Use this guide to help you adapt the delivery of our cross-curricular schools' competition for different teaching settings, whether it's a fast-track option or STEM Club ideas!

Resource Navigation Guide
shell.co.uk/brightideascallenge
Shell has supported science, technology, engineering and maths (STEM) education for over 50 years in England, Wales and Scotland.

The Bright Ideas Challenge is part of our ongoing commitment to inspire more young people to pursue careers in science and engineering.

This cross-curricular competition invites secondary students aged 11–14 to imagine creative ideas to power the cities of the future, ensuring they are vibrant, healthy and clean places to live. The Bright Ideas Challenge aims to excite young people about how science, engineering and creativity can be combined to make a real difference to our world.

To enter the competition, you need to submit one Bright Ideas Entry Form per team alongside your Teacher Cover Sheet.

We’ve also created a suite of resources to help you and your students get the most out of the competition and submit strong entries.

**£45,000**

worth of prizes planned for 2020

**98%**

of teachers would recommend the competition to a colleague

**98%**

of 11-14 year olds enjoyed taking part in the Bright Ideas Challenge

**Not just for science teachers!**

Did you know that the programme has been developed to support cross-curricular learning and can be delivered in a number of subjects? To see how the competition is linked to the curriculum, visit page 5 of the Teacher Toolkit.

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge

Here’s what some previous participants have said about the competition...

“It most made me think about how we have a huge impact on the environment and how we need more energy.”

“I’m a bit of a converted scientist!”

“I saw my students on a number of lunchtimes working outside my room in their own time and that was just fantastic.”

“We’ve done a number of STEM initiatives, of which this one has been the most successful.”
This interactive guide is designed to help you match the competition resources to your teaching needs, whether you’re delivering the competition as part of lessons across different subjects, with limited time or over a period of several weeks.

Choose from the following routes to navigate through the different sections.

I am delivering The Bright Ideas Challenge...

- As part of my subject lessons
- As a STEM Club activity or enrichment day
- In a rush? Check out our fast-track options
- To contribute to my schools careers strategy

Looking for inspiration to kick start your students’ research? You can find top tips and topic overviews for inspiration in the Research Help section.

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
Delivering The Bright Ideas Challenge as part of a subject lesson

Simply follow these steps within your lesson time, whether that falls in science, design & technology, maths, geography or computing:

1. Sign up to our mailing list on the homepage. By registering your details, you’ll get access to our monthly updates; these are packed with the latest news and inspiration, both about the competition and our wider STEM offering.

2. Download the Teacher Toolkit, which provides step-by-step guidance for delivering the competition as part of class time.

3. The Teacher Toolkit will advise you on how to integrate the Student Workbook, Competition Videos and a Classroom Presentation into your lessons, alongside learning objectives and curriculum links for each lesson. The recommended approach for delivering the competition as part of class time is to run it across four full-length lessons.

4. When students are ready to submit their ideas, they’ll need to complete the Bright Ideas Entry Form (either digitally or handwritten), and you will need to fill in the Teacher Cover Sheet. Email these, plus any supporting materials, to shellschoolsteam@hopscotchconsulting.co.uk by Friday April 24, 2020.

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge

Tip: Don’t have enough time to deliver the competition across four lessons? Check out the fast-track route here.

Students looking for inspiration?
Check out the Research Help section for top tips and topic overviews to kick start their research.

Looking for STEAM resources?
The programme is designed to encourage the practical application of creativity and innovation. If you’d like to introduce an engaging, design-based element to your lesson, students can submit supporting materials in a range of formats, from drawings to models! See page 6 of the Teacher Toolkit for more information.
Running The Bright Ideas Challenge in a STEM Club or as an enrichment day

The Bright Ideas Challenge is an ideal STEM Club or enrichment day activity for students. The competition activities can be completed in as little as 2.5 hours or delivered over a number of hours depending on how you use the resources.

Zoe Thomson from Woodmill High School in Scotland delivered the competition with her students as part of an enrichment programme. Her students won £2,500 for their school, alongside a VIP STEM experience in London.

They spent their prize money on a weather balloon and an energy kit to help students make the connection between what they’re learning in the classroom and real-life context.

Read about how she delivered the competition, and turn over for some top tips to run your own enrichment day:

Case study: Bright Ideas enrichment days

“At Woodmill High school we enhance our STEM curriculum by including The Bright Ideas Challenge for all of our S2 pupils. Delivering the competition to the whole cohort ensures that everyone has the opportunity to think creatively about a sustainable future, not just the motivated pupils who attend our Science Club.

Over 3 days during term-time we take 240 young people off timetable (80 at a time) to work in groups in the hall using the resources. Four classes take part each day which allows their teachers to share in the experience. The groups work through the Student Workbook over three two-hour sessions, kicking off with Video 1: The Bright Ideas Challenge.

Students hand in their Bright Ideas Entry Forms for submission at the end of the final session or continue in their own time. Holding the sessions before Christmas allows students plenty of time to perfect their ideas before the deadline.

Zoe’s top tips

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
Running The Bright Ideas Challenge in a STEM Club or as an enrichment day

Zoe’s top tips:

1. Running the *ice-breakers* is a great way to engage students. We use an ice-breaker to spark inspiration at the start of each session – our learners loved the balloon car!

2. Use senior pupils as helpers/mentors during the tasks – they could even run a STEM Club after school or at lunchtime. This year, 12 of our senior pupils provided extra help during and after the enrichment days.

3. Invite a STEM ambassador in to enhance your session(s). They can dispel traditional stereotypes of engineering and reinforce the positive image that engineers are creative problem solvers. It’s also a great way of supporting your careers strategy by embedding interactions with employers or older students. Read more about how The Bright Ideas Challenge can support your careers strategy [here](#).

4. Encourage teams to complete further research in their own time to back up their idea and complete their submission. We set research tasks as homework based on the key areas highlighted in the *Bright Ideas Entry Form* and *Student Workbook*. You could also use the top tips and guidance [here](#) to kick start students’ research.

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
Fast-track routes for delivering the competition

Limited on time? Follow our suggested fast-track route to submit your entries!

1. Watch Videos 1-3 (approx. 4 mins per video) to introduce the competition and the types of areas of research students may want to focus on. Generate a short discussion around each.

2. Download the Bright Ideas Entry Form, using each of the sections of the form as the key focus areas to cover with your students. You may wish to use these for:
   - Prompts, to conduct research in their teams
   - Whole-class discussions
   - Homework for students, tackling each question in their groups (remember teams must consist of two to five students)

3. Watch Video 4 which explains how to complete and submit entries. In their groups, get the students to complete the Bright Ideas Entry Form if they haven’t already. These can be completed digitally or by hand.

4. Submit students’ completed Bright Ideas Entry Form(s), a completed Teacher Cover Sheet and email these, plus any supporting materials, to shellschoolteam@hopscotchconsulting.co.uk by 5pm on Friday April 24, 2020

Further food for thought: For inspiration on discussion points, you may want to use the Idea Generator Cards on page 20 of the Teacher Toolkit.

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
Exploring ways to deliver the competition as part of your careers strategy

At a glance
The competition can make a great tool for contributing to your schools’ careers strategy because…

It has been designed to align with elements of...
- The Gatsby Benchmarks in England*
- ‘I can’ statements in the Developing the Young Work Force Careers Education Standard in Scotland**
- Range and skills elements in the Careers and World of Work framework for Wales***

It’s flexible
The competition contributes to grounding STEM learning in a number of contexts, whether it’s a drop-down session, after-school clubs or within the curriculum. This guide explores the main options for delivering it in different settings.

It’s inclusive
Ideal for all ability groups, the resources can be differentiated easily in order to address the needs, interests and strengths of each pupil.

It’s simple and easy to deliver
The step-by-step nature of the resources makes it ideal to attract volunteers/STEM ambassadors who can provide career inspiration and encounters with employers.

It’s cross-curricular
The competition links learning to future careers across a range of subjects including science, computing, design and technology and geography.

Click through for an interactive contents table directing you to more detail on how The Bright Ideas Challenge can support your careers strategy.

For more information, visit:
* https://www.careersandenterprise.co.uk/schools-colleges/gatsby-benchmarks
** https://education.gov.scot/what-we-do/Developing%20employability%20and%20skills

All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
The Bright Ideas Challenge and your careers strategy: Contents

Click on one of the sections below to find out more detail on how the competition can support you to meet the careers strategy frameworks of the different nations.

<table>
<thead>
<tr>
<th>England – Gatsby Benchmark</th>
<th>Scotland – I can statement</th>
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▶ I can investigate and assess ethical issues in business and trade decisions | ▶ Deliver key skills and other skills required by employers  
▶ Use a variety of sources to search for information about a range of work and learning opportunities |
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▶ I can demonstrate diverse thinking when exploring opportunities and pathways | ▶ Describe their abilities, interests and skills  
▶ Consider their own and other people’s ideas about learning, careers and the world of work to inform opinions and decision |
| ▶ Linking curriculum learning to careers | ▶ I can choose a blend of subjects, courses and experiences to enable my careers pathways  
▶ I can evaluate risks when developing a business idea and explore different methods in setting up and sustaining an enterprise | ▶ Use what they have discovered about themselves, learning and work in decisions about individual Key Stage 4 pathways  
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All resources referenced on this page can be downloaded at shell.co.uk/brightideaschallenge
The Bright Ideas Challenge and your careers strategy

How The Bright Ideas Challenge supports these areas...

The resources ask students to use solid research and draw on external sources for evidence and analysis; within this, reference is made to looking at the roles different professions and organisations can play in solving real-world challenges. This is combined with a further all-important business context by mirroring the work done by the Shell Scenarios team, who imagine the energy challenges future cities may face.

- Use Question 2 of the Bright Ideas Entry Form to get students thinking about the types of jobs they would need to make their ideas a reality. The Q2 ‘tip’ section encourages them to consider the different experts, businesses, governments or technologies who may need to work together to make their solution happen. The starbursting activity on page 10 of the Student Workbook also gets students thinking about who could help them with solving their problem. Are there any businesses or organisations in their local area that might already offer those kinds of jobs?

- The above activity could be followed up with a research task with students drawing on labour market information online. Encourage students to reflect on the skills they have developed through the competition, as well as the organisations and careers they have explored, to research pathways and inform their own career goal-setting. Work completed could be shown at parents’ evenings to encourage families to access information about labour markets and study options their children may want to pursue.

- Use the Video 1: The Bright Ideas Challenge and the Scenarios Team case studies on page 5 of the Student Workbook and page 12 of the Teacher Toolkit to show students how asking big ‘what if’ questions and researching solutions to these relate to real careers in science and engineering. The case studies on pages 12-13 of the Student Workbook and page 17 of the Teacher Toolkit include detail on the further studies individuals chose to reach their professional goals.

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The Bright Ideas Challenge and your careers strategy

How The Bright Ideas Challenge supports these areas...

The competition can be delivered in a flexible, cross-curricular way and asks students to reflect on the different roles and strengths they bring to the team. This allows individuals to contribute in a way that is suitable for their abilities. It also showcases a range of real, diverse and aspirational career case studies to challenge stereotypical thinking and provide positive role models.

- The diverse career case studies on pages 5, 12 and 13 of the Student Workbook are a great place to start for inspiring students about the variety of exciting roles in STEM. These can also be showcased to the whole class using the Classroom Presentation
- The judging criteria highlighted on page 3 of the Student Workbook can be used to outline the range of skills and knowledge required: creativity, solid STEM research, quality of presentation, collaboration and project management. Video 4: Share your bright idea further reinforces the different skills and abilities students developed as members of a team e.g. creative thinker, problem solver, tech whizz etc.
- Explore the other sections of this guide to find ways of delivering the competition which suits your school and students
- The Student Workbook activities encourage students to explore different methods of learning, including mind-mapping and starbursting, to see the wider picture

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The Bright Ideas Challenge and your careers strategy

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How The Bright Ideas Challenge supports these areas...

The resources offer real life examples of inspiring scientists and engineers, helping students relate the skills they learn from taking part in the competition to STEM careers. The competition is also fully cross-curricular and so highlights the range of subjects that can link to STEM, beyond the conventional areas students may expect.

- Use the cross-nation curriculum links highlighted on page 5 of the Teacher Toolkit to showcase the relevance of STEM to a wide range of disciplines – you could ask students to consider the different STEM careers these subjects could lead to, or generate discussion around any of the subjects they wouldn’t have expected to see.

- Students who identify more with creative or artistic subjects can submit supporting materials such as films, computer generated visuals and prototypes. Why not get students to present their idea development as they would for a science and engineering exhibition, and display entries at parents’ evenings? This gives students a taster of how science communication is used in the world of work, and encourages those with a more creative mindset to showcase their skills, build their confidence and see the link between STEM and their abilities.

The competition encourages students to use SWOT (strengths, weaknesses, opportunities, threats) analysis and to outline the solutions they explored and dismissed. This reflects methods used in the real world of work.

- SWOT analysis work can be found on page 11 of the Student Workbook

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## How The Bright Ideas Challenge supports these areas...

As part of their prize, finalists will get to take their bright ideas to the next level in a professionally facilitated prototyping session. This hands-on workshop using real-world design and engineering skills offers a fantastic further opportunity to collaborate with real engineers and designers, providing an unforgettable STEM experience and insight into the exciting range of careers available in this sector.

The competition is part of Tomorrow’s Engineers Energy Quest, a programme that also offers an in-school practical workshop which benefits from the support of a volunteer.

- Find out about Energy Quest in your local area at [tomorrowsengineers.org.uk/energy-quest](http://tomorrowsengineers.org.uk/energy-quest)
- Deliver a drop-down session and invite volunteers or STEM ambassadors to come in and support students with their entries. This could be done through your school’s business networks, parental body, alumni or other organisations like STEM Learning – more information can be found on page 21 of the [Teacher Toolkit](#)
- Speak to a local university with a STEM outreach programme about supporting your cohort with entering the competition – the resources are step-by-step and designed to be easily delivered by a number of different parties

All resources referenced on this page can be downloaded at [shell.co.uk/brightideaschallenge](http://shell.co.uk/brightideaschallenge)
Research help: Teacher guidance

These pages are designed to support you and your students complete The Bright Ideas Challenge, providing top tips and topic overviews for inspiration.

Tips to support your students with their research

- Encourage students to be specific about what they would like to search for in order to make the most of their research time. Entries will be judged on how well students’ ideas are backed up with relevant scientific knowledge and/or technical information.

- That being said, the competition is deliberately broad to encourage young people to draw on a range of transferable skills, including creativity, problem solving and teamwork. It’s important that they bring a range of skills, as a team, to make sure they devise a high-scoring entry (see the judging criteria on page 4 of the Teacher Toolkit).

- If teams are gathering information from newspaper articles or blog posts, encourage students to think about who wrote them, whether it is a primary or secondary source, and if the source is reliable, biased or outdated.

- If your students don’t have access to computers, or if you are running The Bright Ideas Challenge as an enrichment day for a large number of students, why not print out a few articles on each topic using the ‘things to search for’ and share these with the groups to boost their thinking (you can find guidance on running the competition as an enrichment day here).

- If you are running the competition in lesson time, research can be set or completed as homework if there isn’t enough time. Remind students to use their Project Plan to assign different research tasks to different team mates.

Share the following pages with your students to help them kick start their research.
Research help: Student guidance

Tips to level up your research and become a top researcher

- Decide on the energy problem you want to explore and, before you get started, write down a few relevant questions that you want to answer.
- Be clear about what you would like to know – this will make it easier to find information about your chosen subject.
- There’s lots of information on the internet but don’t ignore textbooks or your school library – they might also have the information you need.
- Try to use primary sources wherever possible – these are documents or pieces of information that were created by someone who had direct experience of the event. Primary sources can include autobiographies, interviews, photographs and scientific data from experiments.
- Look at the source before you click through to a website/start reading a book – is it a newspaper or company website? Is there a personal reason why the source was created, for example it helps a company sell a product? When was it written? Do you trust that the information is up-to-date and reliable?
- Make sure you write down the links and names of sources you use, so you can easily find them later if you need to.
- Remember to stay safe online and don’t give out any personal information. Ask your teacher if you don’t know whether a website is safe and don’t click on anything you’re not sure about!

Not sure where to start? Take a look at the topic overviews for inspiration.
### Research help: Student guidance

Not sure where to start? Take a look at the following topics for inspiration:

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- **Air pollution** is where gases or particles in the air cause environmental or health problems to living organisms, e.g. acid rain and respiratory disease such as asthma.
- Burning fossil fuels, through activities such as driving your car and running power stations, releases these gases into the air. As populations grow, demand for energy grows and this could lead to more pollution.

- **Renewable energy** is energy generated from a source that doesn’t run out. Fossil fuels are a ‘finite’ source of energy, meaning there is a limited amount of them on the planet. This means we need to use more renewable energy to power our lives.
- With demand for energy increasing, we need to develop the way renewable energy is generated in order to produce more energy while emitting less CO₂.

- **Food waste** can happen during the production, processing, selling and consumption of food. It is when excess food can’t be or isn’t used and therefore has to be thrown away. Waste food often ends up in landfill where it produces a greenhouse gas called methane.
- With a growing population, more food will be produced and sold, so we need to develop more sustainable methods of processing food waste.

**Things to search for**

- **Carbon capture**, air pollutants, cleaner energy technologies, air purifying plants, clean air zones, minimising carbon emissions, bacteria and microbes that clean up pollution, greenhouse gases.
- **Solar power**, hydropower, tidal energy, affordable energy, future power generation, future energy mix, reducing greenhouse gas emissions, wind turbines, geothermal energy.
- Recycling food waste, bioreactor, biofuel, invisible water, waste to energy, low water food.
Agriculture means farming. It includes growing and harvesting crops, and raising animals. The agricultural industry produces goods and services required by the world and distributes them to consumers.

Future cities will need more goods, services and food than ever before and this will put greater pressure on our climate. As the population of the planet grows, there will be more demand for food but less space to grow the food in.

Things to search for
- Vertical farming, urban farming, hydroponics, aeroponics, sustainable agriculture, textiles of the future

Transport can mean any method of moving people or goods from one place to another. Currently lots of people own cars, however by 2040 the UK government will end the sale of new petrol and diesel cars.

Electric cars, vehicle sharing schemes and public transport can all help reduce the energy used by transport, but other efficient ways of travelling will be needed.

Things to search for
- Electric bikes, electric charging points, human energy, gyro-based technology, piezoelectric generators, kinetic energy, low-carbon transport, policy to reduce car ownership

Technology is all around us and impacting the way we live our lives. Cities of the future will need new technologies to reduce the quantity of energy their populations use.

Our devices currently have lots of functions from playing games, getting us from A to B, watching movies and taking photographs. How could technology be used to help the cities of the future be more energy efficient?

Things to search for
- Smart meters, energy saving apps, technology for saving energy, technology for the future, smart power strips, carbon calculator

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