8-17 March 2024

EARLY YEARS ACTIVITY PACK

A range of activities to be run with children aged 5 and under (approx.)

britishscienceweek.org
This activity pack is a one-stop shop to support you during British Science Week, and you can use it all year!

When developing this pack, we looked for activities which promote cross-curricular learning and break down the stereotypes surrounding science, technology, engineering, and maths (STEM). We therefore 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 have included activities for children to complete in any setting, whether that is their nursery, school, a club, an organisation, or at home with their families.

You can share your brilliant activities, vlogs, or images on social media! Join the conversation or see what’s happening during the Week by tagging British Science Week on Twitter (@ScienceWeekUK) and using the hashtag #BSW24.

Find an activity near you
Last year, hundreds of thousands of people participated in activities around the UK. Help us make British Science Week 2024 even bigger and better! Visit sciencelive.net to find science activities in your local area.
Here are some ways you can introduce the theme to children in a fun, imaginative way to get them excited about the Week:

- Ask children to design a poster based on this year’s theme and enter it into our poster competition for the chance to win some fabulous prizes! Some of the activities in this pack can provide inspiration, simply look out for the activities marked with the paintbrush symbol shown above! You can find more information about how to enter on page 21 and at britishscienceweek.org/plan-your-activities/poster-competition.

- Get children talking about what time means to them. How do they tell the time, and how does it differ from the way their parents or grandparents told the time? What about things that go very fast (the fastest animals, ways of travelling) or very slow (plants growing, building cities and large structures)?

The theme this year for British Science Week is ‘Time!’ It’s the 30th anniversary of British Science Week – we want you to celebrate this huge milestone with us, thinking about time since the Week began, and looking to the future!

Invite a special guest or someone from the school community to share with children their own experience of time. Are there any watchmakers local to you, or clock towers to visit? Maybe a photographer could talk about capturing ‘moments in time’?

See page 5 for information on how to get volunteers.

Here are some other ideas to include at the beginning of British Science Week:

- Tell children about the plan for the Week and give them a challenge related to the theme. If you are sending home an experiment, maybe you could introduce or demonstrate it first.

- Time affects every part of our lives. Has ‘time’ as a theme been in the news recently, or do you have an example from the local area? Are there any historic sites you can talk about, and through which you can explore previous eras?
MAKING THE MOST OF VOLUNTEERS

Face-to-face engagement is a great way to get children involved and excited about a volunteer speaker and their topic, but don’t forget there are also opportunities to get volunteers and presenters to engage with children online.

STEM Ambassadors are volunteers who offer their time and enthusiasm to help bring STEM subjects to life, and to demonstrate their value to young people. It is now possible to request both in-person and remote STEM Ambassador support, meaning that Ambassadors from across the UK can inspire young people wherever they are.

Find out more and make a request for STEM Ambassador support here: stem.org.uk/stem-ambassadors/find-a-stem-ambassador.

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

- Schedule two or three different guests to talk about their jobs or science-related hobbies during the Week. If possible, get children to anticipate who the next guest will be and what job they do. These sorts of experiences can inspire children to think about their future, they’re never too young to explore their career options!

- Where available, involve volunteers/Ambassadors who challenge stereotypes the children might have absorbed and promote a positive attitude towards science. For example, women engineers, people early on in their careers, and those in roles not typically linked to science but still involve it — such as chefs, tech start-ups, gardeners, sportspeople etc.

- Ask volunteers/Ambassadors to share how their job relates to science to show that scientists don’t just work in labs!

- Book your visitors early as many speakers get booked up during British Science Week. Have a clear idea of what you want them to do and communicate this ahead of time.

Volunteers come from a range of careers and experiences, from engineers, designers, and architects to scientists and technicians, so get children looking forward to inspirational career talks which broaden their choices and interests!

Visit the Inspiring the Future website (inspiringthefuture.org) for some helpful ideas for using volunteers.
Do you want to help children carry on participating in British Science Week at home? Here are our top tips for engaging parents and carers with the Week:

- **Make the most of parent newsletters**, the Parent-Teacher Association (PTA) and chat group and text messaging services, if you have them. Let parents and carers know what you have planned for British Science Week at least a month in advance, and how you’d like them to be involved. Ask them to collect or donate materials and tell them what they will need to get involved in any experiments at home, so they have time to plan themselves. The PTA may be able to support you financially to run activities during the Week or help to drum up parent volunteers.

- **Ask parents and carers to think 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 questions or activities they can do at home.

- **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 real life, street lighting engineers or infrastructure like bridges and construction work.

- **Check out the free resources** available through the British Science Association’s CREST Awards. Many of the Star activities can be used with under 5s and in an outdoor setting. Check out the CREST Star challenges collections: primarylibrary.crestawards.org.

- **Send an experiment idea home** during the Week to spark discussions around science. Try to make it as low-resource as possible. It can help if it’s something the children have tried or seen at school or nursery first so that they feel like the ‘experts’ when they do it at home with family, allowing them to lead the learning. Some of the activities in this pack have been adapted to be easily run at home, so they are a great place to start!

There are also a range of science-based home activities requiring few resources in the CREST Home Learning collection: bsa.sc/collectionslibrary-crestawards-low-resource.
GATHERING RESOURCES FOR THE CLASSROOM OR HOME

If you can, try to collect materials throughout the year for use during British Science Week. Alternatively, check to see whether there is a scrap shop/store/club open in your local area. These places are often membership-based and can be a brilliant, inexpensive or free resource for card, fabric, and other bits of material. Salvaged materials can be turned into spaceships, trees, sea creatures and more. You name it – the children will think of it! Look at reusefuluk.org 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 how time affects everything around us, in plants, building structures, and so on. The more colourful, the better!

The photos can be a reference point for future activities. For example, you could gather photos of a certain type of technology, televisions perhaps, (using images from internet if you need to) and ask children try to put them in chronological order of when they were invented.

Collect story books and reference books around the theme of ‘Time’ to create a themed library. You could even organise a read-aloud session of a story book for circle or carpet time.
BEYOND THE WEEK

 Exploration and curiosity don’t have to end once British Science Week is over!

Some of the following ideas could help you to expand the learning beyond the Week:

- Have children take part in a CREST Award. CREST is a scheme that encourages young people to think and act like scientists and engineers. Children can complete eight activities to achieve a Star Award, which will see them receive a certificate and badge. Look out for the CREST logo to see which activities can be put towards a CREST Award. Older children could also work towards a higher-level CREST Award. Take a look at the different CREST Star challenges here: primarylibrary.crestawards.org.

- If you have the opportunity, consider running a STEM club or curiosity lab. You can find supporting resources at stem.org.uk/secondary/enrichment/stem-clubs.

- Find ways to link time into other subjects. In history, you could explore how our understanding of science and the world has changed over time. In PE, you could think about the speed of athletes and how time is important in other aspects, such as reaction times. In geography, you could talk about seasons and the weather.

Inspirations? Find out more
A fantastic way to encourage children to take an interest in STEM is to introduce transferable skills used by those working in STEM-related jobs.

These skills will strengthen positive attitudes and reduce stereotypes of those working in the field.

You could, for example, use the STEM Person of the Week activity from NUSTEM at Northumbria University or introduce a scientist from the British Science Association’s Smashing Stereotypes campaign. Ask children to identify what characteristics people working in STEM need. These might include being observant, creative, patient, good at communication, or curious.

Look out for the skills unlocked tags for each activity in this pack.

The table opposite has a complete list of attributes developed by NUSTEM to use as a talking point or to share with other teachers. As a little bit of motivation, why not award children with a sticker or certificate for each STEM characteristic they demonstrate well during the Week? You can download and print the stickers from britishscienceweek.org/plan-your-activities/marketing-materials.
**SNEAKY SHADOWS**

This activity is designed to get children thinking about how shadows are made. Shadows fall outside in different directions at different times of day, depending on the position of the sun – but we can make shadows indoors too!

**Instructions**

1. If it’s sunny, take the children outside to look at the shadows and discuss how they’re made. They can look for their own shadow – when can they see it, and when does it disappear?

2. Children can explore shadows inside using torches and other light sources.

3. Cut shapes out of the card for shadow puppets. They can be people, animals, cars, anything you can think of.

4. Build a shadow theatre by shining a light source at a hanging sheet. Children can use the sticks to hold the puppets between the light and sheet.

5. Have the children make up plays and perform shadow puppet shows for the group.

6. Have them explore how the shadows in their play fall differently depending on how they hold the torch.

**Think and talk about**

Have children talk about their ideas of where shadows come from. A shadow puppet show is a great way to share the information about how the sun makes shadows at different times of the day.

**Next steps**

This activity is one of the CREST Star challenges. Why not try some of the other activities with your children? You can find out more and download all the resources you need here: primarylibrary.crestawards.org/#Star

**Watch out**

- Make sure children do not touch a hot light source.
- Observe your organisation’s policy for working outdoors.
- Do not let children look directly at the sun.
- Beware of trip hazards if working in dark conditions.

**At home**

Children can experiment at home, making different sized shadows. They can discover how shadows get bigger when the object is closer to the light source.

**Skills unlocked**

Creative, observant

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**Kit list**

- Torches or other light sources
- Card or thick paper
- Shadow theatre – light source (projector or bright lamp), screen (made of translucent material) e.g. a white sheet
- Sticks to attach to the shadow puppets
- Musical instruments (optional)
LET’S MAKE A SAND TIMER!

Guide the children to build an instrument to measure time. This simple craft activity uses everyday objects that can be found around the house or collected easily. Once the children have built their sand timer, it can be calibrated and used to measure time.

30 minutes plus some discretionary time to play with it!

Instructions

1. An adult should insert the screw through the centre of each bottle cap, then remove. Make sure you do this safely and that the screw passes through the middle of both caps. Children must not use the screwdriver.

2. Secure the 2 bottle caps together using electrical tape. This should ensure a tight fit, preventing any leaks.

3. Have the children fill one of the bottles with sand. They should pour carefully through a funnel to avoid spillage.

4. Show the children how to fix the caps onto the filled bottle. Once securely tightened, they should screw the empty bottle onto the other side of the cap.

5. Now comes the fun part! Use a stopwatch to measure how long it takes for the sand to transfer from one bottle to another. Challenge the children to adjust the amount of sand to achieve specific time frames — perhaps a minute, 2 minutes, or even 5!

Visit the link below for a visual representation of the instructions: okido.com.

Think and talk about

- Can we see or measure time?
- Could our sand timer help us cook an egg or pasta?
- Adjust the timer:
  - Want a faster or slower timer? Add or remove sand, or change the hole size.
  - There are 60 seconds in a minute. Let’s count together using ‘Mississippi’!

Next steps

Visit okido.com to learn more about sand timers!

At home

Use your sand timer to perfectly cook an egg, vegetable, rice, or pasta. It’s a fun and practical way to understand time!

Skills unlocked

Curious, logical

Career options

This activity of building, creating, and problem-solving lays the foundation for many future career paths. Children could become:

- engineers
- architects
- product designers
- scientists.

These early skills can be used to innovate and solve real-world challenges.

Kit list

- 2 plastic 330 ml bottles
- Dry sand
- One screw
- Screwdriver
- Electrical tape
LET’S EXPLORE THE OUTDOORS

We see time pass through seasons! Encourage children to explore the outdoors throughout each season, starting this spring. Keep records throughout the year to see how time changes the environment as we pass through each season.

20 minutes + additional observations to follow through the seasons

Instructions

1. Take the children outside and encourage them to observe and draw their surroundings, discussing what they see.
2. Plan to revisit the same outdoor site across different seasons. Each time, ask children to draw and talk about any changes they notice.
3. Compile all the drawings and observations in a seasonal scrapbook. This will serve as a visual record of how the site changes throughout the year.
4. Assign a daily task for children to observe and record the day’s weather. Maintain these records in the classroom.
5. Regularly initiate discussions about the weather records, encouraging children to share their thoughts and observations.
6. Provide children with paint colour charts. Ask them to find and match as many colours as they can from their outdoor surroundings.
7. Repeat the colour matching activity each season. This will allow children to notice and compare how the colour palette of their environment changes throughout the year.

Watch out
Follow employers safety guidance on working outdoors.

Think and talk about

- What can you see today?
- Has anything changed since the last time we visited this place?
- What is the weather like today? Is it always like this?
- What colours can you find today? Are the colours you can see the same or different to last time? Why?
- What creatures can you find?

Next steps

Explore the natural world around the local environment. Make observations and draw pictures of animals and plants.

View 4 provision maps to explore activities for each season: pstt.org.uk/resources/play-observe-ask

At home

Embark on a mini spider safari at home! Carefully explore your surroundings for spiders, and when you spot one, draw its fascinating appearance.

Skills unlocked

Observant, curious

Career options

Are you stopping to smell the flowers? Evolutionary biologists collect smells from different flowers to understand them. They also investigate how insects smell flowers.

Learn about Kelsey Byers, an evolutionary biologist here: pstt.org.uk/download/1864/?tmstv=1676890592

Kit list

- Paper
- Pencils
- Cameras
- Seasons scrapbooks
- Weather chart/symbols for different weather
- Paint colour charts
- Magnifying glasses
In this engaging exploration, children will delve into the world of apple varieties. They’ll use their senses to describe the apples’ appearances and textures, and even taste them! They’ll discover the smallest, tallest, and widest varieties, and observe apple cores over time. Documenting changes through photos or drawings will enhance their observational skills.

30 minutes initial exploration followed by observation over 6-8 weeks

Instructions

1. Guide the children in investigating apples with their senses. Discuss descriptive words for colours, textures, and scents.

2. Show children how to measure each apple’s circumference (around the widest part) using string. Compare the cut string lengths to identify the smallest and widest apples.

3. Cut an apple in half to uncover the seeds inside.

4. Slice the apples, leaving the core, and invite children to compare the taste of different varieties.

5. Place the eaten apple cores into sealable transparent plastic bags for observation.

6. Encourage children to track changes in the cores over time, using cameras or creating observational drawings. Remind them it will take a while before they see any changes.

- Model good practice when cutting the apple - only an adult must use the knife.
- Be aware of children with allergies.
- Keep the plastic bags sealed to prevent mould spores spreading.
- Children must not eat around the apple cores.
- At the end, throw the sealed bags away in a non-recycling bin.

Think and talk about

- How are the varieties similar and different?
- Which apple is the tallest? Which is the widest?
- Can you count the seeds in each variety?
- Are they sweet or sour? Crunchy or juicy?
- Predict what will happen to the apple if we leave it for an hour, a day, a week and a month.

Next steps

Go to exploriﬁ.uk to create a free account and try the Early Years activity ‘What Just Happened? Apple orchard’. Log in or sign up free to find it here: exploriﬁ.uk/en/activities/what-just-happened/apple-orchard.

Discuss how the apple tree changed over time.

Did you know that blossom flowers turn into the fruit?

Notice that the leaves change colour and fall off in the autumn.

At home

Can you find a fruit tree in blossom in your garden or local park? Take a photo or draw a picture of the flowers.

Skills unlocked

- Patience, observant

Career options

- Farmers who grow apples in orchards need to know how to look after the trees to ensure they produce lots of apples.
- Food scientists find ways to store foods for longer and find ways to make their taste and textures better.

Kit list

- A variety of apples
- String
- Knife and chopping board (suitable for use with children)
- Transparent sealable containers or bags
- A camera (or paper and pencils)
DOES TIME CHANGE OUR PLANS?

Time can truly change the game in planning! Ever wondered how having a lot of time versus just a pinch can alter your decisions? Let’s dive into 2 scenarios for the children to explore this concept.

30 minutes

Kit list

- Pens
- Paper
- A great imagination!

Instructions

1. Give the following instructions to the children:
   
   Imagine you’ve just found out it’s my birthday TODAY and you need to organise a party for me just after lunchtime. You only have a couple of hours and you’re at school. Think about what you can do in that time frame.

2. Help the children to plan, draw, or write their plans on your paper.

3. Give children the opportunity to share their plans.

4. Now give the following instructions to the children:

   Now imagine that it’s my birthday NEXT MONTH and you’ve got the job of organising a party. You have one month to make plans and get people involved. Think about what you can do in that time frame.

5. Help the children to plan, draw, or write their plans on your paper.

6. Give the children another chance to share their plans and notice the differences between having only a few hours versus having a whole month to plan the surprise.

Think and talk about

- What were the differences between planning a party today and in one month?
- Which time frame was easier?

At home

You can use this exercise to set goals in your own life too.

What might you want to achieve in the next month versus next year?

Skills unlocked

- Good communicator, creative

Career options

Lots of careers need careful long-term and short-term planning! These could include:
- people who run the local council
- politicians, and other experts.
PRINTING WITH TIME AND LIGHT

In this activity you are going to guide the children to use time and light to make an artwork of silhouettes created by objects placed on paper that fades in strong light. You don’t need expensive materials, just patience! The longer you leave the paper in the light, the better the effect will be.

20 minutes to make plus time in the sun.

Kit list
- Brightly coloured sugar paper (dark colours will work the best)
- Clear tape
- Flat objects with strong shapes
- A window (south facing if possible)

Instructions
1. Ask the children to gather a collection of flat objects with intriguing outlines. Items like leaves, flat toys, or cut-out shapes work well.
2. Assist children in arranging their chosen shapes on a sheet of sugar paper. Encourage them to experiment and form a unique pattern or picture.
3. Once the children are satisfied with their arrangement, guide them to tape down the items, ensuring the edges are as flush to the paper as possible. Only adults must use scissors or a tape dispenser to cut the tape.
4. Instruct the children to tape their papers to a sunny window with the objects facing the glass.
5. Leave the compositions in place for an extended period, preferably for several hours. The goal is to let the sun bleach the paper around the objects.
6. After the waiting period, help the children gently remove the tape and lift the objects off the paper. They will reveal a print made by the interplay of time and light.

Think and talk about
Why might paper with a stronger colour show the shapes better than a lighter coloured paper?
What do you think has happened to the colours to make them fade?

Next steps
For art, craft and design education inspiration and information, visit nsead.org.

At home
Look around at home. Are there any things that have been faded by the sun? What do you think is happening to the colours to make them fade?

Skills unlocked
Patience, creativity

Career options
Engaging in this activity sheds light on diverse career paths like:
- textile designer, tapping into pattern creation
- photographer, capturing moments in light.
It also paves the way for roles in science, such as:
- chemist
- colour technologist.
It also introduces the meticulous world of an art conservationist.
Instructions

1. Visit [www.seeandeat.org](http://www.seeandeat.org) and download the free Green Bean eBook. Read the Green Bean book with the children, introducing them to the vegetable’s life cycle.

2. Guide the children in planting their own green bean seeds. Dampen the paper towel and wrap it inside the small clear plastic pot. Place the bean between the towel and the pot’s edge, about a third of the way down.

3. Put the small pot in a warm, well-lit spot, and remember to keep the paper towel moist.

4. Once the bean shoot reaches above the pot with at least 2 leaves, transplant it into a larger pot. Only an adult must handle compost.

5. Have the children periodically complete activity templates to document each stage of the bean’s life cycle.

Watch out
- Children must wash their hands with soap and water after growing activities.
- Children must not touch their faces or put anything near their mouths during growing activities.

Think and talk about
- Do beans grow in the ground or on stalks above the ground?
- What time of year do beans grow? In which seasons do other vegetables grow?
- How might you prepare and cook beans to be eaten?
- How do other vegetables grow? Can you think of another vegetable that grows on tall climbing plants like green beans?

Next steps
Did you enjoy learning about the life cycle of a green bean? Why not check out some of our other SEE & EAT activities and resources which can be downloaded for free on [seeandeat.org](http://seeandeat.org). Or try growing another vegetable in the SEE & EAT book series.

At home
Research by the SEE & EAT team at the University of Reading shows that the more familiar children are with vegetables, the more likely they are to eat them when they appear on their plate. Why not read another book from our series and try to grow this vegetable at home? Remember to talk about the seasons and stages of growth!

Skills unlocked
Observant, patient

Career options
The skills required in this activity such as being observant, curious and recording information are similar to those needed in careers such as:
- scientist
- biologist
- gardener or plants person.
## SEE & EAT GROW A BEANSTALK
### RECORD SHEET OF GROWTH

<table>
<thead>
<tr>
<th>Lifecycle stage</th>
<th>Completed</th>
<th>Date</th>
<th>Photograph/drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed leaves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaves</td>
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<td></td>
</tr>
<tr>
<td>Flowers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bean pod</td>
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</tbody>
</table>
**Instructions**

1. Cut the Seasons Wheel template along the outer circle. Only adults should use scissors.
2. Explain the 4 seasons to the children, and provide them each with the arrow shape template. Explain the arrow will indicate the current season on the wheel.
3. Attach the arrow to the centre of the wheel for the children with the split pin, allowing the arrow to spin freely. Children must not use the split pins.
4. Distribute the sheets with the names of the seasons, characters, and trees that are provided. Explain that these labels will represent the different seasons.
5. Help the children to glue the names onto the Seasons Wheel, ensuring that they match each label to its correct section.
6. You could also cut out the seasonal characters and trees. Assist the children in gluing these elements around the wheel.

**Think and talk about**

- What is the weather like during different seasons?
- What is the weather like today and what season do you think it is?
- What clothes do you wear during different seasons?

**Next steps**

You can discover more about the world and its place in the universe by exploring our “Solar System Holiday” Early Years resources: [rmg.co.uk/schools-communities/teacher-resources/solar-system-holiday](http://rmg.co.uk/schools-communities/teacher-resources/solar-system-holiday).

**At home**

Encourage children to ask their family and friends what their favourite season of the year is and why.

**Skills unlocked**

- Observant, creative

**Career options**

The skills practised in this activity include problem solving and understanding the world around us. This can help develop the skills you need for lots of different careers, including:

- scientist
- teacher
- historian
- astronomer
- astronaut.
THE SEASONS WHEEL
ACTIVITY CARD

Make your own Seasons wheel by cutting around the circle and using a split pin to attach the arrow to the centre of the wheel (X marks the spot!). Cut and glue the names of the seasons to complete your wheel. You can decorate the wheel with our pictures, or you can draw your own! What kinds of things do you see each season?
POSTER COMPETITION

Children can get creative and enter the British Science Week annual, UK-wide poster competition! To enter, they simply need to create a poster which fits in with the theme of ‘Time’. Schools then select the 5 best creations and submit them for a chance of winning an array of prizes. The activities found in this pack marked with a paintbrush symbol could all be used as a source of inspiration to get children started!

2+ hours

Kit list

<table>
<thead>
<tr>
<th>Paper (A4 or A3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative materials such as:</td>
</tr>
<tr>
<td>pens</td>
</tr>
</tbody>
</table>

Instructions

Encourage children to think about time – what it means to them and how it relates to the science they’ve learnt about – to come up with ideas to include in their poster. Here are some points and questions to get you going:

- Get children to think about their own time – how do they spend it? At home, out playing in the park, arts and crafts, learning at school?
- What about time in the world, and beyond? How do we measure time – seconds, days, seasons, centuries?
- Are there any scientists they know of whose work relates to time?

Make your poster

Once they’ve done their thinking, it’s time for children to get creative! Posters must be A4 or A3 in size and you’ll need to be able to take a photograph of each one so it can be sent to us online for judging. Children can use pop-up pictures, pull out tabs or materials such as pencils, paints, crayons and paper to create their posters.

Send us your poster

Posters will be judged on creativity, how well they fit the theme, how well they have been made or drawn, and how engaging they are. Once a child’s poster is complete, take a photo of it and complete the online form to submit it as an entry.

Next steps

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