BRITISH SCIENCE WEEK

PRIMARY RESOURCE PACK

British Science Week
9-18 March 2018
www.britishscienceweek.org

Supported by

Department for Business, Energy & Industrial Strategy

3M

BRITISH SCIENCE WEEK

This resource pack aims to be your 'one-stop-shop' for supporting you during British Science Week, but can be used at any time. Feel free to adapt or extend the activities to suit your students' needs and the curriculum you are delivering. In addition to the activities in this pack, there are lots of other ways to enthuse and engage your students throughout the Week.

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

2018, THE YEAR OF ENGINEERING

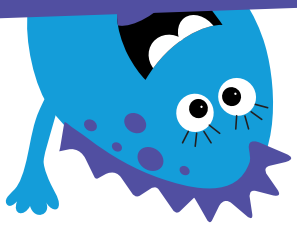
British Science Week events

You can create your own club, class or school event or search for things happening near you on our website. Last year, there were over 5,000 events reaching more than 1 million people. Help us make British Science Week 2018 even bigger and better! Visit www.britishscienceweek.org

2018 is The Year of Engineering. This is a chance to celebrate the UK's engineering heritage, invest in skills and inspire young people to consider a career in engineering. Get your students to take a fresh look at engineering using activities in this pack.

Poster competition

Some of the activities in this pack could be followed up by designing a poster; simply look out for the paintbrush symbol above. The theme for this year's competition links with this year's activity pack theme of 'exploration and discovery'. For more information on the competition and how to enter, read on further in the activity pack or visit www.britishscienceweek.org/planyour-activities/poster-competition.



CREST Star Awards

Many of the activities in this pack can count towards a CREST Star Award. Further CREST Star resources can be downloaded for free from www.crestawards.org/crest-star

You need to do eight challenges to get the Award, so why not use British Science Week to launch the Award in your school? You can download a passport from the CREST website to keep track of pupil progress.

Get 10% off CREST Discovery Awards until 30 April 2018 with this code **BSWActivity10**

Contents

The theme for this year's British Science Week is **exploration and discovery**, encouraging young people to think about everyday discoveries and how they affect their lives by exploring science in the world all around us; from their home and schools, to their local area and wider environment. It is also a chance for young people to consider how exploration and discovery can have a positive impact on the future.

Assembly ideas

Why not start British Science week off with a bang, by holding an assembly to get your students excited about the week ahead.

Tell the British Science Association about your assembly ideas by tweeting or sharing images with the hashtag:

#BSW18

- You could reflect on the great discoveries made in the last century, with a special focus on people from your area
- Get the students thinking about how discoveries affect their day to day lives, e.g. electricity, fuel or medicines. Don't let this list limit you – there have been many amazing discoveries across all sectors of science and engineering
- Profile a prominent explorer who made a significant contribution to our understanding of our planet or even the solar system
- Invite a special guest or someone from the school community to come talk about a related topic. Try out www.sciencelive.net to connect with a range of amazing speakers.

Here are some other ideas to include during your assembly:

- Tell your students about the plan for British Science Week and give them a challenge related to the theme
- Launch the poster competition (see page 22 of this pack)
- Launch the citizen science project (see page 21 of this pack)
- Encourage your students to invite family to British Science Week events at school.

BRITISH SCIENCE WEEK

Exploring the outdoors

Poo from the past

Council for British Archaeology

About this activity

For most people, the idea of finding old human poo is disgusting; and the idea of cutting it up and looking at it through a microscope is even worse! But this is exactly what some archaeologists do to help us understand what people ate in the past, and how they prepared their food.

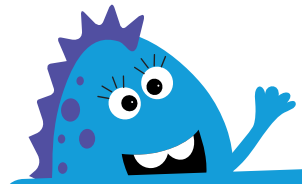
Your challenge is to make your own Aztec poos and then challenge your friends to excavate them!

Kit list

- 2 cups of flour
- 1 cup of salt
- Tablespoon of vegetable oil (plus a bit extra for oiling the finished poos!)
- Beef stock cubes
- Warm water
- Brown poster paint (optional)
- Popping corn, pumpkin seeds, tomato and pepper skin
- Large mixing bowl
- Tablespoon
- Wooden lolly sticks or cocktail sticks
- Paper plates
- Poo excavation sheet (download here)
- 'Poos from the past' information sheet (see next steps section)
- Pencil

Part one

1. Mix together the flour, salt and oil in a big bowl
2. Add warm water to the stock cubes to make a thick gloopy dark brown paste
3. Add the gloopy paste into the floury mixture. You'll need to get your hands in and squish it together! If the mixture is too dry, you can add more water, or you may wish to add some brown ready-mixed paint to make the mixture browner and stickier
4. Mix, squish and knead until you have a solid brown lump and then roll out sausage shapes for your poo!
5. It's time to add the dietary evidence to your poo. For an Aztec poo, add popping corn or maize, pumpkin seeds, and the skin and seeds from plants like tomatoes, chillies and peppers – these are parts of the foods that Aztec people ate, which might not have been fully digested. Make sure you roll your poo to hide the evidence inside it!
6. Put a bit of oil on your hands and rub this onto your finished poos. This will make them look realistic and even yuckier!



WATCH OUT!

This is not edible (Yuck!)

Part two

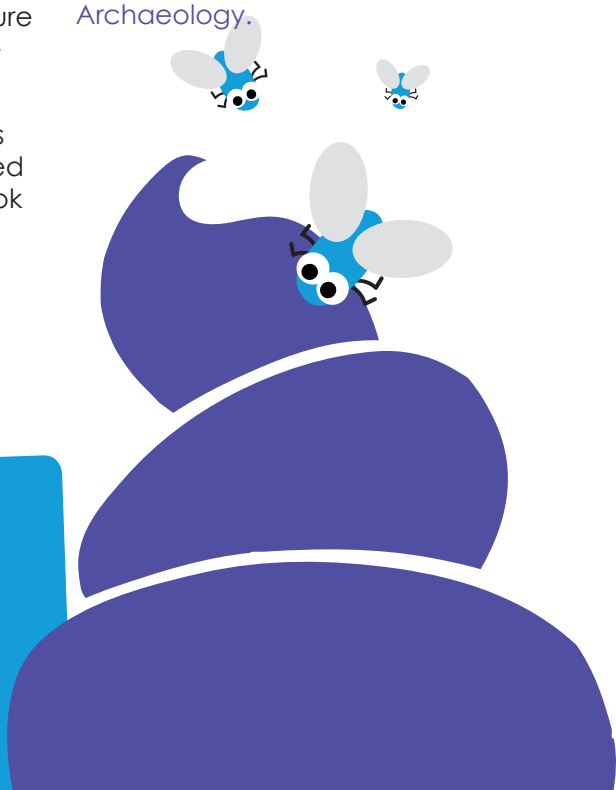
Congratulations!
You've now made your fake coprolites (fossilised faeces). Get your friends and family to excavate them and collect the dietary evidence. Use lolly sticks or cocktail sticks to make sure you don't miss anything, as some of the evidence is really small.

Use the evidence to work out: who 'did the poo?'

Next steps

If you haven't had enough of poo, you could make poos from different periods of history. Use Young Archaeologists' Club 'Poos from the past' information sheet to find out what evidence might have been found in poos from Egyptian, Roman, Viking and Tudor times.
www.yac-uk.org/things-to-do

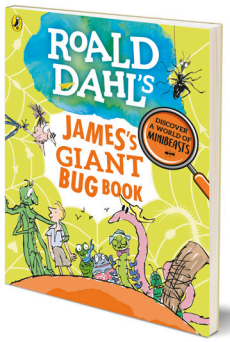
Activity by the Young Archaeologists' Club which is part of the Council for British Archaeology.



BRITISH SCIENCE WEEK

Exploring the outdoors

Great grasshoppers



About this activity

Have you read 'James and the Giant Peach' by Roald Dahl? It's a story about a boy who travels the world in a giant peach and meets some amazing insects! One day he befriends some giant insects and travels far and wide, across the oceans in a giant peach. One of James' friends, the Old-Green-Grasshopper, has wonderful musical skills. In this activity you're going to make your own musical grasshopper! Grasshoppers can make melodies by rubbing their back legs against their wings, causing them to vibrate; a bit like the way a bow plays a violin.

Kit list

- 1 six-egg carton
- Scissors
- Green poster paint
- Pencil
- Green card
- Emery board
- 2 small green pom-poms (optional)
- PVA glue
- 2 googly eyes (optional)
- Green pipe cleaner
- Craft stick (or you could use a pencil, twig or chopstick)

Part one

1. Cut your egg carton lengthways in half, so that you have three compartments in a row - this is going to be your grasshopper's long body. Paint it green and set it aside to dry.
2. Next, it's time to make your grasshopper's large hind legs. Draw a V on the green cards; you want each outer line of the V to be 10 centimetres long and 1.5 centimetres wide. When you are happy with your shape, cut it out using scissors. You can then use this first hind leg as a template for the second one by drawing around it on the card. Then cut the second one. Make sure you are careful when using scissors, and ask a grown-up to help you.
3. Using scissors, carefully cut the emery board in half and then take one of your legs and turn the V's upside down. Glue one piece of the emery board to the right-hand part of one of the V. Do the same for the second leg, but glue the emery board to the left-hand part of the V.

Part two

Now, glue the hind legs to the back section of the egg carton: one on each side. When the glue has dried, use a craft stick/pencil to rub along the emery board to make a musical noise.

Next steps

Get creative! If you're feeling artsy, decorate your grasshopper. Have a think about the different habitats where grasshoppers are found and how they might be able to camouflage themselves in grassy fields and sandy dunes.

Why not take a picture of your grasshopper and enter it into the poster competition?

WATCH OUT!

Be careful when using scissors and make sure to put down newspaper when painting!

BRITISH SCIENCE WEEK

Exploring the outdoors

Augmented reality minibeasts

AUGMENTIFY IT®

About this activity

Using the power of augmented reality (AR), this activity allows you to explore your environment to look for and learn about all sorts of different minibeasts.

This activity is powered by the free AR app *AugmentifyIt*®.

The app can be downloaded for free on the App Store, Google Play and Amazon App Store. The AR requires WiFi to work, however this activity can be used without AR too.

Kit list

- White card (6cm x 10cm)
- Glue stick or double-sided sticky tape
- Pen or pencil
- Ruler
- Tablet or phone devices for AR
- Paper
- Spoon
- Paper cup
- Magnifying glass

WATCH OUT!

Take care when collecting minibeasts so you don't hurt them, and ensure you return them back to their homes.

Also watch out, as some insects can bite or sting! Adults should supervise activities outdoors.

Wash hands after working outside.

Part one

1. Create your AR minibeasts profile card.

   To make your card, choose one of the minibeasts shown on the following page (worksheet 1). Carefully cut out your minibeast image along the lines. Stick onto one side of the card.

2. Take care not to crease the image.

3. On the reverse of the card, create a profile for your minibeast, including its name, type (insect or arachnid), where it lives, number of body sections and number of legs.

4. **Have a think** - what is a minibeast? And what is a microhabitat?

Part two

- Download the latest version of the FREE AugmentifyIt® app on your tablet/device. Open the *AugmentifyIt*® app and point the device at the AR minibeasts sticker, filling the device screen with the image.
- See your minibeast card come to life!

Pair up with a friend with a different minibeast. Can you describe your minibeast to one another? How many legs does it have? How does it move? How are the two mini beasts different?

Part three

Go Outside! Minibeasts can be found everywhere, if you know where to look…

Draw a table or chart on paper listing different locations or microhabitats such as in the air, under a stone, in the grass, under a log or in a tree.

Explore outside. Use a spoon to scoop up a minibeast and gently drop it into a cup.

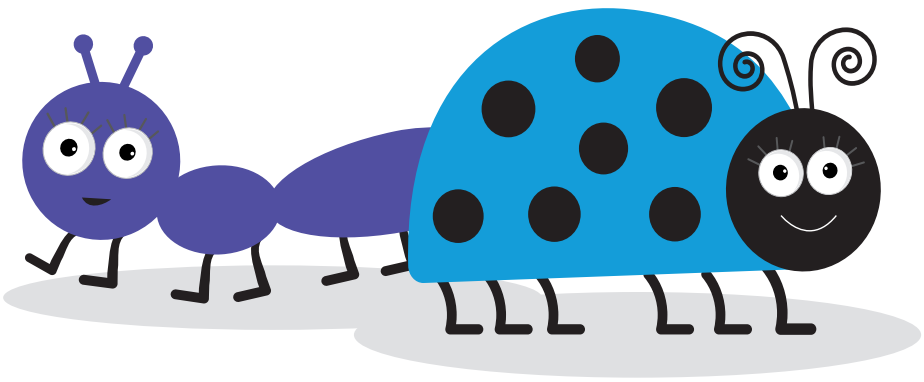
Use a magnifying glass to get a close-up look. Once you have finished, return your minibeast carefully to its home.

- How many minibeasts can you find?
- Where did you find the most/ the least?
- What kind of minibeasts did you find in the different locations?

Record your findings in your chart.

Next steps

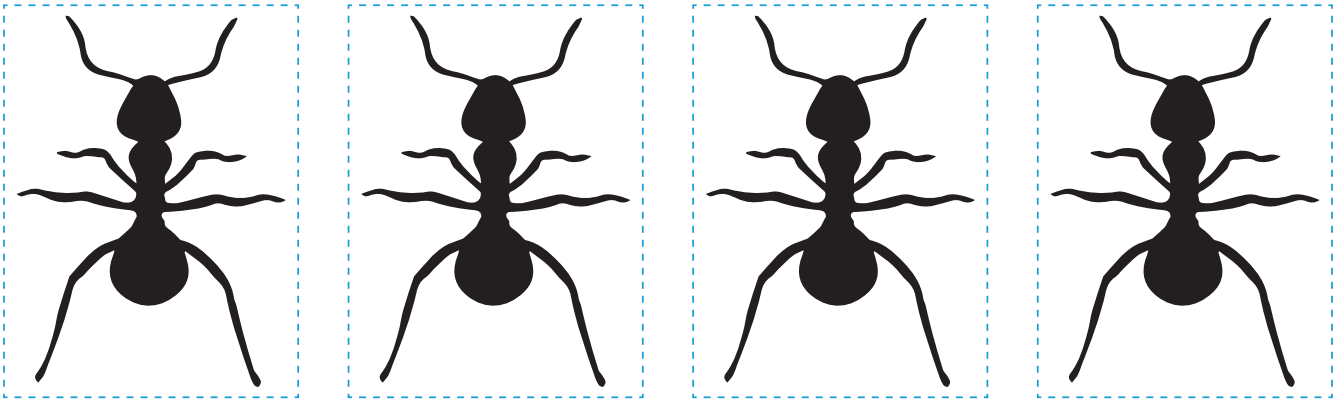
To extend the AR minibeast learning experience, extra AR resources can be found on www.augmentifyit.com

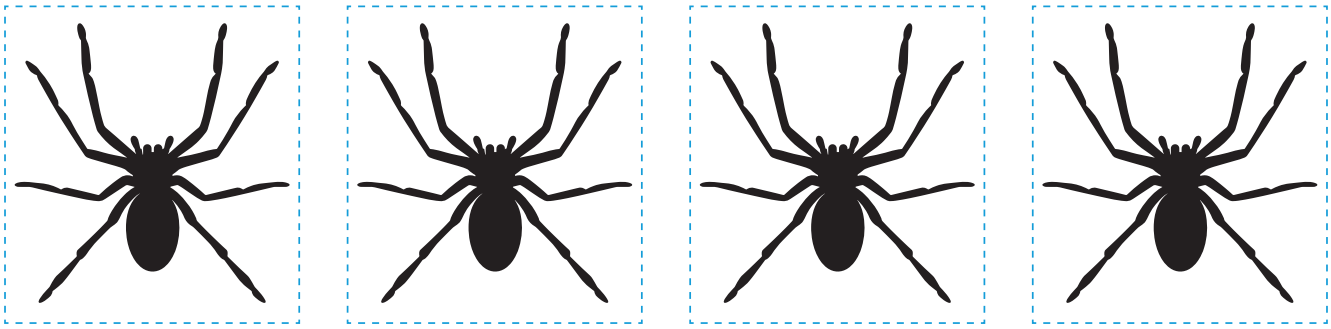


Exploring the outdoors

Augmented reality minibeasts

Worksheet 1





AUGMENTIFY IT®

BRITISH SCIENCE WEEK

Exploring the outdoors

Brilliant birds

ERNEST COOK TRUST · ECT · learning from the land

About this activity

Local birdwatcher Mrs Twitcher is an expert on birds' nests. "I think birds are brilliant, but I don't think people can build nests like birds do." Do you think Mrs Twitcher is right?

In this activity, have a go at making a birds' nest using materials that you can find naturally outside.

A bird nest is the spot in which a bird lays its eggs and raises its babies. These can be usually found in trees, bushes or a burrow dug into the ground.

Kit list

- Materials for nest building such as twigs, leaves, mud and grass
- Modelling clay (optional)

WATCH OUT!

If you see nests outside, do not disturb the birds or remove the nests or eggs.

When working outside make sure an adult knows where you are at all times. Remember to wash your hands after working outdoors. Adults should supervise activities outside.

Wash your hands after working outside.

Part one

Before you start building your nest, have a think about the following important questions:

1. What materials can you find to build your nest?
2. Which ones do you think will be best?
3. Do you need different materials inside and outside the nest?
4. How will you keep everything together?
5. You could start with a small bowl made from modelling clay.
6. What other ways can you think of to build a nest?

Part two

Now you've got a plan in place, head outdoors and explore what natural materials you can find. Perhaps collect some leaves, feathers, twigs and some mud!

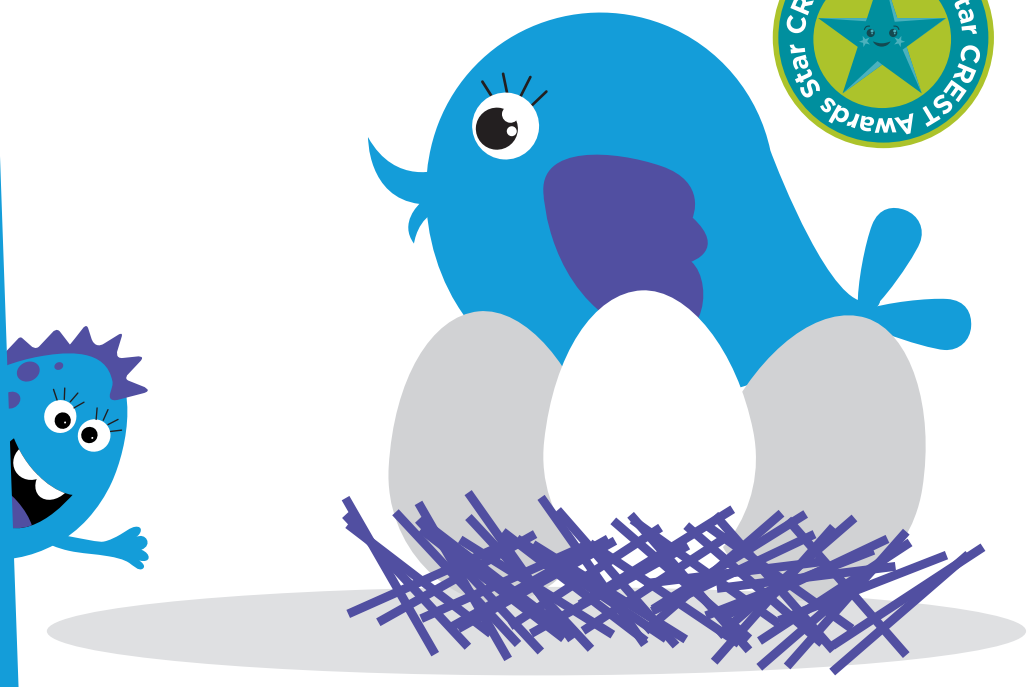
Build your nest, ensuring it can comfortably fit a small bird and their eggs. Make sure it's strong and sturdy.

Next steps

- Why not take it further and test your nest?
- What would happen to your nest on a windy day? What would happen to your nest in rainy weather?
- What worked well and what could have been improved?

This activity can be put towards a **CREST Star Award** and there are plenty more online activities you can try for free. For more information, follow this link www.crestawards.org/about-crest-awards/

CREST Awards Star CREST Awards Star



BRITISH SCIENCE WEEK

Exploring the outdoors

Bug hotel

OKIDO

About this activity

In some gardens it's hard for wildlife to discover safe hideaways where they can live. So, why not help them out by building your own bug hotel?

It could help shelter all sorts of creatures, from ants to woodlice, ladybirds or even toads!

Kit list

- A flower pot
- Stones, twigs, bark, dried leaves
- Waterproof marker
- Sugar cubes

Part one

1. Find a good spot where you'd like to put your flower pot (perhaps near some trees or bushes) and put a few stones next to the flower pot to stop it rolling over or blowing away.
2. Fill it with twigs, bark and dried leaves that will make it cosy for your guests.
3. Add a few sugar cubes to tempt them in, and maybe add a personalised welcome sign at the front!

Part two

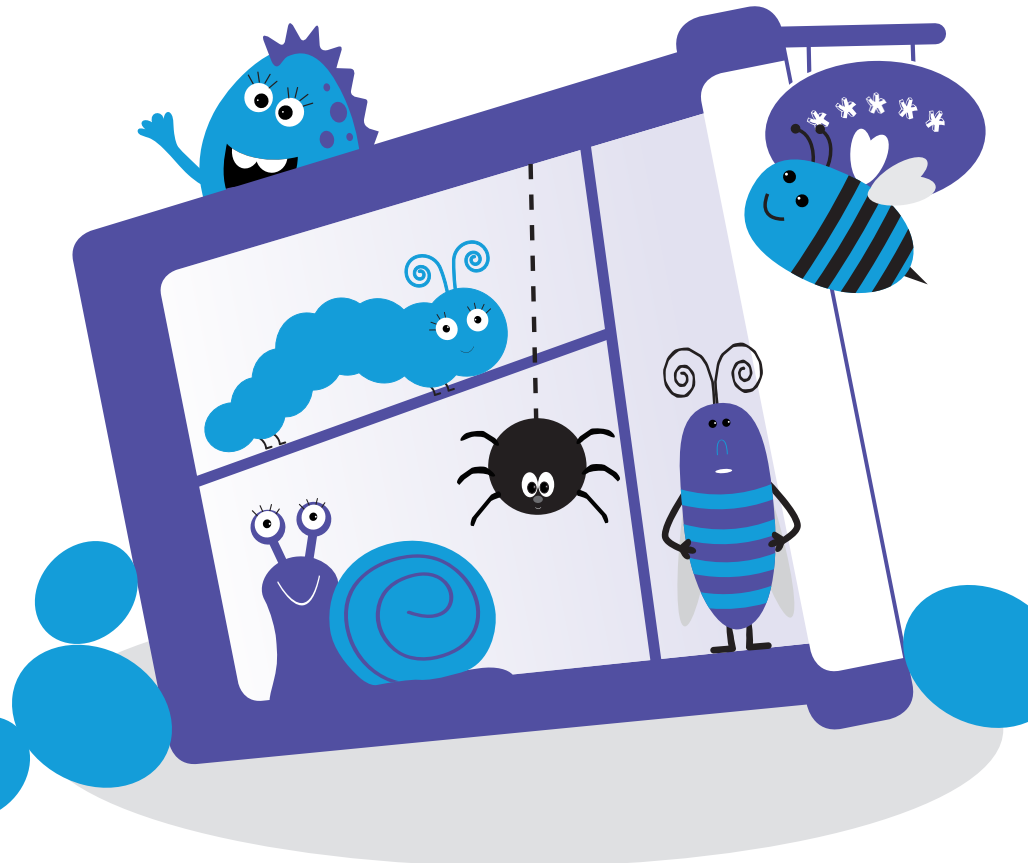
Peep inside every day to check on your creepy-crawly visitors.

Next steps

Why not keep a record of all the animals you see in your hotel each day? Then you can see who likes your hotel the most.

If you want to look at them more closely, use a magnifying glass.

Find more activities here www.okido.co.uk/schools



WATCH OUT!

Careful as some bugs may bite or sting.

Adults should supervise activities outside.

Wash hands after working outside.

BRITISH SCIENCE WEEK

Exploring our homes

Plastic milk

BBC TERRIFIC SCIENTIFIC

About this activity

Have you ever wanted to make cheese? Now's your chance! It all starts with the 'coagulation' of milk. In milk there is a protein called casein. Casein is really small and there are lots of separate pieces (or molecules) of casein in the milk. The acidic vinegar changes the casein and causes it to all start sticking together, which causes the large blobs to appear.

This was also the basis for making plastic out of milk in the early 20th century; it was shaped and left to harden in a similar way.

The earliest evidence of cheese making dates back 7,500 years in what is now Poland.

Kit list

- 570ml of full fat milk
- 4 teaspoons of white vinegar
- Strainer/sieve or a muslin cloth
- Food dye (e.g. yellow)
- Cookie cutter
- Spoon
- Pan or a bowl

Part one

1. Get an adult to heat the milk in a pan or in the microwave. It should be hot but not boiling.
2. Pour the milk into a bowl and add the vinegar and food dye.
3. Stir for about a minute, then pour the milk and vinegar solution through the strainer into the sink. If you have some muslin cloth, use it to line your strainer, as it's easier to get your plastic cheese out.

Part two

There should be a mass of lumpy blobs left in the strainer.

Rinse them with water and squeeze them together.

If you find your milk doesn't turn into a solid, the vinegar may be old and has lost its acidity, so you'll need to use fresh vinegar instead.

Part three

You can use the cookie cutter to cut out shapes, or just mould them into any shape like they did when making casein plastics. The mixture should harden in a couple of days.

Next steps

Go to www.bbc.co.uk/terrificscientific for a video guide and other investigations to try at home.

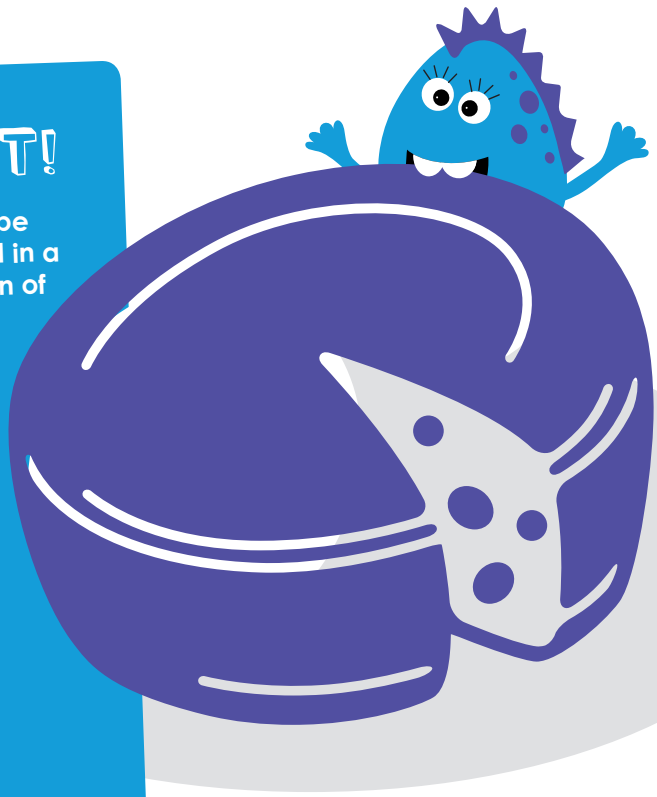
Research how cheese is made in factories and how bacteria can be used to make all the different varieties and flavours we find in the supermarkets... cheddar, brie, stinky cheese etc.

WATCH OUT!

The milk only needs to be warm. It can be heated in a bowl placed over a pan of hot water or in a microwave.

We advise you not to eat the cheese you have made.

Make sure to wash your hands!



BRITISH SCIENCE WEEK

Exploring our homes

Confusing cans

About this activity

You've come home from school excited to eat your favourite meal of beans on toast, only to discover your younger sibling has taken all the labels off the cans in the house and is rolling them along the floor. How are you going to find your beans now?!

You notice that some cans have rolled further than others. Perhaps how they roll might help you figure out which one contains beans…

In this activity you will be using a fair test experiment to find out the contents of unlabelled cans.

Kit list

- A can of tinned tomatoes
- A can of soup
- A can of baked beans
- Cat food for each group (with labels removed and marked with different numbers or colours)
- A set of cans with labels for comparison
- Boards/trays to make the slopes, plus blocks/books to support it
- Metre rulers, tape measures and other distance markers
- Can opener

Things to consider

What's inside the can will affect how far it will roll. Normally, the more solid the food, the further the can rolls.

Try shaking the cans to 'listen' to what's inside. The ones that you can 'hear' tend not to roll as far as the ones you cannot hear.

Roll other labelled cans of food to see if they fit the pattern.

You can fill bottles with water, freeze them (without the top), then see if there's difference in how they roll as the water thaws (don't forget to put the top back on). You can fill containers (large coffee tins or jars with lids are ideal) with different things, e.g. different amounts of sand, syrup or cotton wool and see what happens.

Part one

1. Talk to a friend about your ideas of how to figure out what is inside of the cans.
2. Discuss how you might make the cans roll. Can you make it a fair test, e.g. using the same slope or letting go of the cans rather than pushing them from the top?
3. Build the slope you discussed.

Part two

4. Explore the unlabelled cans first. Then roll the labelled cans to make a comparison. From what you have seen, can you predict which of the cans contain the beans?
5. Talk about the distance each can rolled and what is inside it. Can you see a pattern?
6. Try rolling other things to see if they fit the pattern.
7. Have an adult help you open the cans and see if you were correct.

Next steps

This activity can be put towards a **CREST Star Award** and there are plenty more online activities you could try for free. For more information, follow this link www.crestawards.org/about-crest-awards

WATCH OUT!

Be careful not to leave cans lying on the floor for people to trip over.

Get an adult to help you use a can opener. Push the can lid well inside open cans and recycle them safely after use as they have sharp edges!

BRITISH SCIENCE WEEK

Exploring our homes

Squashed tomatoes

PRACTICAL ACTION
Technology challenging poverty

About this activity

Many farmers in Nepal grow their crops (including tomatoes) on the mountainside. To sell them at the local market they need to transport them to the bottom of the mountain, but it's a long and hazardous journey which involves a river crossing. Tomatoes are quite easily squashed, so they need to be transported with care.

In this activity you should work with a small group to design and build a model that can transport as many cherry tomatoes as possible, at the same time, and without squashing them.

Kit list

- Building materials such as K-Nex, Meccano, Lego, paper straws, pulleys, split pins, paper-clips, Sellotape, newspaper, nets, dowelling, card, paper cups, boxes, dried spaghetti, string, thread, cardboard tubes
- Rules
- Ramps with various surfaces
- Cherry tomatoes

Your task

Build a basket to hold your tomatoes and design a device to move the basket safely without squashing the tomatoes.

The rules

The tomatoes need to be transported a minimum of one metre along the ground starting from desk height.

The tomatoes cannot be touched whilst they are moving, catapulted or 'flown' in any way. They must be moved in a controlled way, so they don't just crash into the ground and get squashed. You can also adapt the challenge by either aiming for the greatest weight of tomatoes transported in one trip, or go for speed of operation and aim for the greatest weight moved in two minutes. In both cases, the group that transports the heaviest weight of tomatoes wins.

Next steps

This activity can be used to achieve a **CREST Discovery Award**. For more information follow this link www.crestawards.org/about-crest-awards

CREST Awards Discovery CREST Awards Discovery

WATCH OUT!

Make sure your model is safely set up in an area clear of obstacles, and not close to where anyone may trip over it.

Make sure you lay down some newspaper for the squashed tomatoes.

Do not eat the tomatoes.

BRITISH SCIENCE WEEK

Exploring the world

Ocean grabber

POLAR EXPLORER PROGRAMME

About this activity

Only 5% of the deep ocean has been explored, meaning we know less about the ocean floor and the creatures that live there than we do about the surface of Mars, Venus and the Moon. The only way to explore these depths is by using remotely operated vehicles (ROV) that are specially designed to withstand the huge pressures. These are controlled from ships by a ROV pilot, whose job it is to direct the ROV into position and perform required tasks such as gathering water samples, collecting rock and animal samples or observing life in the dark.

The challenge: create your own ROV grabber to explore the deep.

Kit list

- Water/sand tray
- Sand
- Selection of objects of different shapes, sizes and textures, e.g. marbles, eggs, prepared jelly in bowl, rice, slices of bread, fruit, vegetables, balloon (filled with air), balloon (filled with water), empty balloon
- Very strong card or corflute
- Strong scissors or craft knife
- Cutting boards
- Rulers
- Split pins
- String
- Elastic bands
- Plasticine/Blu-tack
- Small bulldog clips

Part one

1. Cut out the template on the following page (worksheet 2) and copy onto corflute or strong card.
2. Ask an adult to use a craft knife or a strong pair of scissors to cut out the 'T' shape and two triangles.
3. Copy the position of split pins onto the corflute.
4. Using a ball of plasticine behind the corflute, pierce holes in the corflute to position the split pins (a nail works well to make a large enough hole.)

Part two

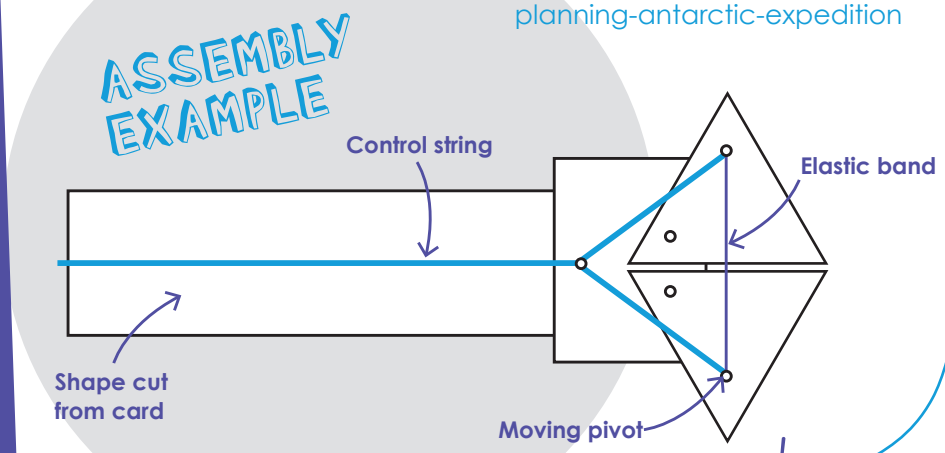
1. Assemble the main body of arm together with split pins.
2. Wind the elastic band around the top two split pins. It should hold the grip closed but not so tight that the teeth overlap.
3. Wrap string around the top two split pins and tie them off. Pass it through the bulldog clips, finally winding loosely around the bottom split pin.
4. When the string is pulled the jaws should open. When the string is released the jaws should close.
5. You can now test your grabber by placing the assorted items in the sand tray, and seeing if you can grab them.

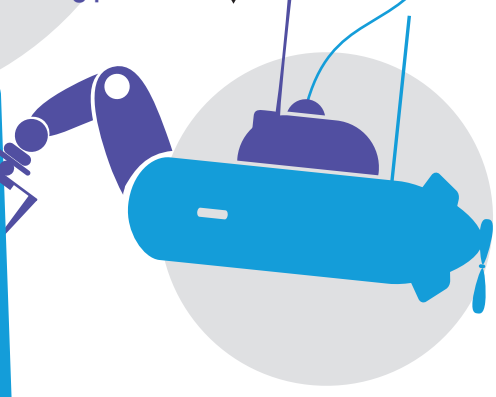
Part three

Have a think about how well your grabber worked. What can you do to improve it?

Next steps

You can find another British Antarctic Survey activity here www.stem.org.uk/resources/elibrary/resource/411615/planning-antarctic-expedition





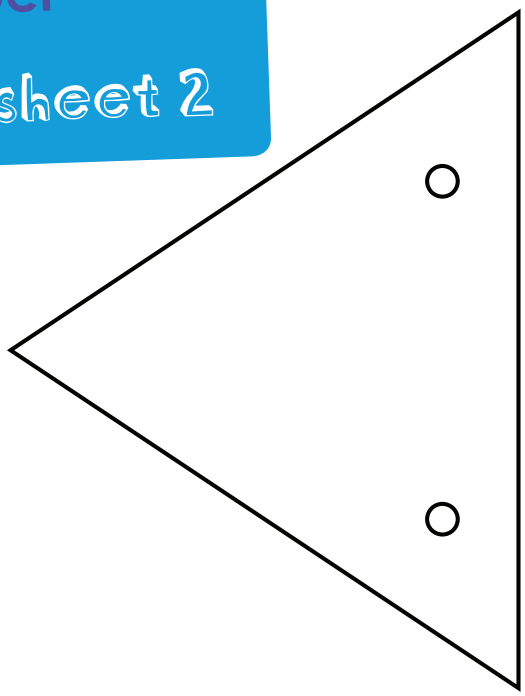
WATCH OUT!

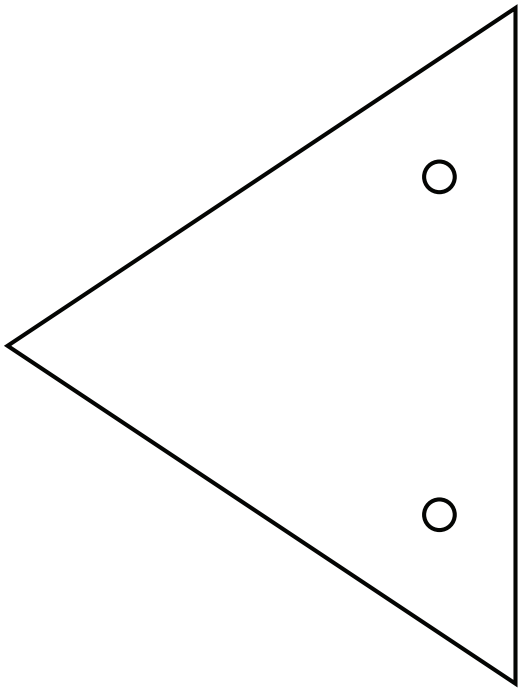
- Have an adult help you if you need to use a craft knife or strong scissors.

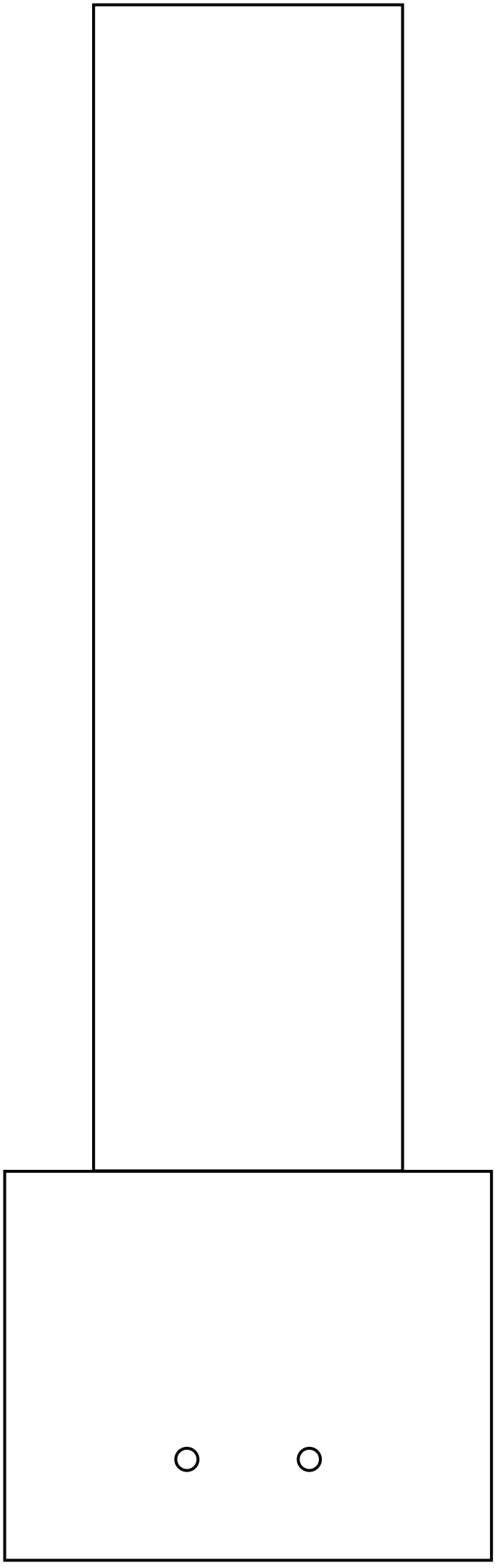
Exploring the outdoors

Ocean grabber

Worksheet 2







BRITISH SCIENCE WEEK

Exploring the world

Polar explorer food

About this activity

In this activity, you will be planning what food to take on an overnight field research trip in the Antarctic. In the extreme cold, people get very hungry and hard work uses lots more energy than usual.

Challenge: You are travelling by skidoo, so you need to ensure that each member of the team will get 3,350 calories over the 24 hours.

You have a budget of £60.

Kit list

- Food list with calorie information www.stem.org.uk/rxekyz
- A selection of foods from the list to weigh
- Weighing scales
- Pen
- Paper

WATCH OUT!

Be aware of any food allergies when handling foods.

Do not eat the food.

Part one

1. Look at the selection of foods.
2. Weigh the different foods to discover which would be lighter and most suitable to take.
3. Record your results for later reference.

Think about what foods would be good to take with you. What will the groups do to ensure they have water to drink? It is essential for survival, but do they need to take lots of bottles with them?

Fruit and vegetables are good for our health, but do you think they are a good food to pack for the field research trip? Why?

Part two

Plan the food you will take on the overnight field research trip using the food list you downloaded. Remember, you need three meals a day, which must have the right number of calories and be within the budget.

Your groups will need to carry their food on sledges or in a backpack, so it should be light and take up as little room as possible.

Next steps

Present your findings in a creative way - perhaps a presentation or poster (which you could enter in the poster competition!)

For more activities about polar explorers, head to www.stem.org.uk/polar-explorer-educational-resources

BRITISH SCIENCE WEEK

Exploring the world

Astro-nappy

The Ogden Trust
making physics matter

About this activity

When astronauts are doing a spacewalk, for example, to fix or add something to the outside of the International Space Station (ISS), they can't just nip to the toilet when they need to. Usually they are outside the ISS for seven hours, so they need to wear a specially designed 'astro-nappy'. In this activity, you will find out which materials are best at absorbing liquids.

Kit list

- Pipette
- Various absorbent/ non-absorbent materials, e.g. cotton wool, felt, cotton, tissue, PVC
- Measuring cylinders (50ml)

WATCH OUT!

Take care with water spillages, ensure they get mopped up quickly!

Part one

1. Place the first material on a piece of tissue paper or kitchen towel. Fill the pipette with 5ml of water, and slowly add water, one drop at a time to the material.
2. Record the number of drops it takes before the tissue becomes wet.

Part two

3. Draw up your results in a table to measure how many drops of water each material can withstand.

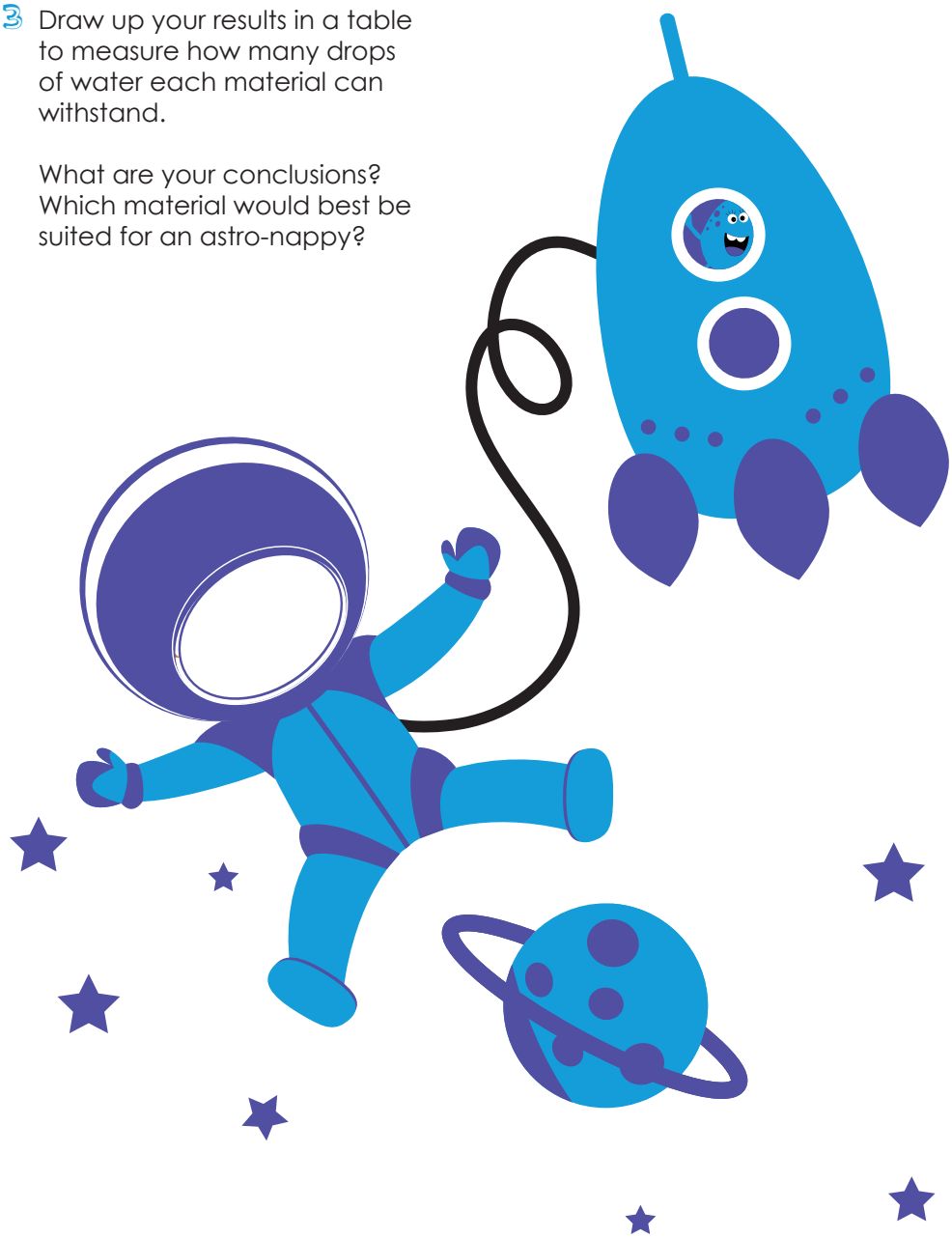
   What are your conclusions? Which material would best be suited for an astro-nappy?

Part three

What other materials would your astro-nappy need? Does it need to be water-proof on the outside? Does it need to keep you warm from the cold of space?

Next steps

Find other great resources at www.ogdentrust.com/schools-partnerships/resources1



BRITISH SCIENCE WEEK

Exploring the world

Ocean floor mission

POLAR EXPLORER PROGRAMME

About this activity

Autosub6000 **is a type of autonomous underwater vehicle (AUV). It is used to explore the world's oceans without a pilot or any tether, including the polar regions, as it can work under ice. Before the submersible is launched, it is programmed with instructions about where to go, how deep to go and what to measure.**

Your challenge is to use Scratch to debug (fix) and improve the programme to move the *Autosub6000* around the ocean floor, while photographing the samples found.

Kit list

Computer with internet access

WATCH OUT!

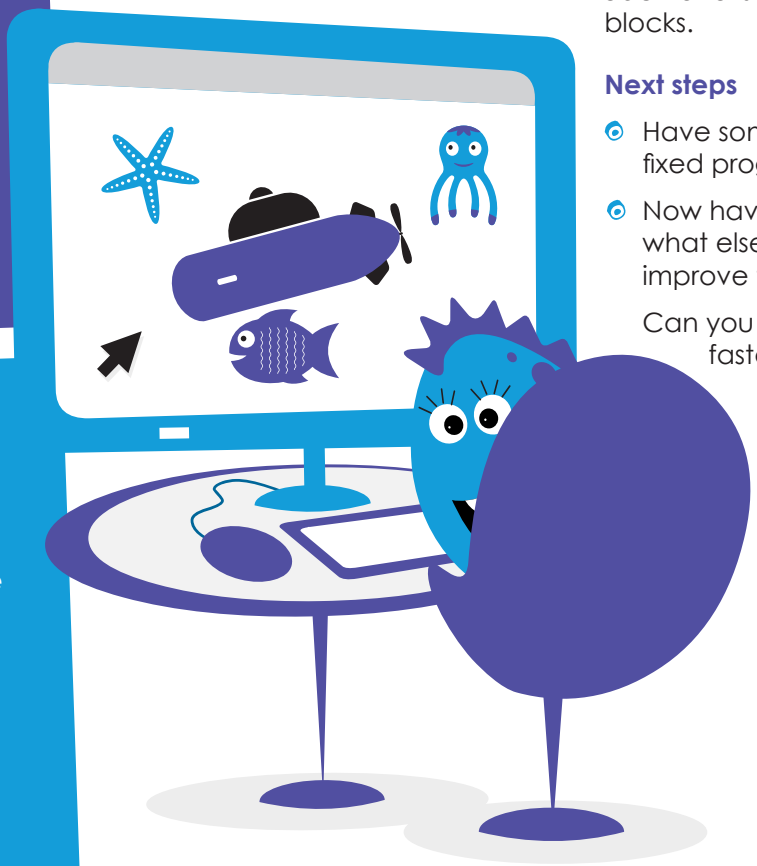
You will need a basic understanding of the Scratch coding programme before doing this activity.

Part one

1. Using the internet, do some research about the *Autosub6000*. This will give you some background information and an understanding of what it is used for.
2. Go to this link scratch.mit.edu/projects/161272628
3. Have a go at the activity. Now click the 'See inside' button to look at the programme and get an understanding of how it works.

Part two

4. By yourself or with a partner, write a list of instructions you think are needed to programme the *Autosub6000 sprite*. You can act the instructions out to check if you have them right.



Part three

5. Now open the project scratch.mit.edu/projects/166843083/ and click the button 'See inside'.

You are going to debug the program as it has missing blocks – you may want to run the programme and look for any unexpected behaviour.

Think about the *Autosub6000 sprite* from part two and create the same algorithms you wrote down, adding in the missing blocks and testing your work as you go.

The sample sprites also need debugging. The crab sprite has the correct algorithm to refer to; it is important you can explain what each block in the working model does. The others have missing blocks. Work through the sprites, each one is missing more blocks.

Next steps

- Have someone test your fixed programme
- Now have a think about what else you can do to improve this programme

  Can you make the sprite go faster or slower?

  Can you make the animal sprites move automatically like real sea creatures?

BRITISH SCIENCE WEEK

Exploring the world

Escape from the ice

Millgate House Education

About this activity

A plastic adventurer got themselves stuck in ice, and it is up to you to explore how best to get them out! What methods do you think will work best?

Ice is formed when water is cooled down to 0 degrees Celsius. The molecules (little water particles) get all their energy sucked out of them as they cool down, until they stop moving altogether. This is when ice is made - we call this process freezing.

When you want to turn ice into water the reverse happens; we call this process melting.

Kit list

- Yoghurt pot or small freezable container
- A figurine, e.g. Lego person
- Water
- A freezer
- Foil
- Small hammer or bowl of tepid water

Part one

1. Fill the yoghurt pot or similar a third of the way up with water and add a figurine so they are submerged in the water. Put this in the freezer
2. When it is frozen, top up the water until the container is full and freeze again so that the figurine will be inside the ice, not floating on the top.

Part two

1. Release the ice from its container. You might need to run the yoghurt pot under a little water to free the ice
2. Now, it's up to you to decide what is the best way to get the figurine out of the ice. Putting it in a bowl of warm water perhaps? Or maybe putting it on the windowsill. How about tapping it with a hammer?

Next steps

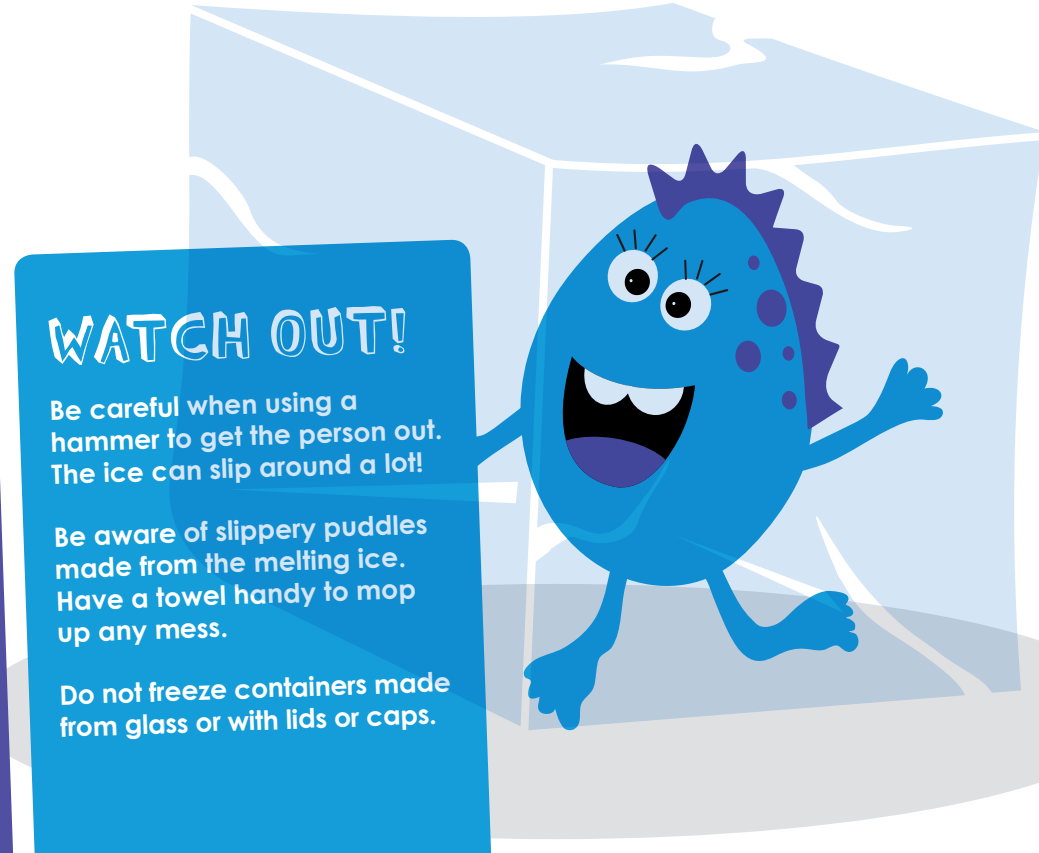
- If you left the ice to melt, draw a sequence of pictures showing how much the ice has melted after 5 mins, 10 minutes and so on
- You could create a story or poster, recounting how the figurine ended up in the ice and then act out the story using sounds and movements.

WATCH OUT!

Be careful when using a hammer to get the person out. The ice can slip around a lot!

Be aware of slippery puddles made from the melting ice. Have a towel handy to mop up any mess.

Do not freeze containers made from glass or with lids or caps.



BRITISH SCIENCE WEEK

Exploring the world

Run to the Deep

About this activity

Run, walk, push, or even skip to the bottom of the ocean and get active whilst exploring sea-life. Run to the Deep is a new running app that will be available during British Science Week, following the successful launch of Run the Solar System last year. Mark a course around your school and give students the chance to become experts by creating banners and short demonstrations to communicate the science behind each ocean zone. Invite families to take part and make it a whole school event.

Kit list

- Long tape measure or measuring wheel.
- 7 pieces of cloth or other banner material for waymarks
- Materials to decorate banner: pens, poster paints, PVA glue, scrap fabrics, string
- **Download the app** Optional: During British Science Week you can download the mobile app from www.runtothedeep.com

Step one

Find a large space outdoors to mark out a 1000m course. This will give a rough scale of 1:10 compared to the actual depth of the ocean which can be over 10,000 metres deep. You might need to have multiple laps. You can scale it down further to suit different ages and abilities. Use the depth guide on the following page (worksheet 3) to plan the course. Ask your students to help calculate where they will need to place the waymarks along the route to mark the start of each of the five zones.

Tip: Students should divide the depths on the worksheet by 10.

Step two

Divide the class up into groups and ask each group to research one of the ocean zones. Give each group materials to create a banner or display which will communicate what they have found out. You could ask them to come up with a simple demo or brief presentation to perform alongside their display. Position the banners around the course at each waymark.

Tip: The deeper you go, the less we know about ocean life, so the abyssal and hadal zones may be more challenging to research.

Step three

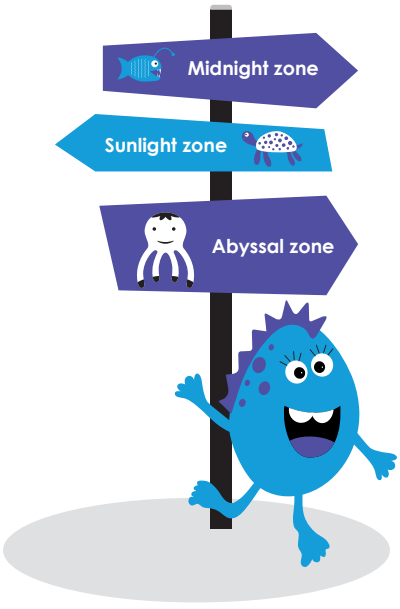
Invite other students, teachers and families to sign up to take part. They could run, walk, push themselves or even skip around the course. Ask them to stop at each banner to find out about the ocean zone and watch the demo or presentation.

Next steps

If you have a school running club or you are organising this as a family event you could invite adults and older students to sign up to the full 10km during British Science Week. They can download the mobile app by going to www.runtothedeep.com to listen to commentary about each zone as they run and participate in a virtual race.

WATCH OUT!

- Make sure that the course is safe and remove any trip or slip hazards.
- Ensure the course is accessible to everyone.
- Consider the weather.
- Risk assess and supervise if necessary the student interactions at each waymark.
- Manage the flow of people moving around the course.



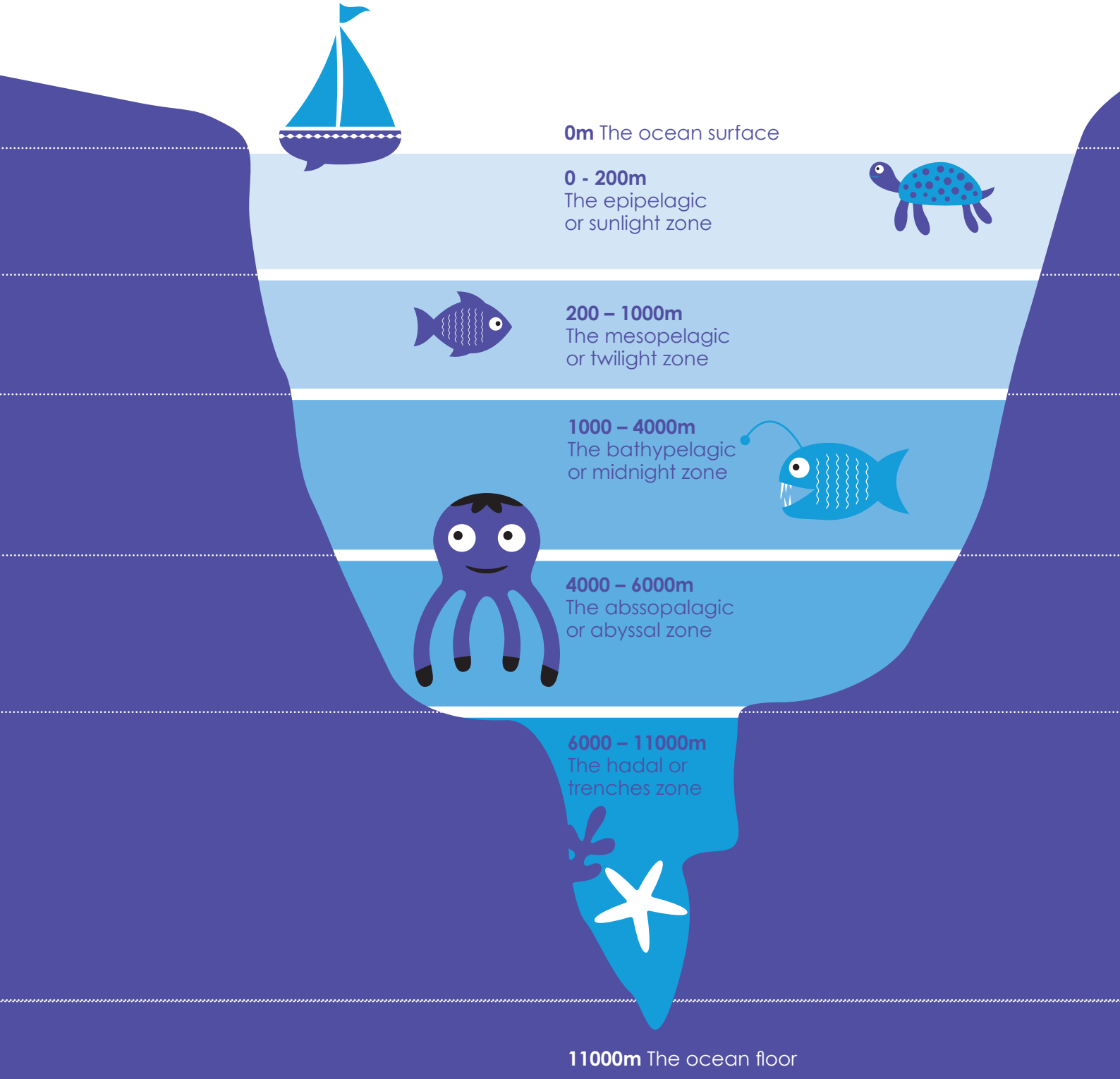
Get involved

Run to the Deep

Worksheet 3

Exploring the world

Ocean zones



BRITISH SCIENCE WEEK

Exploring the world

Building bridges

About this activity

These are the guidelines for an official Guinness World Records® challenge. If you're successful, you could get your name in the record books!

The record: Longest span of a LEGO™ bridge made in three minutes

The challenge: Build a LEGO bridge in three minutes (with no help from anyone else) that is at least 10cm (3.93in) off the ground and that will stand for at least 10 seconds.

To make an official application, visit www.guinnessworldrecords.com/apply

Kit list

- LEGO bricks – no longer than 4cm or 1.57in
- Base plates (optional)
- Stopwatch or timer
- Ruler or measuring tape
- Camera (optional)

Watch out!

- Make sure to have a clear space to build, without people around.
- Careful not to tread on the blocks, as they hurt!

The rules

1. Each of the LEGO bricks used must be no longer than 4cm (1.57in)
2. The bricks must be laid flat on a surface prior to the attempt, and may not be pre-joined in any way. Once laid out, the bricks may not be touched until the attempt begins
3. The bridge must have two towers on either side and a deck connecting the two
4. There must be at least 10cm (3.93in) clearance between the underside of the deck and the ground
5. You have three minutes to complete the bridge and it must stand unsupported for 10 seconds after the time is up

Erect the towers...

With the clock ticking, you're going to need to move fast. The first bits you should construct are the towers at either end. These must be big and strong, but you can't take too long to make them.

Build the span...

Next, you'll need to make the bridge span. Here, you've got to balance stiffness with weight. More bricks mean more strength, but are they fixed firmly enough to support their own weight?

And hope it stands!

Finally, join it all together and stand back. If it's still standing after 10 seconds, then you've got yourself a valid record attempt. Be sure to film everything clearly, including the stopwatch used to time the attempt.

Next steps

For more fun science activities visit www.guinnessworldrecords.com/science

For full guidelines and to apply for this record visit www.guinnessworldrecords.com/records/apply-to-set-or-break-a-record/

BRITISH SCIENCE WEEK

Get involved

Citizen science

About this activity

There is a rising tide in our oceans, a tide of waste plastics. It is a sad fact that 60% of our oceans are being heavily contaminated with plastics, which has a negative effect on the wildlife living within the seas.

Eight million tonnes of plastics enter our ocean each year, but scientific researchers can only account for where 1% of that ends up… which is found on our ocean's surface. So where is the missing 99%?

'The Plastic Tide' is a citizen science project that uses drone technology to survey and take photos of contaminated beaches, where plastics can be found. The project needs your help to examine hundreds of thousands of images to locate these pieces of waste in order to train computers to find the litter by itself in the future. Get involved and be a part of the clean-up effort! Help realise a 'Vision from the Skies'.

Kit list

- A computer/laptop or mobile/tablet
- Internet access
- A keen eye

Part one

Get online!
Head to www.zooniverse.org/projects/theplastictide/the-plastic-tide

Part two

Can you see any plastics or litter?
It can be difficult to spot litter and plastics. However, generally you're looking for pieces bigger than 1-2 cm which are visible at normal zoom.

You should be able to spot plastics and litter by carefully looking at each image, and zooming in on objects you're not sure about. Watch out for the clear, black and white plastics, as they can blend in to their surroundings. Remember if you are uncertain about an object, you can use the 'uncertain' tag.

Part three

Found something? Awesome! Draw the rectangle around the offending piece of plastic so it fits inside and move onto Part four.

Not found anything? No problem, just press 'done'… and please keep on searching the images, you will find some!

Part four

Once you've drawn a box that fits the litter tightly inside, tell us what kind you think it is in the pop-up. The types can include ropes, strings, soft bags/wrappers or drink bottles. When selected, click "OK".

Keep on repeating this process, to help us create a cleaner world!

Next steps

Sign up to our social media and check out our website or sign up to our newsletter for updates:

@VisionFromTheSkies

@ThePlasticTide

ThePlasticTide

To get involved with other citizen science projects, head to zooniverse.org

Poster competition

About this activity

Get creative and enter the British Science Association's annual poster competition. You can make your poster about whatever type of exploration or discovery you like, and enter our UK-wide competition with the chance to win an array of prizes.

Many activities found in this pack could be entered into the poster competition, *simply look for the paintbrush* symbol. Or you can use them to serve as a source of inspiration to get you started.

Kit list

- Paper (A4 or A3)
- Creative materials, e.g. pens, pencils, scissors, glue, watercolours, paint, colouring crayons, glitter, pipe cleaners, felt, thread, wool, foil, clay, straws, string, beads, stamps, googly eyes, foam, sequins, pom poms

Part one

Research your poster
Investigate and imagine all the amazing exploration and discovery that takes place around the world. Here are some topic ideas to get you started:

- What sort of discoveries have you made?
- Research famous explorers e.g. Captain James Cook, Gertrude Bell, David Livingston
- Think about what discoveries might be made in the future
- Other than places, what else do people explore?

Part two

Make your poster
Once you've done your research, it's time to get creative!

Your poster must be:

- 2D (flat) – if you make a model, you need to just send us a photo of it
- On A4 or A3 paper

You can use pop up pictures, pull out tabs or use materials such as paint, drawing pencils, crayons and paper.

Part three

Send us your poster
Posters will be judged on how creative and well-researched the ideas are and how well the poster has been made or drawn. Once your poster is complete, write all your information on the back, have your teacher, leader or parent/guardian fill in the online registration form, and then post your entry to us.

Next steps

Celebrate!
For more details, along with the full set of rules and tips for educators, check out our website www.britishscienceweek.org/plan-your-activities/poster-competition/