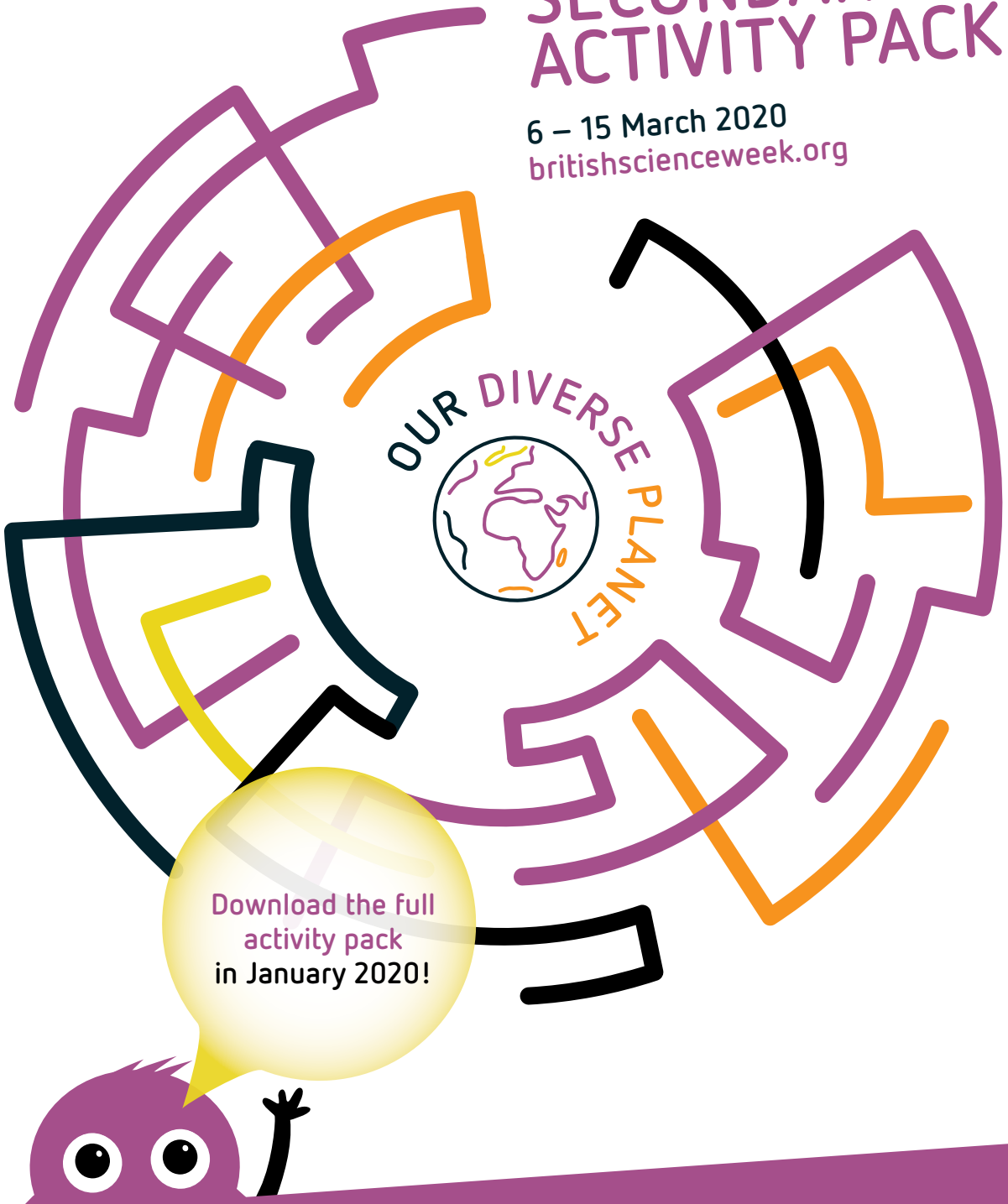
BRITISH SCIENCE WEEK

SNEAK PEEK SECONDARY ACTIVITY PACK

6 – 15 March 2020
britishscienceweek.org



Prepare for British Science Week with this short, teaser pack of activities and ideas for your older students!

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BRITISH SCIENCE ASSOCIATION

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BRITISH SCIENCE WEEK

We've created this teaser pack of ideas and activities to help you prepare for **British Science Week** next year. This is just a starting point - a bigger pack with even more activities will be published on our website in January 2020.

The two activities in this pack have been designed to work as hand-outs for young people aged between 10 and 14 - but they can be easily adapted and extended to be suitable for young people of all ages.

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 childrens' own backgrounds, lives and interests.

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.

Look out for even more ideas in the full activity pack which will be available next year.

This year, our activity pack theme is '**Our Diverse Planet**' - celebrating the amazing diversity we see across the world. From biodiversity to cultural and societal diversity, from the diversity of knowledge to STEM careers and subjects! There are lots of ways to explore this theme - we'd love to hear some of your ideas too!

#BSW20

Poster competition
look out for the paintbrush symbol at the top right corner of the page.

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Making the most of volunteers

Volunteers could be a wonderful asset to your British Science Week adventures. Volunteers like STEM Ambassadors offer their time and enthusiasm to help bring STEM subjects to life, demonstrating their value in life and careers. The *Inspiring the Future*'s website can match you up with someone who has the skills you're looking for.

Volunteers come from a range of careers and experiences, from engineers, designers and architects to scientists and technicians – be sure to take advantage of this so students can see all the options available to them in the future!

Check out *STEM Learning*'s website for some handy tips on how to get a STEM Ambassador: stem.org.uk/stem-ambassadors/find-a-stem-ambassador

Visit *Inspiring the Future's* website for some helpful ideas of events you can use volunteers at: inspiringthefuture.org/schools-and-colleges/resources-and-guides

Here are some ideas and tips on how you could utilise volunteers this British Science Week:

- Kick off with a volunteer-led talk/demo, getting young people excited to take part in the rest of the Week.
- Invite a different visitor each day to keep children engaged throughout.
- Where available, choose volunteers/ambassadors who go against stereotypes the students might have of people who work in or engage with science, e.g. female engineers.
- Reserve visitors early (many speakers get booked up during British Science Week), have a clear idea of what you want them to do and communicate this with them ahead of time with a brief.

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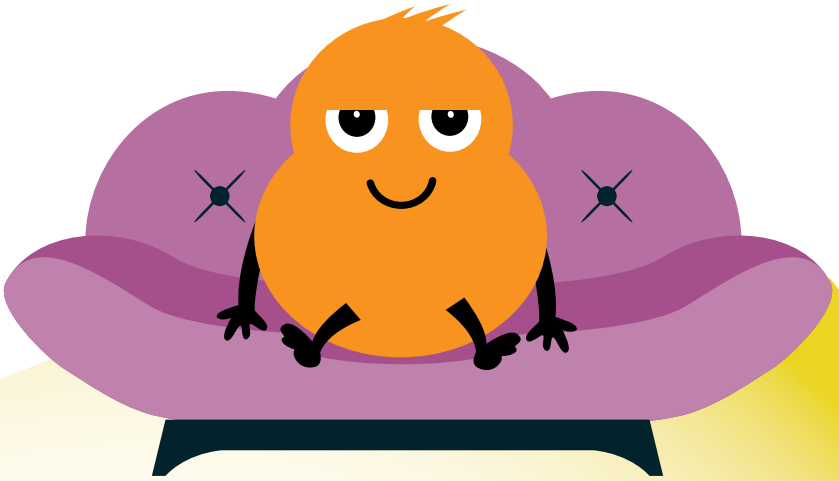

British Science Week at home

Want your students to enjoy British Science Week at home, but not sure how? Here are our top tips for engaging parents and carers so the fun doesn't stop at school:

1 Make the most of your parent newsletters, the Parent-Teacher Association (PTA) 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 for use during the Week, and if you want them to try any experiments at home, they may need time to plan and collect materials for 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 science and technology subjects and encourage them to chat with their children about this. You could do this via a newsletter.

3 Encourage exploring the outdoors in the community or in local cultural spots. This could be anything from local parks to the streets around children's houses. Parents and families can get involved simply by going on a nature walk, exploring science related events and activities in their local area, or visiting places such as museums or science centres. Many of our CREST activities are quick and easy to do as fun outdoor challenges too: library.crestawards.org/

4 If you are conscious that parents may struggle to engage with British Science Week at home, invite them on school trips or use resources such as: bsa.sc/oxford-sparks

5 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.

6 As well as this pack, there are always lots of other useful downloads for take-home activities, such as: education.gov.scot/parentzone/Documents/IamaScientistMar16.pdf

rigb.org/families/experimental

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Gathering resources for your classroom or home

- Try to collect materials all year round: empty bottles, toilet rolls, cereal boxes, elastic bands, newspapers, etc. This way you will have lots of great things to use during your British Science Week.
- Alternatively, check whether there is a scrap shop/store/club 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, or, use Google to find your nearest.
- Look out for the 'At home' tasks in this pack for more ideas.

Beyond the Week

Once British Science Week is over, it doesn't mean the exploration and curiosities must stop!

Below are some ideas of how you can continue the fun:

- Set up a STEM club or run a Curiosity Lab once a month during science class.
- Students could take part in a CREST Award, spending anywhere between 5 and 70 hours of work on a project that they lead, on a topic they're interested in. For more information, research the different CREST Levels available: crestawards.org/which-level
- Older students could run CREST Star with younger students, and work on their communication skills. Learn more about CREST Star here: crestawards.org/crest-star
- 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/ioe/departments-and-centres/departments/education-practice-and-society/science-capital-research/science-capital-teaching-approach
- Keep an eye out for the 'Next steps' tasks in this pack for more ideas.

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Get students leading the way

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

Encourage young people to run their own events during British Science Week. They could recruit STEM Ambassadors or *Inspiring the Future* volunteers to come in and present in class or at an assembly, or ask classmates' parents with knowledge and experience of any STEM-related subjects to speak about their own backgrounds.

Young people could research events or programmes happening in your community, particularly those that at first don't seem to be obviously science related. Take a look at some of the community groups we work with during British Science Week for inspiration of where to start: britishscienceweek.org/plan-your-activities/support-us/community-grant-case-studies

Get students running their own CREST projects and use this as inspiration for a science fair or other related event. We have lots of handy CREST resources on our website: library.crestawards.org

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Take it home:

Make your own bath bomb

About this activity

In this activity you will investigate how to make your own bath bomb. We can all support the diversity of our planet by using less packaging including single-use materials. By designing your own bath bomb you could also find a way to cut down on the packaging required and encourage others to make their own bath bombs.

The following recipe makes 4 small bath bombs.

Dry ingredients

- 100 grams Baking soda
- 50 grams Citric acid
- 25 grams Cornflour

Wet ingredients

- 2 tbsp Sunflower oil or olive oil
- 2 tsp Water
- 1 tsp Food colouring (optional)
- 12-15 drops essential oils of choice (be sure to check for allergies)

Kit list

- Two mixing bowls
- Whisk
- Flexible plastic moulds (clean empty yogurt pots, silicone ice cube tray or silicone cupcake cases)

Time

2+ hours

Watch out!

Make sure your bath bomb recipe comes from a reliable source.

Always complete a risk assessment and have it checked by your teacher before you start your experiment.

Never use anything on your skin that has been made in the laboratory or using laboratory chemicals.

Instructions

1. Mix the dry ingredients together in one bowl and the wet ingredients together in the other bowl.
2. Add the wet ingredients to the dry ingredients a few drops at a time while whisking, until the mixture just sticks together when pressed.
3. Press the mixture into the mould and leave to dry for at least 2 hours.
4. Make a few bath bombs with variations and record the differences in them, such as:
   - More or less baking soda
   - More or less citric acid
   - Different oils (citric or other)
   - Different colours
5. Remember to keep some elements the same, to make it a fair test.
6. Now it's time to test your bath bomb! Put the bath bomb in some water and record:
   - How long it takes to disperse
   - How high the 'fizz' is
   - What happens to the water
   - Anything else you think might be important in deciding if a bath bomb is effective or not
7. Compare your different bath bombs, deciding which one makes it more effective as a bath bomb.
8. Re-write your favourite recipe as a step-by-step guide

Next steps

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

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Our Diverse Planet

Revealing fingerprints

About this activity

Every person's body is different, and this includes our fingerprints, meaning they are very useful in identifying people, in particular those who have left fingerprints at a crime scene. In this activity you will investigate the best way to identify fingerprints on different surfaces.

Kit list

- Different surfaces to retrieve fingerprints from. E.g. crockery, glass, paper, gloss paint
- Ink pad
- Different types of adhesive tape, to test their effectiveness at lifting prints
- 'Dust' to use for lifting prints. E.g. Cocoa powder
- Iodine vapour can also be used to reveal latent fingerprints. You could try this, but be careful what you expose to iodine – it may permanently stain some surfaces.

Time

2+ hour

Watch out!

Iodine is **HARMFUL - avoid skin contact.**

Some powders and chemicals used to reveal fingerprints may be hazardous. Make sure you complete a risk assessment before you start your investigation and check it with your teacher.

Instructions

1 Start by testing how well you can see your own or others' fingerprints on the different surfaces listed in the kit list.

- Why do you think police take fingerprints from paper, not glass?
- Do fingerprints show up better on light or dark surfaces?
- Are prints more difficult to see clearly on a patterned surface?
- Does the answer depend on whether the fingers are clean or dirty? For example, with mud, oil / grease or printing ink after reading a newspaper.

2 You can 'lift' fingerprints using adhesive tape such as sellotape. Why not try different adhesive tapes to see which one is best for 'lifting' fingerprints.

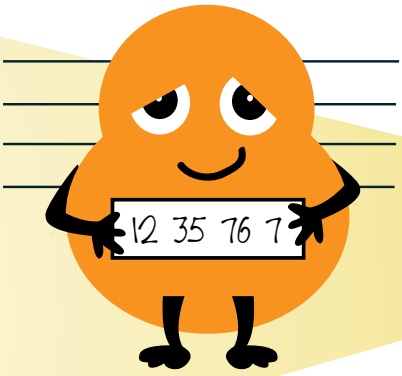
- If revealing fingerprints involves using chemicals, you may need to remove the print from the surface first, to avoid the chemicals damaging the surface. This is called 'lifting'.
- You could investigate various types of adhesive tape to see which picks up the best impression of the fingerprint from different types of surface. You may need to find a way to 'develop' the print on the sticky surface to make it more visible.

3 Argue your case:

- Why not use your discoveries about identifying fingerprints to argue a case, identifying some fingerprints at a fictional crime scene?
- You will need some sample latent prints, and a record of prints from a suspected 'criminal'. Use your identification skills to argue that the 'suspect' was in fact at the scene of the crime.

Next steps

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



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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: #BSW20

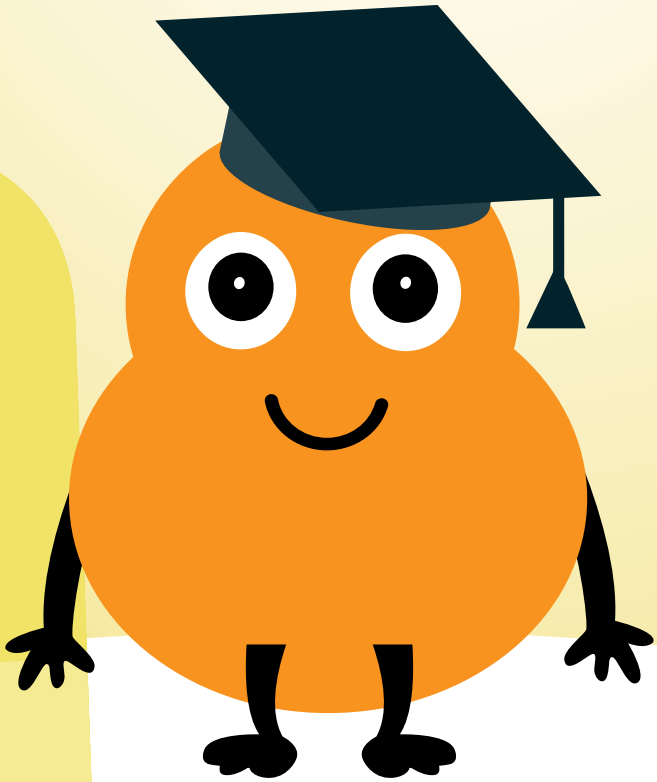
Kick start an assembly with a simple but impressive demo. Try this alkali metal roulette experiment, eic.rsc.org/classroom/exhibition-chemistry/alkali-metal-roulette/2000039.article or make a cloud in a bottle britishscienceweek.org/cloud-in-a-bottle/

Remember, a demo is a good way to get young people's attention, but it shouldn't be the whole focus of the assembly.

- You could reflect on important scientific discoveries or inventions in the last century, with a special focus on the diversity and range of the both the subjects and the people who discovered or invented them. Try focusing on people from more underrepresented backgrounds, whose work may have been overshadowed at the time. See if there is anyone from your area who fits this bill
- Get the students thinking about how diversity is a part of people, materials, animals, nature or anything else in their everyday lives
- Profile a specific person who has contributed in some way to the diversity of a STEM field; from opening doors for underrepresented communities, to contributing new ideas, understanding or knowledge
- Invite a special guest or someone from the school community to come talk about a related topic. See Page 3 for information on how to get volunteers

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. If you are sending home a family experiment, maybe you could introduce/demo it during the assembly.
- Where has the topic of diversity been in the news? Is there any way you can discuss this in an assembly?
- Launch the poster competition (see Page 12 of this pack).



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Our Diverse Planet

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 'Our Diverse Planet' you like and enter our UK-wide competition with the chance to win an array of prizes.

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

  N.B. try to avoid using straws or glitter - these plastics can damage our planet and harm the diverse creatures and ecosystem that live there

Research your poster

Investigate and imagine 'Our Diverse Planet' and everything that makes it special. Here are some topic ideas to get you started:

- Why not think about biodiversity? From the diversity in your own garden, to the diversity at the very bottom of the ocean, research all the amazing creatures and organisms that live on our planet
- The diversity of science and STEM subjects. Have a think about all the diverse ways that science affects our lives and who you know that uses science every day. Is there science in baking and cooking? What about making a film or taking a picture? Or how about operating planes and cars? Remember that science is everywhere, you just have to look for it!
- Think about the other kinds of diversity our planet contains – from the variety of the molecules that make up essential parts of life, to the different way our towns and cities are built, and the variation of people's tastes and interests.
- Our planet is unique, but why not investigate what makes it different from the other planets in our solar system?

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.

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, write your children's information on the back, fill in the online registration form, and then post your entry to us at:
British Science Week Poster Competition,
British Science Association,
165 Queens Gate, London, SW7 5HD

Next steps

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