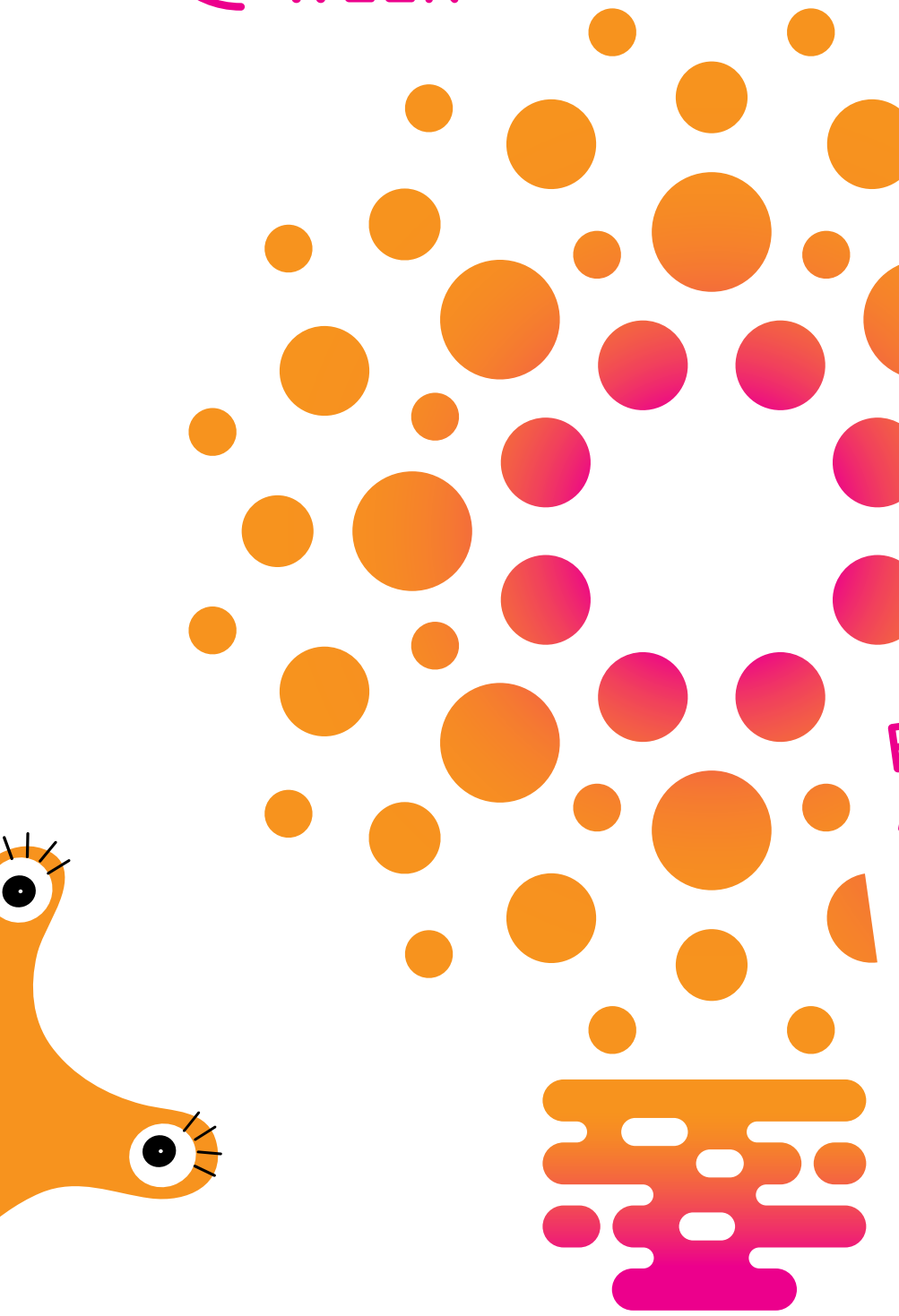
BRITISH SCIENCE WEEK



EARLY YEARS ACTIVITY PACK

Innovating for the future
5-14 March 2021
britishscienceweek.org

A range of activities and ideas to be run with children under the age of 5

Delivered by

BRITISH SCIENCE ASSOCIATION

Major Partner: Innovation

3M

Supported by

UK Research and Innovation

Mewburn Ellis
The forward-looking IP firm

BRITISH SCIENCE WEEK

This activity pack is your 'one-stop-shop' for supporting you during British Science Week, but it can be used at any time. Feel free to adapt or extend the activities to suit your children's 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 children throughout British Science Week. In developing this pack, we have looked for activities which break down the stereotypes surrounding science, technology, engineering and maths (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 children's own backgrounds, lives and interests.

We understand that this academic year is quite different for schools and nurseries and we've adapted this pack to best support you for British Science Week 2021. This year, we've got some activities to complete in your setting, plus some which are specifically designed for children to take part in at home with their families. Please feel free to further adapt activities within the pack to suit your setting, taking into consideration any quarantine of resources, working in bubbles and social distancing needed. We have also added some suggestions on remote engagement if you are unable to accommodate visitors.

Find an activity near you:
You can either create your own activity in your class or setting, or see what activities are happening near you. Last year we reached more than 180,000 people. Help us make British Science Week 2021 even bigger and better! Visit **sciencelive.net**

Enter our competition:
Some of the activities in this pack could be followed up by designing a poster; simply look out for the paintbrush symbol shown above. The theme for this year's poster competition is 'Innovating for the future'. For more information on the competition and how to enter, read on further in the activity pack or visit **britishscienceweek.org**

BRITISH SCIENCE WEEK

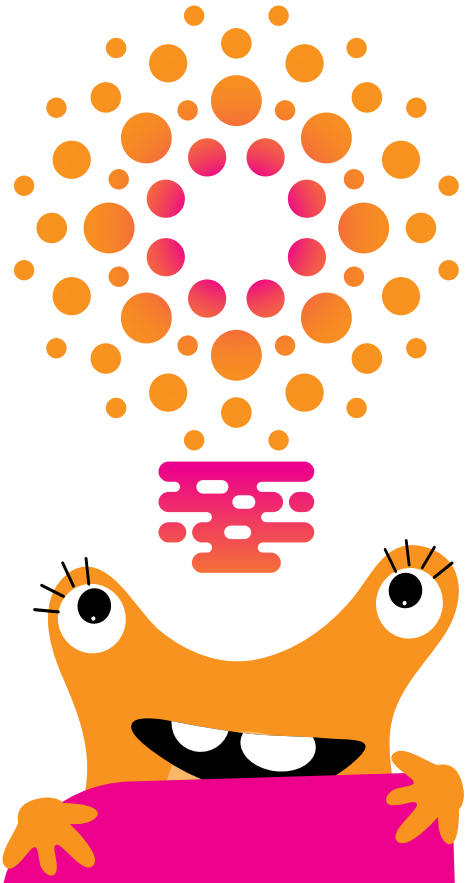
Introducing the theme 4
Making the most of volunteers 5
British Science Week at home 6
Gathering resources for classroom or home 7
Beyond the Week 8
Unlocking skills 9
Wavy wax painting 10
Flitter jars 11
Ice gardens 12
Crunchy architecture you can eat 13
Make a water purifier 14
Poster competition 15

BRITISH SCIENCE WEEK

Introducing the theme

Why not start British Science Week off with a bang, by introducing parents and children to the theme 'Innovating for the future' in a fun way to get them excited about the Week ahead?

- Post your brilliant activity ideas or share images online tagging the British Science Association on Twitter - @ScienceWeekUK - and using the hashtag #BSW21
- Kick start the week with a simple but impressive demo. Try a game, an audio-visual presentation, a mystery or special object, an inventor's box or a pop-up display which communicates the theme 'Innovating for the future.' Here is a video featuring the Rube Goldberg machine which you can show the children. Anything that inspires their inquisitive minds is an epic start.
- Get the children to put on their thinking caps and experience innovation by asking them to come up with machines they would like to invent. Use scrap, craft materials or basic toys found in the classroom or setting to build the machines.
- Engage the children by sharing how innovation is a part of people, materials, animals, nature or anything else in their everyday lives.
- Invite a special guest or someone from the school community to discuss with the children their experience of an innovation. They could highlight a special tool that they use in their job and demonstrate how it makes their work more efficient, or they could feature their favourite innovation. See Page 5 for information on how to get volunteers.



Here are some other ideas to start the Week:

- Tell the children about the plan for British Science Week and give them a challenge related to the theme. If you are sending home a family experiment, maybe you could introduce/demo it at your setting first.
- Innovation is all around us. Watch an episode of CBeebies Bitz and Bob together and talk about how the characters create amazing things to tackle challenges.
- Launch the poster competition and let parents know about this (see Page 15 of this pack).

BRITISH SCIENCE WEEK

Making the most of volunteers

Opportunities for face-to-face engagement with external visitors may be limited this year, but there are opportunities for getting volunteers and presenters to engage the children online.

STEM Ambassadors offer their time and enthusiasm to help bring science and technology subjects to life and demonstrate their value.

The STEM Ambassador website has recently been updated to enable teachers to request online STEM Ambassador support. Any activity created has an 'online' check box as well as a place to enter a link to a video conferencing call if required. STEM Ambassadors from across the UK can respond to any online activity request. Find out more and make a request here: www.stem.org.uk

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

Things that work well are to:

1. Kick off British Science Week with a career talk/demo from one of these inspiring volunteers to engage the children for the rest of the week. The volunteer can highlight a useful tool or innovation which they use in their jobs and how it makes their job easier. Or, the volunteer can highlight their favourite innovation to share what and why that is.

2. Schedule two or three different guests for a career talk throughout the week if you can. This will keep children excited and anticipating who the next guest will be, and what they do. Opportunities like this will likely inspire them about what they want to be in the future. Remember, they are never too young to explore their career options.

3. Where available, choose volunteers/ambassadors who challenge stereotypes the children might have and that promote a positive image of science - e.g. a female engineer or a scientist with a disability. Let the volunteers/ambassadors share a simplified talk about how their job is making a difference in the world (or an anecdote of what science activity they loved to do as a child).

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

5. Volunteers come from a range of careers and experiences, from engineers, designers and architects to scientists and technicians, so get children excited about inspirational career talks; broaden their choices and develop their interest in these careers!

Visit Inspiring the Future's website for some helpful ideas for using volunteers, some of which may be transferable when using remote engagement.

www.inspiringthefuture.org

British Science Week at home

Want the children to get involved in British Science Week at home but not sure how? Here are our top tips for engaging parents and carers in the Week:

1 Make the most of your parent newsletters, the Parent-Teacher Association (PTA), chat group and text messaging services if you have them. Let all the parents know in advance of the Week (at least a month) what you have planned, and how you'd like them to be involved. They might be able to collect/donate materials and store them for use during the Week, and if you want them to get involved in any experiments at home they may need time to plan and collect materials themselves. The PTA may be able to support you financially to run the Week or help drum up parent volunteers.

2 Get parents thinking about how their own jobs might link to STEM subjects and encourage them to chat with their children about this. You could do this via a newsletter or send children home with activities they can do with their parents, which may then lead onto further conversations. (See Page 11 for a great take-home activity).

3 Encourage exploring outdoors, in the community or in local cultural spots. This could be anything from going on a nature walk around local parks to spotting STEM in action on the streets around children's houses. Many of the British Science Association's CREST activities are quick and easy to do as fun outdoor challenges too: library.crestawards.org

4 Send an experiment idea home during the Week which might spark mealtime discussions around STEM. Try and make it as low-resource as possible. It can help if it's something the children have tried or seen at school first so that they feel like the 'experts' when they do it at home with family, allowing them to lead the learning.

Why not try these fun science-based activities from the CREST at home Star collection (collectionslibrary.crestawards.org) which can be completed at home with few resources? You could also use the 'Flitter jars' activity on Page 11 of this pack.

BRITISH SCIENCE WEEK

Gathering resources for your classroom or home

- If you can, try to collect materials all year round that can be cleaned and stored for use during British Science Week.
- Alternatively, check to see whether there is a scrap shop/store/club open in your local area. These shops are often membership based and can be a brilliant, inexpensive or free resource for card, plastic, bits of material – all sorts. These things can be turned into forests, cars or model people; you name it, the kids will think of it!
- Look at **childrensscrapstore.co.uk** to find a UK directory of scrap stores.
- Take photographs when out and about and share these with the children to foster discussion and raise their level of understanding about innovation – machines, materials, building structures, etc. The more colourful, the better. You can also use these photos for an innovation version of the guessing game 'I spy' where you can describe what the innovation is used for and the children will attempt to guess it.
- Collect story books and reference books linking to the theme 'Innovating for the future' ahead of time to create a themed library. You can even organise a read-aloud session of a related story book for circle or carpet time.

Beyond the Week

Once British Science Week is over, this doesn't mean the exploration and curiosity have to stop!

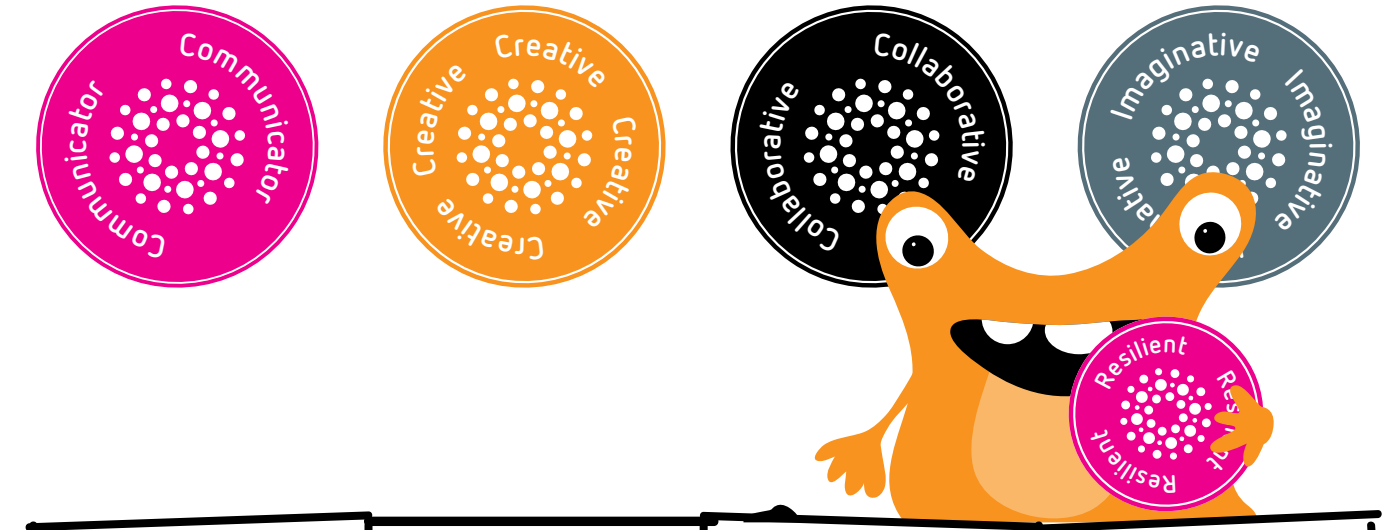
Some ideas for keeping children engaged include:

- Children could take part in a CREST Award. CREST is a scheme that encourages young people to think and behave like scientists and engineers and children can complete eight activities to achieve a Star Award which includes a certificate and badge.
- If there are older children at your school or in a school nearby they could earn a higher level of CREST too. Take a look at the different CREST SuperStar challenges here: primarylibrary.crestawards.org
- Consider sharing your British Science Week learnings by running a CPD session for other teachers in your school or, where relevant, academy chain. Think about incorporating the Science Capital teaching approach into your methods: ucl.ac.uk
- If you have the opportunity, then you could consider running a STEM club or curiosity lab. Find supporting resources at stem.org.uk.

Unlocking skills

A fantastic way to encourage STEM interest in children is to introduce transferable skills used by those working in STEM jobs. These skills will strengthen positive attitudes towards STEM and reduce their stereotypes of those working in the field.

You could engage the children in the STEM Person of the Week activity from NUSTEM at Northumbria University (nustem.uk). Ask the children to identify what attributes people working in STEM need. It might include being observant, creative, patient, a good communicator, or curious. See the below table for the complete list developed by NUSTEM that can be used as a talking point or with other members of staff.
As an alternative and a little bit of motivation, why not award each of the children with a sticker or certificate for a STEM skill which they identify with very well during the Week?



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

BRITISH SCIENCE WEEK

nsead

Innovating for the future

Wavy wax painting

About this activity

Children will explore how a solid changes state when it gets warm. They will see the different marks and textures they can make when the wax is a solid stick, and when it gets softer and more paint-like.

Time

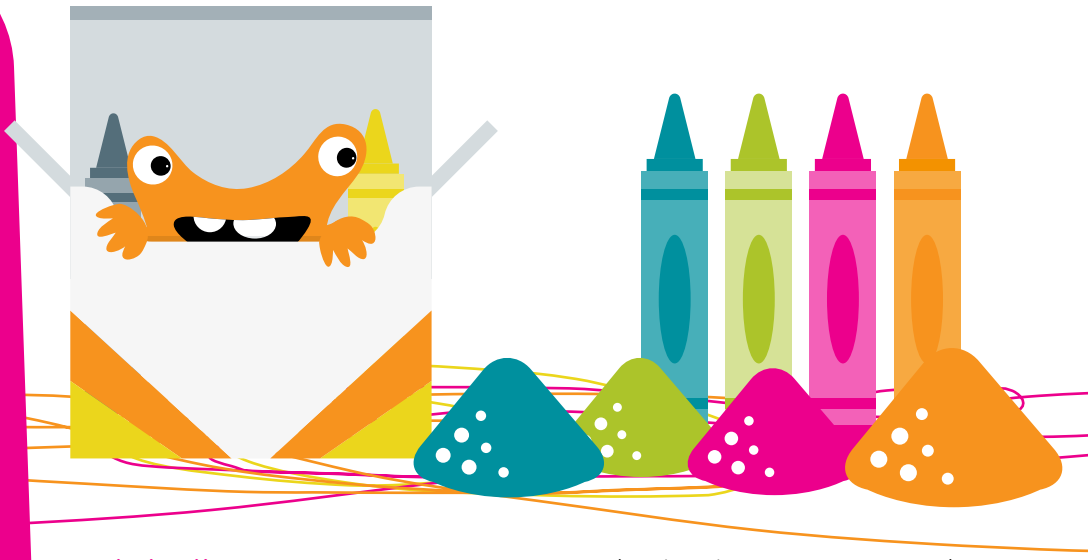
30 minutes

Kit list

- Wax crayons in different colours
- Plastic food bags and a rolling pin or pestle
- Heavy paper – sugar or cartridge paper
- Greaseproof paper
- Hairdryer
- Glue sticks and paint brushes

Next steps

You could try making a resist painting. When your wax pictures have cooled, you can paint over them with watery paint and watch how it only fills the bits of paper where there is no wax.



Instructions

Children can work individually or in groups or pairs to make wavy wax pictures, using gentle heat to make the wax behave like paint.

1. Make a collection of broken wax crayons. Ask the children to separate them into colours.
2. Using the wax crayons pieces, ask the children to draw shapes on a sheet of A3 paper – sugar paper or cartridge paper is best. Use a different colour for each shape.
3. Crush the wax crayon pieces – put each colour into a separate plastic bag and bash with a rolling pin of a pestle until you have a bag or coloured wax 'crumbs' (this is a job best done by the adult). Empty the wax crumbs into bowls.
4. The children should then sprinkle the crumbs on their drawings, filling in the shapes with the right colour.
5. Melt the wax. Either leave the drawings in a warm, sunny spot or on a warm radiator and wait for the wax to melt and soften, or place a piece of greaseproof paper over each drawing, and gently heat the drawings with a hairdryer until the wax melts. (Adults will need to do this.)
6. When the wax melts slightly, the children can use glue spreaders and brushes to make marks in the wax. As the wax starts to solidify they can warm their paper again and watch what happens.

Think and talk about

- Where could we leave our pictures to melt the wax?
- How does the wax change when it gets warm?
- What does it do on the paper?
- What happens if the colours run into each other?

You can find more activities and inspiration exploring materials on the NSEAD website

Skill unlocked

- Observant

Watch out!

- Inspect and test the hairdryer beforehand to check if it is safe to use.
- An adult should use the hairdryer. Take care that the wax 'crumbs' don't fly away – use direct heat from above.
- If the wax gets very warm, take care that little fingers don't get coated in runny wax.

BRITISH SCIENCE WEEK

Millgate House Education

Innovating for the future

Flitter jars

About this activity

This activity mimics the snow or flitter domes, popular since Victorian times, which contain objects in a swirling snowstorm. This highly engaging activity encourages children to talk about light, shadows and materials. It can lead naturally into children spinning and twirling about like the pieces of flitter in the jars.

Time

30 minutes

Kit list

- Transparent containers with lids
- The flitter: tiny pieces of foil, coloured glitter (ideally bio-glitter), table confetti, water beads
- Food colouring
- Torch
- White paper to act as mini screens

Next steps

Encourage children to draw what they observed while playing with their flitter jars. You can add comments to annotate the drawing for them. You could try using different types and shapes of transparent container and comparing them.

Watch out!

- Smooth-sided glass jars produce better shadows in this activity, but they present a hazard if breakages occur. In case of breakages, clear up immediately with a brush and dustpan and dispose of properly.

Instructions

1. Let children choose a jar and fill it with water. Pop the lid on until they have decided what flitter to add.
2. Give children time to explore the shiny glittery bits to add to the jar. Encourage them to observe as the glitter is added. Small amounts of flitter produce much clearer results than shovelfuls of shiny pieces!
3. Let them try the jars with clear water first. Add a few drops of food colour to enliven the concoction. Screw the lid on tightly.
4. Give time to enjoy tipping the jar back and forth repeatedly to watch the movement of the flitter. Compare the movements caused by a big shake, a little shake, and just tipping the jar.
5. Shine a torch through the moving liquid and allow the shadows and colours to fall onto a piece of white paper behind the jar.

Think and talk about

- What do you see when you add the shiny pieces to the water?
- How can you make the pieces move faster?
- What can you see when you shine the light?
- In what ways can you change the shadows?

At home

Can the children name ten items that they have in their home that would shine like the flitter does?

Skill unlocked

- A good communicator
- Curious

BRITISH SCIENCE WEEK

Millgate House Education

Innovating for the future

Ice gardens

About this activity

In this activity, children will produce beautiful ice gardens that attract their observations, stimulate their imaginations and can lead to creative outcomes (in speaking and listening, art or writing).

Time

30 minutes

Kit list

- Variety of leaves, flowers, buds
- Water
- Shallow trays
- Optional: food colouring
- Access to a freezer

Next steps

Make a collection of natural and manufactured materials. Tell the children that they need to decide which things can go in an ice garden. Remind them that only natural things can go into the ice garden.

Watch out!

- If children are collecting their own natural objects, check the policy for working outdoors and that there are not any harmful plants or contaminated objects in the area.
- Mind the wet floors when the ice melts! A wet floor is a slip risk and can cause injuries.

Instructions

1. For this activity, it is a good starting point to show the children 'one that I made earlier'. This helps them to visualise what their own garden could include. Put some interesting natural objects in the bottom of a tray. Pour in a shallow layer of water to float the objects and then place in the freezer. When it is frozen, add more water and freeze again.
2. As each child selects their samples, discuss differences and similarities between the flowers, fruits and leaves – consider colour, size, shape, number of petals, seeds, etc. Practice counting, or graph making, by observing how many different leaves or flowers are used.
3. Label the trays with each child's name or their bubble group. Add a shallow layer of water to their tray. Children will see the contents float on top of the liquid – discuss the problem of how to get the leaves and flowers inside the ice.
4. Place the trays in the freezer for a couple of hours and show the results. They may now see that they can put a second layer of water over the contents and freeze it again.
5. Give children time to observe the ice gardens as they melt.

Think and talk about

- Look closely at your ice garden – what can you see?
- Which of these are flowers/leaves/fruit? How do you know?
- Are all plants safe to pick?
- Where would you like to go to choose your samples?

At home

Ask children to tell their family how they made the Ice Garden through to the point at which it melted.

Skill unlocked

- Curious
- Observant

BRITISH SCIENCE WEEK

Innovating for the future

Crunchy architecture you can eat

About this activity

This activity is ideal to do at home. It encourages children to be creative and think of innovative designs to build some crunchy architecture with biscuits, wafers, crackers and edible cement.

Time

30 minutes

Kit list

- Different shaped biscuits and/or crackers, wafers
- Dark chocolate
- Bowl, water and saucepan
- Baking paper
- Cooker/microwave

Next steps

Discover more playful activities and inspire children to become creative scientists at okido.com

Watch out!

- Wash hands before you start.
- Children should only eat buildings created by them or members of their household.
- Be careful not to get the chocolate too hot. Check that the temperature of the melted chocolate is not over 25°C before using it. Transfer melted chocolate into a bowl and keep the hot saucepan out of children's reach to prevent burns or injuries.
- Check children's allergies beforehand and modify materials accordingly
- This activity can be messy so it would be good to put aprons on.

Instructions

1. Make the edible cement by melting some small pieces of chocolate in a 'bain marie' (a bowl on top of a pan of boiling water) or microwave. (An adult should do this.)
2. Use the melted chocolate like glue. When the chocolate goes hard, it will stick the biscuits together.
3. Make some edible biscuit buildings with multiple floors or even a roof! With chocolate stick biscuits you can build thin shapes. Pile up wafers like wooden blocks. Build a strong floor by sticking together two layers of rich tea biscuits. Construct strong posts by filling a biscuit hole with choco-cement and sticking in a round wafer. Thin crackers make good, strong roofs.
4. When you get bored, pretend to be a giant and eat your biscuit buildings.

Think and talk about

- What did you build?
- What shapes of biscuits/crackers/wafers are good for the roof? Floors?
- Why did you use this biscuit for this part of your building?

Skill unlocked

- Creative
- Problem solving

BRITISH SCIENCE WEEK

Innovating for the future

Make a water purifier

About this activity

This hands-on activity will show children how dirty water turns clean.

Time

30 minutes

Kit list

- Big plastic bottle- cut in half
- Plastic cups/containers
- Soil
- Pebbles
- Kitchen roll or cotton wool
- Buttons
- Sand
- Cloth
- Marbles
- Magazines or newspapers
- Pasta shapes

Next steps

There are more playful activities to inspire children to become creative scientists at okido.com

Watch out!

- Do not drink water filtered from this activity because the water is not safe to drink.
- Be sure to collect soil that is not contaminated.

Instructions:

1. Discuss with the children how they use clean water in their daily lives.
2. Now make some dirty water. Take two containers and fill both with tap water. Add soil, sand or mud to both containers. Use one container with dirty water to filter and keep the other to compare at the end.
3. Put the top half of the bottle upside down into the bottom half.
4. Begin by placing a layer in the bottle with cloth, cotton wool or kitchen roll. Then layer with smaller things, like sand and pebbles.
5. Pour your dirty water into the bottle.
6. Watch what happens.

Think and talk about

- What happened to the dirty water when it came out?
- Does the water that comes out look cleaner?
- Where did the dirt go?
- Compare the purified water with the other glass of dirty water.

Skill unlocked

- Patient
- Problem solving
- Observant

BRITISH SCIENCE WEEK

About this activity

Get creative and enter the British Science Association's annual poster competition. You can make your poster about whatever version of 'Innovating for the future' you like and enter our UK-wide competition with the chance to win an array of prizes. The 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.

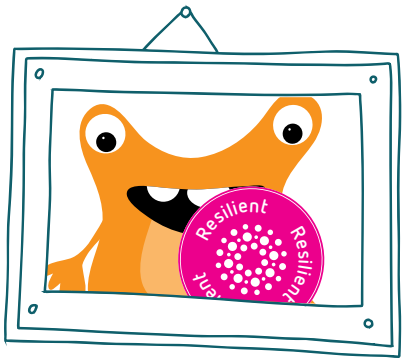
Kit list

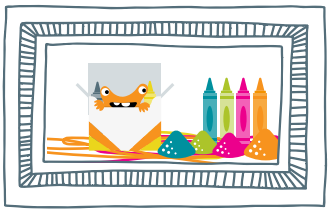
- Paper (A4 or A3)
- Creative materials, e.g.

  pens, pencils, scissors, glue, watercolours, paint, colouring crayons, pipe cleaners, felt, thread, wool, foil, clay, string, beads, stamps, foam, pompoms

Innovating for the future

Poster competition





Instructions

Get children thinking about ideas to include in their poster.

They could investigate and imagine 'Innovating for the future' and everything that makes it special. Here are some topic ideas to help you get inspired.

1. Think about your own innovation – from inventing your own toy that you want to share with your friends to a useful machine that will help your family or the whole world! How will it change the ways of play, sports and leisure, entertainment, communications, work, or even school?

2. Feeling futuristic and global? Why not think about an innovation – new ideas, inventions, products or services we have never heard of before that would make the world a better place?

3. Do you know someone who is an awesome innovator? Try to showcase their innovations and reflect on how this person's innovations impacted the lives of many.

4. Everyday innovations can be easily overlooked. Identify common innovations that you use daily and give a thought on how your life would be without them.

Make your poster

Once you've thought about your idea, it's time to get creative! Your poster must be:

- A4 or A3 size and you need to be able to take a photo of it to send to us online for judging.
- You can use pop up pictures, pull out tabs or use materials such as paint, drawing pencils, crayons and paper.

Send us your poster

Posters will be judged on creativity, how well they fit the theme, and how well the poster has been made or drawn. Once the poster is complete, scan or take a photo and go to britishscienceweek.org **for details on how to send in your entry**.

Next steps

Celebrate! For more details, along with the full set of rules and tips for educators, check out our website britishscienceweek.org