OUT MORE

Have a look at the CREST website to find more projects to work on.
www.britishscienceassociation.org/crest-intro

Part 1
Making a telescope

1. Draw around one of the lenses on a piece of corrugated card, and then cut out the circle you've drawn to make a hole in the card the same size as your lens. Fit the lens into this hole, using glue to hold it there if necessary.
2. Do the same with the other lens on the second piece of cardboard.
3. Trim the cardboard around the **convex** lens so that it's the same diameter as the **larger** outer tube, the cardboard should fit into the tube perfectly.
4. Trim the cardboard about the **concave** lens so that it's the same diameter as the **smaller** outer tube, the cardboard should fit into the tube perfectly.
5. Glue the rings on to the ends of the two tubes and slide the inner tube into the outer tube
6. Your telescope is complete! Look through the concave, eyepiece lens and focus on distant objects by sliding it towards to objective, convex lens.

Part 2
How does your telescope work?

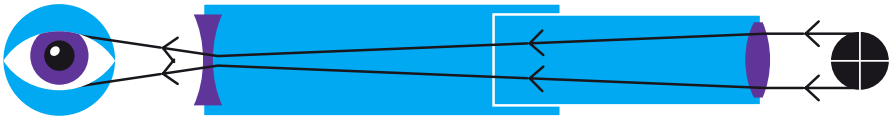
Your telescope uses a convex lens and a concave lens.

A convex lens is thicker in the middle than at the edge, and it **converges light towards its centre**.

A concave lens is thinner in the middle than at the edges and **diverges light away from its centre**.

Using the diagram below as a stimulus, research how the lenses in your telescope work to magnify distant objects.

Research how the telescope works and make a poster to explain it. Use the image below to help you.



OUTER SPACE

NAVIGATING IN SPACE

WITH THE UK SPACE AGENCY

WHAT YOU'LL NEED

- A Raspberry Pi, BBC Mirco:bit or Arduino
- A camera or webcam which connects to your computer
- Images of star constellations (real or made up!)

BACKGROUND

A long time ago, sailors used to navigate at sea by using the position of the stars. Like this, satellites sometimes use patterns in the stars to work out where they are and which way they are pointing in the vast expanses of space.

In this activity, you're going to do some computer programming using a Raspberry Pi, a BBC Micro:bit or an Arduino. You'll need a bit of experience programming your computer in order to do this activity!

If you get stuck and you're using a Raspberry Pi, you can look for help on the Astro Pi site. https://astro-pi.org

FIND OUT MORE

Tim Peake, the British Astronaut, has two Raspberry Pi computers on board the International Space Station with him. Visit the Astro Pi website to use the data collected on board, write code for the Raspberry Pi and find lots

Part 1
Connect a camera to your computer

Your first challenge is to connect a camera or webcam to your computer.

Part 2
Recognising star patterns

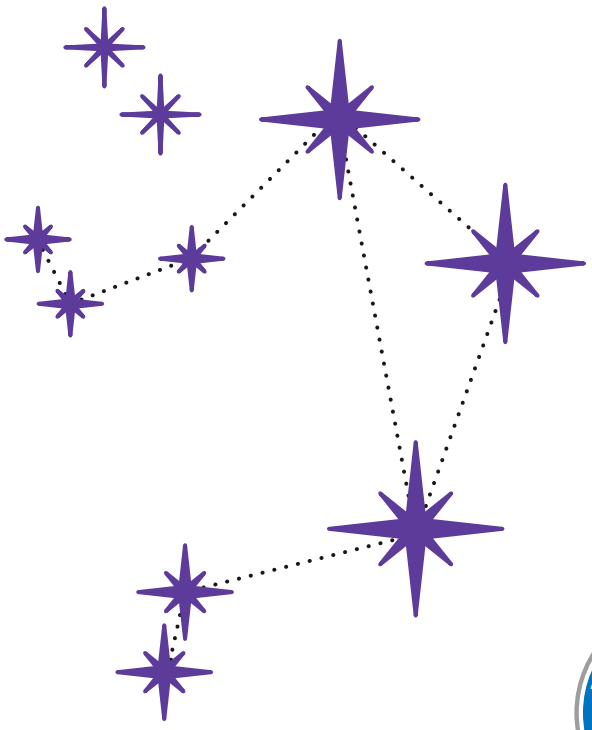
Can you programme your computer to recognise patterns?

You can research and draw some real star constellations, or you can make up your own.

Part 3
Navigating in space

Once you've programmed your computer to recognise patterns, try and programme it to react when it sees certain patterns or shapes of stars.

For example, you could programme it to display the name of the constellation it can see, or if you have a motor you could programme it to rotate and look at the different constellations until it can see a particular one.



PERSONAL SPACE

THE STROOP EFFECT

WHAT YOU'LL NEED

- Coloured pens and cards
- A stopwatch

FIND OUT MORE

The Stroop Effect can be used in the diagnosis and monitoring of some diseases which affect the brain and how fast you can process information. To extend the activity, do some research into its medical uses.

Part 1
What is the Stroop Effect?

Name the **text colour** of the following lists of words as fast as you can.

List 1:

RED
YELLOW
GREEN
BLUE

List 2:

RED
YELLOW
GREEN
BLUE

Which list was harder? Why?

You experience the Stroop Effect because the meaning of the words conflicts with the colour. Your brain automatically reads the word first (you can't help it!) and so you have to make a choice between two mixed messages. This means it takes longer to work out the correct answer.

Part 2
Testing the Stroop Effect

In pairs or small groups, design a simple test to examine the Stroop Effect, and see if it affects you. You'll probably need a stopwatch, some coloured pens and cards.

Part 3
Extending the test

Can you think of any other ways that we might experience the Stroop Effect?

Here are some examples of things you could test:

Example 1:

QUIET!
Loud

Example 2:

How many times is each word repeated?

Seven
Seven

Five
Five
Five
Five

Four
Four
Four

Think of a hypothesis you could test in your group to find something out about the Stroop Effect.

Other ideas you could explore are using different languages, more unusual colour words (such as 'magenta' or 'turquoise'), adding sounds or other noise.

PERSONAL SPACE

MUSIC AND PHYSICAL PERFORMANCE

WHAT YOU'LL NEED

- Space for exercise and any equipment needed for the exercise you choose
- Speakers or headphones

BACKGROUND

Lots of people use music when they're doing exercise or playing sport to help improve their physical performance, whether it's listening to music whilst running or to help psyche up before a big match. Does music really help performance? You're going to conduct an experiment to try and decide.

Part 1
Designing your experiment

First you need to choose someone in your group whose performance you're going to test. Then you need to decide how you are going to test performance. It needs to be something you can measure and record. **Here are some ideas:**

- Number of star jumps
- Distance run
- Speed of heart rate recovery
- Percentage of basketball shots scored

Make sure that whatever physical activity you choose is **safe for both the person doing the exercise and for the whole group.**

Once you've decided on your physical activity, you then need to decide what you're going to change about the music.
Here are some ideas:

- Quiet vs. loud music
- Different genres of music
- Music in headphones vs. music from a speaker
- Music vs. an audiobook

Consider if you also want to do a control experiment to measure performance without any music.

Once you've made these decisions, you can make a plan for your experiment. In this experiment plan, you need to include who is doing what job and how you're going to record your results. Once you've made your experiment plan, check it over with an adult to make sure it's suitable and safe.

Part 2
Conducting your experiment

When you've planned your experiment thoroughly, you can carry it out!

Make sure everyone in your group know what they need to do and when, that you have all the equipment you need, and that you have somewhere ready to write down your results as you go.

Part 3
Analysing your results

Once you've conducted your experiment, have a look at your results.

You firstly need to work out how to present your results. You could use tables, graphs and diagrams.

What can you learn from your results? Are there any conclusions you can draw? Do you think music affected performance in this experiment?

Why do you think the music may or may not have affected performance? What else could have affected the outcome of your experiment (did your volunteer have time to fully recover in between each time doing the exercise)? Apart from the music, what else might have made a difference between performance in the two tests?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