



SNEAK PEEK SECONDARY ACTIVITY PACK

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

A range of activities
and ideas to be run with
students up to the age of 14

Delivered by



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This activity pack is your 'one-stop-shop' for supporting you during British Science Week, but it can be used at any time. This pack is a sneak-peek of the full version, which will be available in January. 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 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 that 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.

We understand that this academic year is going to be quite different for schools and we've adapted this pack to best support you for British Science Week 2021.

This year, we've got some fantastic activities to complete in school, plus some specifically designed for students to take part in at home with their families.

Please feel free to further adapt activities within the pack to suit to your setting taking into consideration any quarantine of resources, working in bubbles and social distancing needed.

We have also added in some suggestions on remote engagement if you are unable to accommodate visitors within your school.

Find an activity near you:

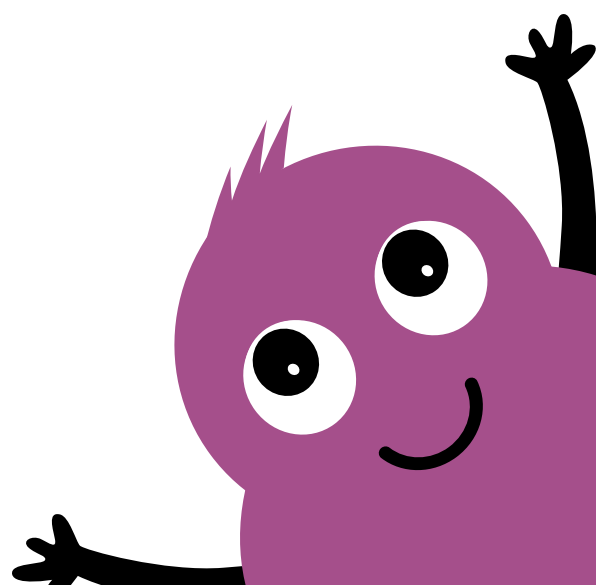
You can either create your own activity in your class, or see what activities are happening near you. Last year we reached more than 180,000 people. Help us make British Science Week 2021 even bigger and better! Visit [sciencelive.net](https://www.sciencelive.net)



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 to the right. 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](https://www.britishscienceweek.org)

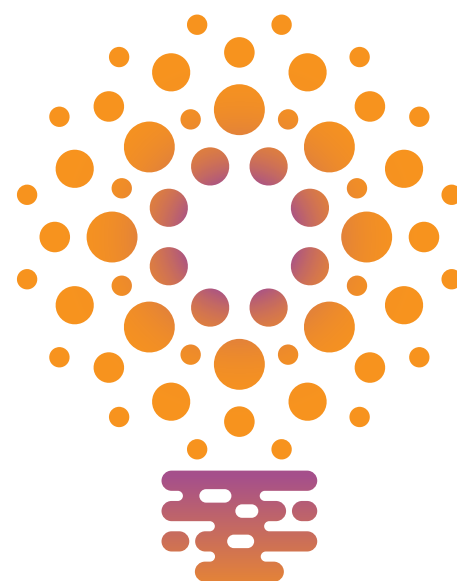
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Introducing the theme

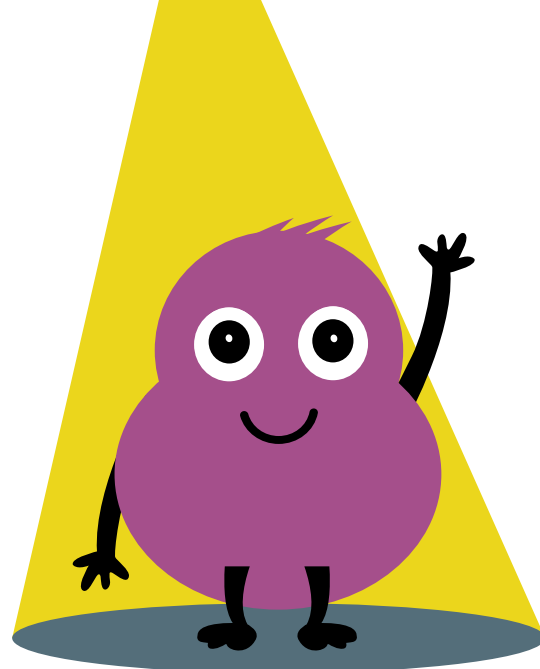
Why not start British Science Week off with a bang, by introducing parents and students to the theme 'Innovating for the future' in a fun way to get them excited about the Week ahead?

- ✓ 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 students. Anything that inspires their inquisitive minds is an epic start.
- ✓ Get the students thinking through their imaginative hats and allow them to experience innovation by asking them to come up with machines they would like to invent from readily available scrap or craft materials in the classroom or setting.
- ✓ Encourage the students to come up with an acrostic poem for INNOVATION by asking them what comes to mind when they hear it. You can even turn their acrostic poem into a jingle which you can sing with them throughout the week to remember their own ideas about innovation.
- ✓ Engage students into 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 engage the pupils with 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 students 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 around us. Where has the topic of innovation been in the news or your local area? Can you give an example of innovation? Is there any way you can encourage conversations with students about this?
- ✓ Launch the poster competition and let parents know about this (see **Page 13** of this pack).



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 your students online.

STEM Ambassadors offer their time and enthusiasm to help bring science and technology subjects to life and demonstrate the value of them in life and careers.

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 and STEM Ambassadors from across the UK can respond to any online activity request. Find out more and make a request here: 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 students 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 favorite 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 students might have and promote positive

attitudes towards science - e.g. female engineers. Let the volunteers/ambassadors share in a simplified talk 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.

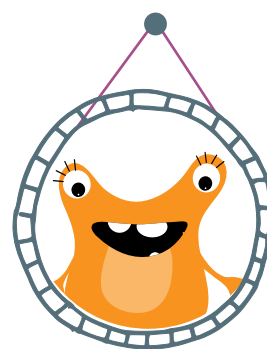
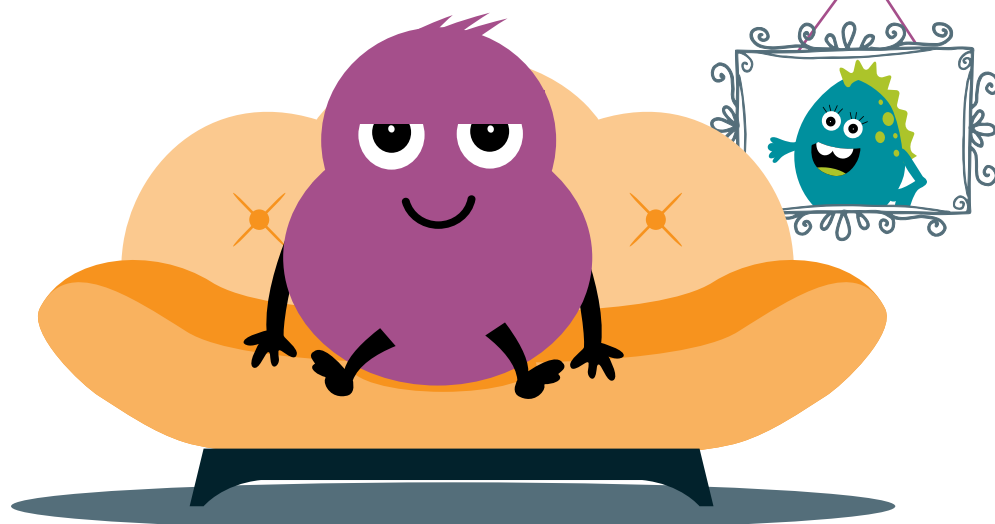
Volunteers come from a range of careers and experiences, from engineers, designers and architects to scientists and technicians, so get children excited about inspirational career talks, broaden choices and develop their interest in these careers!

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

British Science Week at home

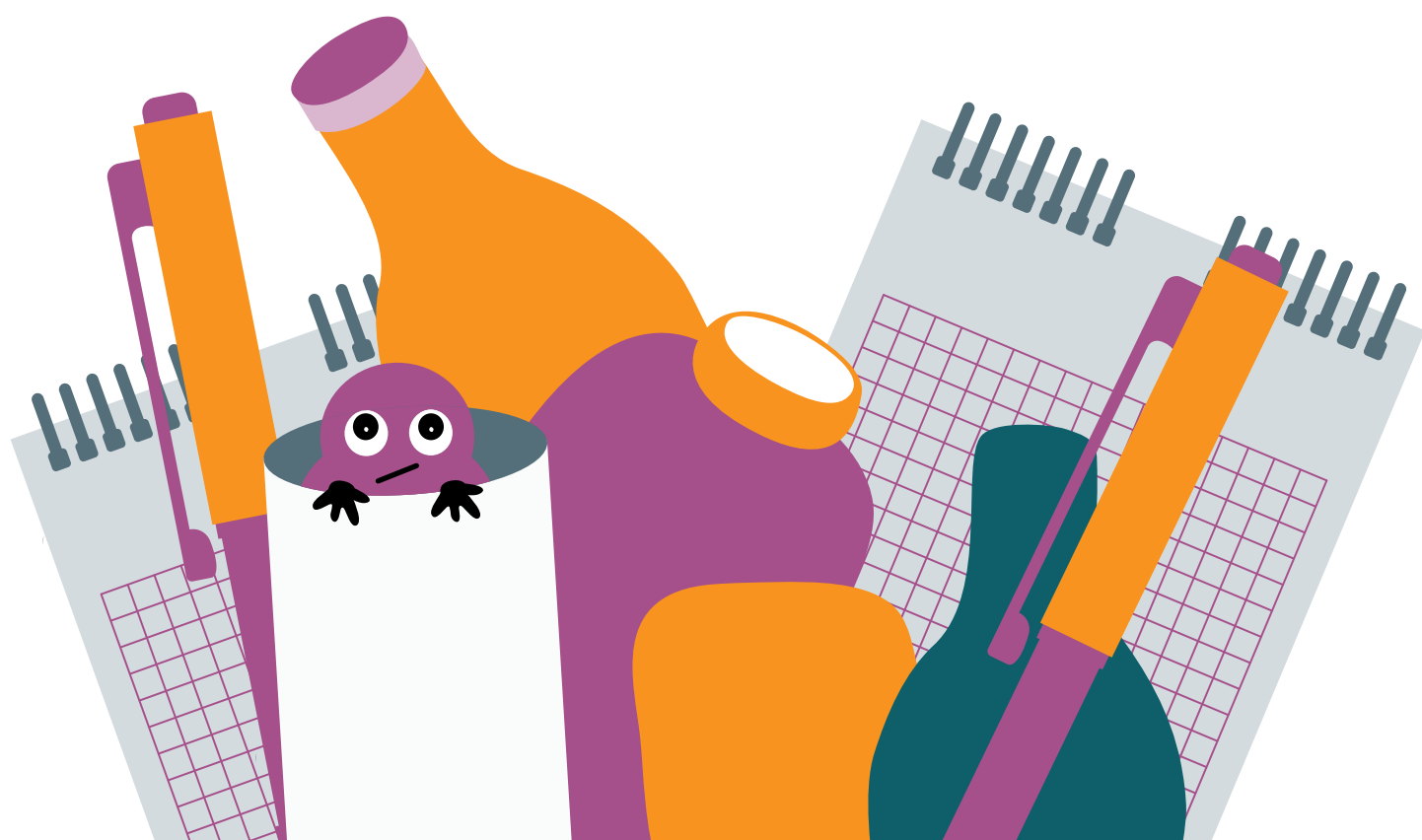
Want your students to enjoy British Science Week at home, but not sure how? Here are our top tips for engaging parents and carers in the Week:

- 1 Make the most of your parent newsletters, the Parent-Teacher Association (PTA), chat group and text messaging services, if you have them. Let parents know in advance of the Week (at least a month before) 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 students home with activities they can do with their parents, which may then lead onto further conversations. (See Page 12 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 students' houses. Why not try out some of the CREST Award activities which are quick and easy to do as fun, outdoor challenges too: library.crestawards.org
- 4 Send an experiment idea home during the Week which may spark mealtime discussions around STEM. Try and make it as low-resource as possible. It can help if it's something the students have tried or seen at school first, so they feel like 'experts' when they do it at home with family, allowing them to lead the learning. Explore your options for fun science-based activities at home which require few resources from the CREST at home collection collectionslibrary.crestawards.org



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 the British Science Week.
- ✓ Alternatively, check whether there is a scrap shop/store/club open in your local area. These shops are often membership-based and can provide a brilliant, inexpensive or free resource for card, plastic, bits of material – all sorts. These things can be turned into rockets, cars, spaceships; 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 students to foster discussion and raise their level of understanding about innovation – machines, materials, building structures, etc.
- ✓ Collect story books and reference books ahead of time leading to the theme 'Innovating for the future' to create a themed library.





Beyond the Week

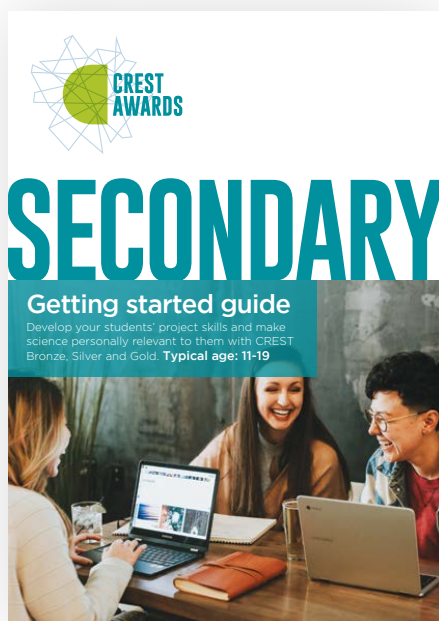
Once British Science Week is over, this doesn't mean the exploration and curiosity have to stop!

Some ideas for doing this include:

- ✓ Students could take part in a CREST Award, spending anywhere between 5 and 70 hours of work on a project that they lead on, or a topic that they're interested in, to achieve a Bronze, Silver or Gold Award. Find out more and how your students can get involved: secondarylibrary.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 within science class or school.

- ✓ Find supporting resources at stem.org.uk.



CREST RESOURCE LIBRARY
CREST resource library hosts a wide range of Discovery Day packs. This pack includes guidance for your students, a suggested timetable and materials for you to use, and some optional activities to kick off the day.
You can browse the Discovery Day packs we have available online at: library.crestawards.org



Unlocking skills

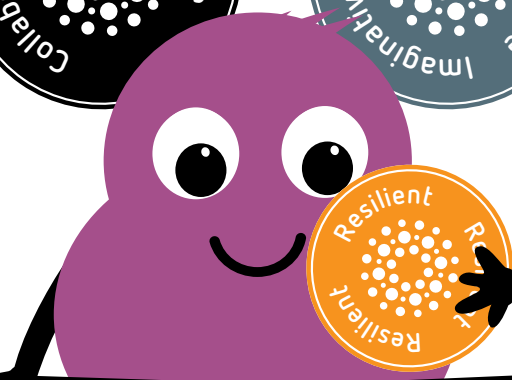
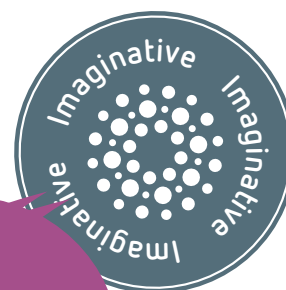
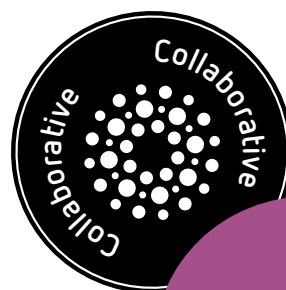
A fantastic way to encourage STEM interest in pupils is to introduce transferable skills used by those working in STEM jobs. These skills will strengthen positive attitudes towards STEM and reduce their stereotypes of those working in the field.

You could engage the pupils in this STEM Person of the Week activity from NUSTEM at Northumbria University (nustem.uk).

Ask the pupils to identify what attributes people working in STEM need. It might include being observant, creative, patient, a good communicator, or curious.

See the table below for the complete list developed by NUSTEM.

As an alternative and a little bit of motivation, why not award each of the pupils 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

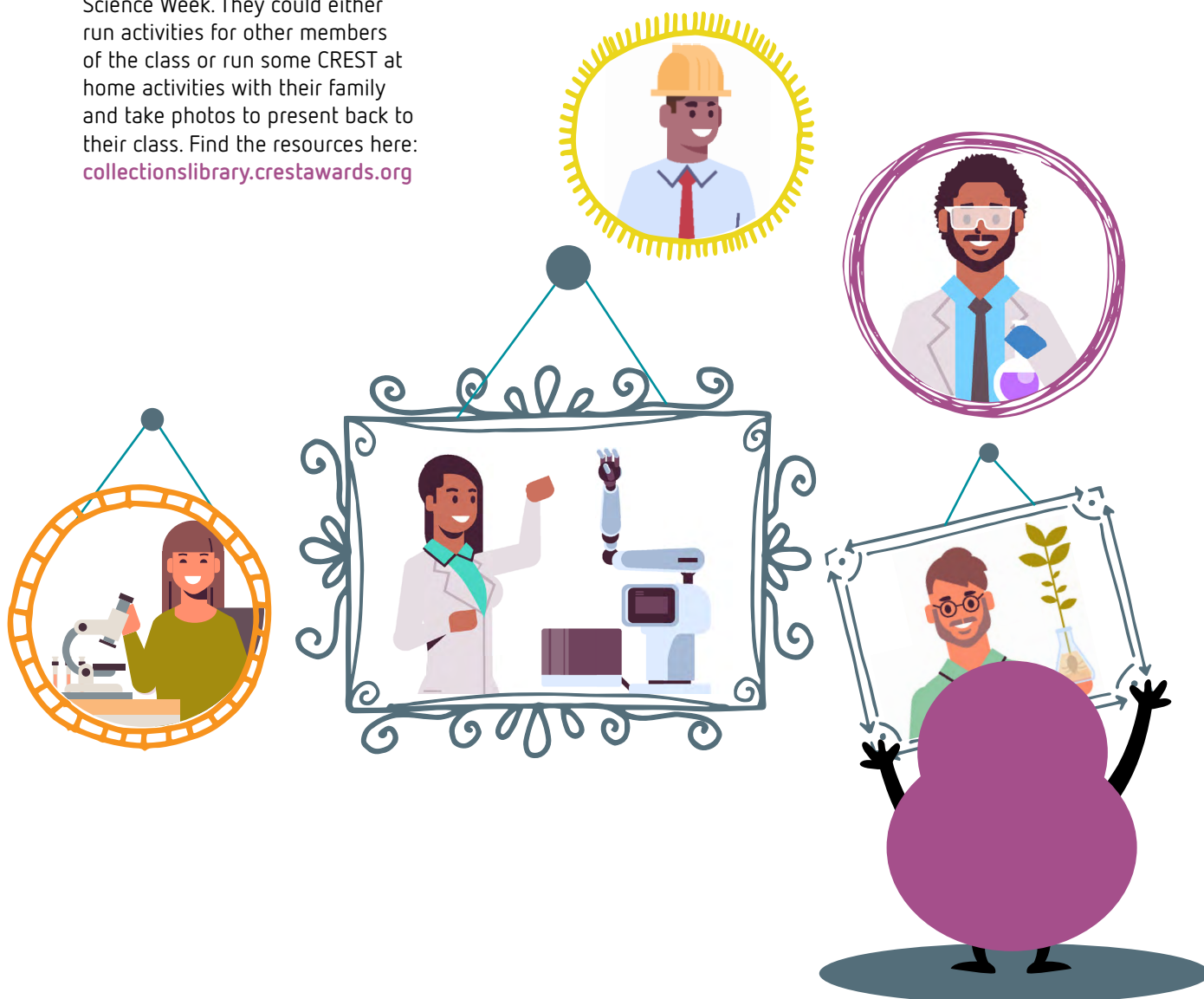
Get students leading the way

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

- ✓ Encourage students to run their own activities during British Science Week. They could either run activities for other members of the class or run some CREST at home activities with their family and take photos to present back to their class. Find the resources here: collectionslibrary.crestawards.org

- ✓ Ask students to research an invention and how this influenced how we live our lives today and then write report for the school newsletter or website.

- ✓ Encourage students to design and create their own display of scientists through time – a photo exhibit of scientists who changed the world with their discoveries, inventions and innovations.



Innovating for the future

What makes bread rise?

About this activity

Some people can't eat bread because they're allergic to wheat or gluten which is in wheat. In this project, you're going to make bread dough using some different types of flour. You'll compare how well the bread rises and think of possible non-wheat flours that you can make bread with.

Kit list

- ✓ Flour (wheat, rice, potatoes, and soya)
- ✓ Water
- ✓ Yeast

Time

2+ hours

Watch out!

Do NOT eat breads if they have been made in a science laboratory or using science equipment. For tasting/eating experiments you must use a food technology room and carefully follow hygienic procedures.



Instructions:

- 1 Mix one kind of flour with water and yeast to make bread dough. Make some small quantities of dough using each of your different flours (same quantity of ingredients for each dough).
- 2 Knead each bread dough for the same length of time.
- 3 Push each bread dough into the bottom of an empty boiling tube – the tubes should all be the same size. Mark the side of each tube to show where the dough comes up to and label it.
- 4 Leave the boiling tubes at a temperature of 35°C for the dough to rise.
- 5 Leave your dough for 30 minutes then look at your boiling tubes again. Mark where the level of the dough is in the tube.
- 6 Compare your different bread doughs and measure how much they've risen by.
- 7 Compare your different breads again when they are cool.
- 8 Which type of flour rose the most and which type of flour rose the least?
- 9 If you make the dough into bread, slice the bread and describe what the loaves look like inside. Are there lots of holes? Are they hard or soft? How else could you compare the loaves?

Next steps

This activity can be put towards a CREST Bronze Award. For more information, follow this link: crestawards.org/crest-bronze

Skills set

- ✓ Curious, logical, patient
- ✓ Career options
- ✓ Making bread from different types of flour can lead students to working on research and development.
- ✓ How well has the bread risen after baking?
- ✓ How do the different breads look?
- ✓ How do they smell?

Take it home

Make your own fizzy drink

About this activity

In this activity you will investigate how to design an experiment to make the perfect fizzy drink. Compare your homemade fizzy drink to those you can buy in the shops. You can be innovative and encourage others to make their own fizzy drink suitable to their taste or dietary needs.

Kit list

- ✓ Lemons
- ✓ Sugar
- ✓ Baking soda

Time

2+ hours

Watch out!

Make sure your fizzy drink recipe comes from a reliable source.

Always complete a risk assessment before you start your experiment. Check with your teacher if you need help with this.

Never drink anything that has been prepared in a laboratory or with laboratory equipment or chemicals.

Instructions

- 1 Check out these lemonade recipes we have gathered. Make sure you do a risk assessment on these in advance of using them. Check with your teacher if you need assistance with this.

✓ littlebinsforlittlehands.com/fizzy-lemonade-science-project

✓ sciencekids.co.nz/experiments/lemonade.html

✓ thoughtco.com/fizzy-sparkling-lemonade-made-with-science-607468

- 2 When you've got your recipe, you're ready to make the perfect fizzy drink.
 - 3 Follow the instructions to make the fizzy drink. You may even add food colouring that suits your liking.
 - 4 Buy a fizzy drink the same flavour as yours. Compare your fizzy drink with the shop bought one.
- ✓ What different ingredients do the two drinks have?
 - ✓ What do they look like?

- ✓ How fizzy are they?
 - ✓ How acidic are they?
 - ✓ What are the shelf-lives of the two drinks?
 - ✓ What additives are there in the bought drink? Why do you think they have been put in?
- 5 Reflect on how you could improve your drink and think of innovative ways to make your improvements.
 - 6 Write down your method for making your drink so that other people can use it.

Next steps

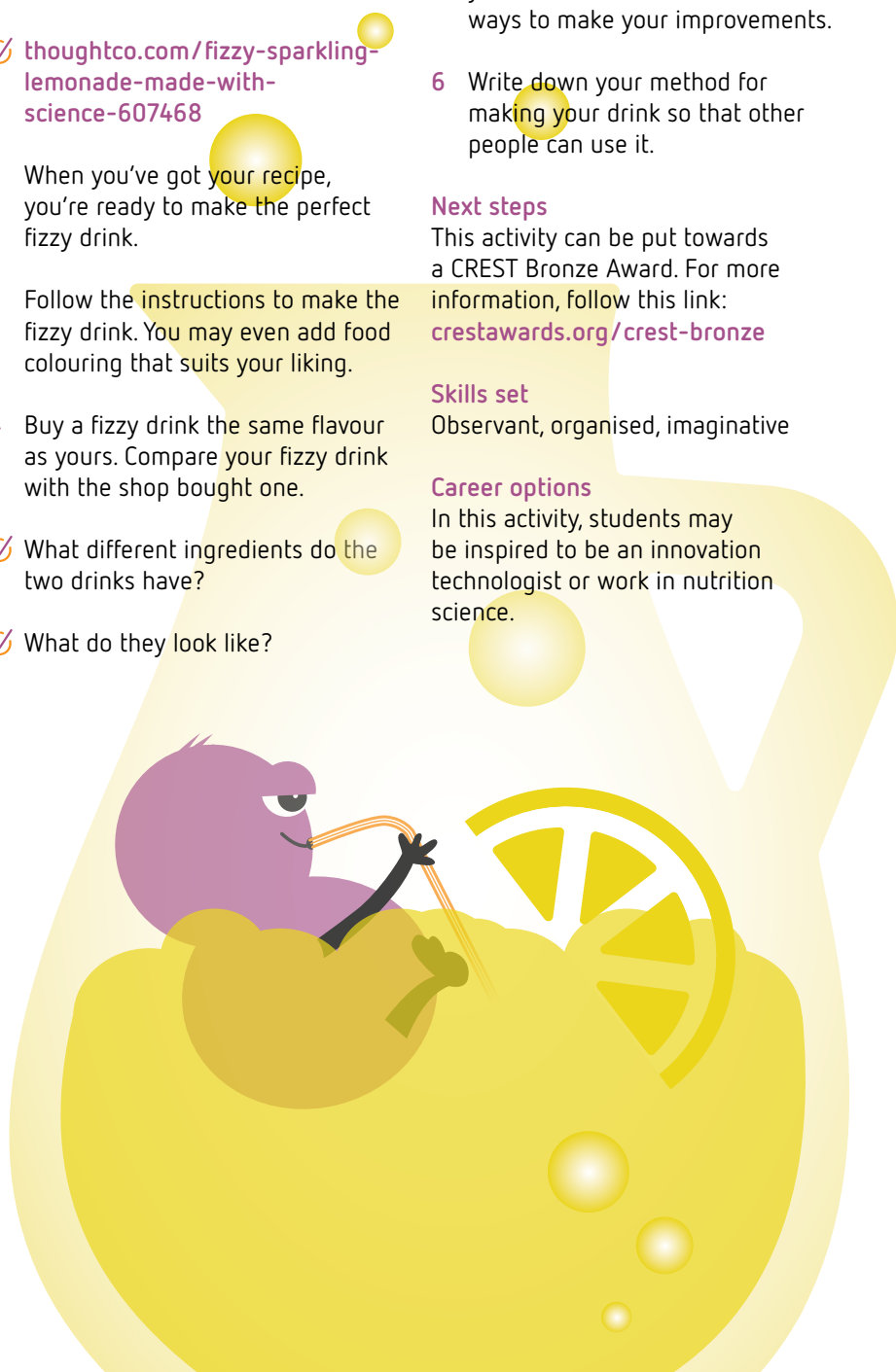
This activity can be put towards a CREST Bronze Award. For more information, follow this link: crestawards.org/crest-bronze

Skills set

Observant, organised, imaginative

Career options

In this activity, students may be inspired to be an innovation technologist or work in nutrition science.



Innovating for the future

Poster competition

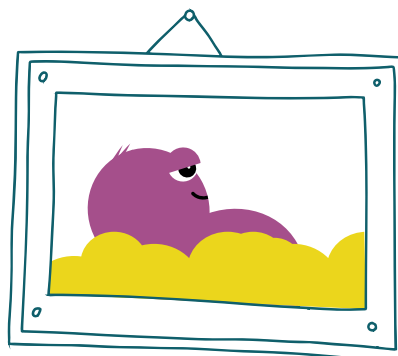
About this activity

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

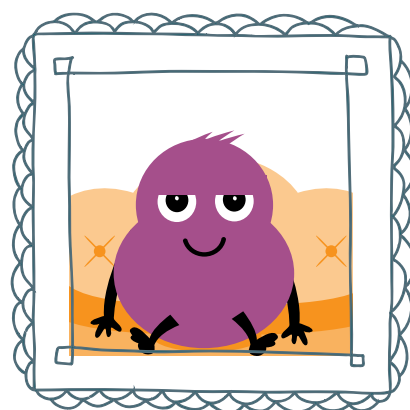
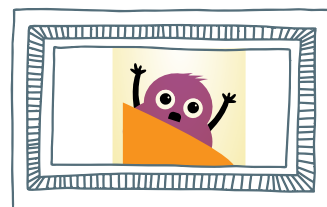
- ✓ Paper (A4 or A3)
- ✓ Creative materials, e.g. pens, pencils, scissors, glue, watercolours, paint, colouring crayons, pipe cleaners, felt, thread, wool, foil, clay, string, beads, stamps, foam, pompoms



Research your poster

Investigate and imagine 'Innovating for the future' and everything that makes it special. Here are some topic ideas to get you started:

- 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 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 done your research, 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 complete the [online form](https://www.britishschoolscience.org/competition) with your entry details.

Next steps

Celebrate! For more details, along with the full set of rules and tips for educators, check out our website [britishscienceweek.org](https://www.britishschoolscience.org)