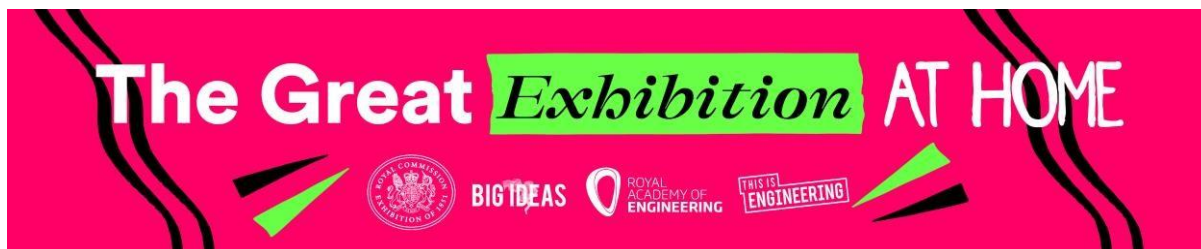


## THE GREAT EXHIBITION AT HOME



<https://www.big-ideas.org/join1851/>

In the spirit of Prince Albert's original Great Exhibition, which showcased the most exciting Victorian technology and inventions from 1851, students across the country will take part in engineering challenges and create their own Great Exhibitions at home!

For this year's challenge, participants are asked to submit a 1 minute video presenting their Great Exhibition at Home, which tackles the question:

*How can engineering help protect the planet?*

Take part in The Great Exhibition at Home Challenge to be in with a chance of winning fantastic prizes including: £500 worth of equipment to supersize STEM subjects in your school, the opportunity to video chat one with one of our inspiring engineers and more!

From the start of the Summer Term Big Ideas will be running 7 weeks of virtual engagement and support that you and your students can take part in, this engagement will focus on one set of challenge worksheets each week. Teachers, parents and carers can keep updated with our weekly Great Exhibition at Home by signing up, OR download your digital resource pack and weekly worksheets now if you'd like to get started right away and complete the challenges at your own pace.

Join our Facebook community, a group for teachers to share ideas and ask questions about the challenges throughout the project. If you would like to be a Great Exhibition Champion and have your school's work featured, then get in touch by emailing [1851@big-ideas.org](mailto:1851@big-ideas.org)

**The deadline for entries is July 2020.**

### STEM Ambassadors

***Can you produce a 1 pager  
to show how you protect  
the planet in your job – to  
inspire our young people?  
Send them to us please!***

# ROYAL ACADEMY OF ENGINEERING

<https://www.raeng.org.uk/education/stem-at-home>

Take a look at the fantastic range of resources on the Royal Academy of Engineering website – projects that can be undertaken in groups remotely, within families or individually.



## Maths magic

Explore a variety of magical maths activities from multiplication tips to card tricks. Did you know that maths can help you read minds?

Using mathematical reasoning (no prior knowledge needed!) find out the shoe size and age of your friends and family members. Learn about the maths behind card tricks use your fingers to do some quick multiplication.



## Majik water

### Majik water video guide

The activities in this booklet are inspired by a project to supply clean drinking water to communities in Kenya.

Learn about an innovation that harvests water from the atmosphere and explore this idea at home by building your own mini water cycle.



## Are we connected?

Are we connected? explores engineering through the technology we communicate and connect with.

Through enquiry and practical activity learn about the electromagnetic spectrum; 'find your friends' on a map of the UK and Ireland using trilateration; consider the ethics around AI technology; use algorithms to build shapes using tangrams; program a virtual Sphero ball; and use code-breaking skills to decrypt text.



## Power up!

Power up! looks at different types of energy, the importance of electricity and how it is generated. It investigates different types of renewable energy sources through a number of hands-on practical activities.

Create a circuit to investigate energy transfers using different objects you might have at home, design and build your own Rube Goldberg machine and build a mini wind turbine using recycled material.



## Light saver

### Light saver video guide

Light saver investigates how properties of light have been used to develop a new light-based technique to help diagnose and monitor the health of babies' brains. The resource looks at the visible light spectrum, nanometres, behaviour of light and health monitoring.

Discover the interactive tool 'Scale of the universe' and compare light waves with double-decker buses, human and a grain of rice. Investigate how light behaves, interacts with our bodies and used in medical engineering through a number of experiments that just need a torch, water, food colouring and gummy bears.

# PRACTICAL ACTION – Home Learning Guides



<https://practicalaction.org/schools/home-learning/>

The fantastic Practical Action have pulled together their top learning at home resources that we hope will inspire you and your children during the lockdown period. Each activity links to areas of the formal curriculum in the UK and gives your children the opportunity to learn about real world issues.

Their STEM challenges are very popular activities as they engage children in developing their own solutions for real life problems. For example, the Floating garden challenge invites children to make a model of a garden that floats so that farmers can grow crops on flooded land. Practical Action has developed home learning guides as guidance for parents and carers for some of the STEM challenges and will be adding more shortly. Including the aptly themed 'STOP THE SPREAD' STEM challenge.

All can be used to gain a CREST Award, go to the CREST website to find out more at

<https://www.crestawards.org>

## STEM Challenges

<p><b>Beat the flood</b></p>  <p>Flooding due to climate change can have a devastating effect on people's lives. Set on the fictitious island of Watu, pupils explore how STEM skills can be used to help communities be better prepared for flooding.</p> <p><a href="#">Find out more &gt;</a></p>	<p><b>Squashed tomato challenge</b></p>  <p>This is a STEM Challenge where pupils take on a real life problem affecting people in Nepal, designing and building a model to move tomatoes down a mountain and over a river, so they can be sold at the local market.</p> <p><a href="#">Find out more &gt;</a></p>	<p><b>Floating garden challenge</b></p>  <p>Pupils will learn about the difficulty that farmers in Bangladesh experience trying to grow crops on land that is regularly flooded, and are challenged to make a model of a garden that can float to enable farmers to grow their crops on.</p> <p><a href="#">Find out more &gt;</a></p>
<p><b>Regreen the desert</b></p>  <p>The challenge inspires pupils to develop ideas to address a real life problem caused by climate change. Their challenge is to capture rain water to irrigate crops for a community living in North Darfur, Sudan.</p> <p><a href="#">Find out more &gt;</a></p>	<p><b>Stop the spread</b></p>  <p>Infectious diseases are a global problem and cause millions of deaths each year. This STEM challenge enables pupils to research the problem to design a hand washing devise and education materials for a primary school in Kenya.</p> <p><a href="#">Find out more &gt;</a></p>	<p><b>Ditch the dirt</b></p>  <p>Set in Turkana in Kenya where for two out of three people do not have access to clean drinking water, this activity enables pupils to investigate ways of making dirty water cleaner and safe to drink, through sieving and filtering.</p> <p><a href="#">Find out more &gt;</a></p>

## STEM LEARNING – At Home Resources



<https://www.stem.org.uk/home-learning>

To support parents and carers with home learning, our subject experts have put together a selection of activities and materials, all of which are completely free for everyone to access.

For teachers and educators: explore free resources, guidance and professional development opportunities to help you to continue educating young people while they are at home.



**NOTE:** If you need any help, STEM Learning subject experts are available weekdays from 8:30 am to 4.30 pm via their webchat, which you can find in the bottom right-hand corner of all webpages.

Primary

Secondary  
biology

Secondary  
chemistry

Secondary  
physics

Secondary  
computing

Secondary  
D&T

Secondary  
maths

Post-16



## ROYAL INSTITUTION :

### Make Your Home a Science Lab



<https://www.rigb.org/families/experimental>

ExpeRimental from the Ri brings you a series of short films making it fun, easy and cheap to do science experiments at home with your children.

## LONDON SCIENCE MUSEUM :

### STEM resources for remote teaching



#### FREE ACTIVITIES AND RESOURCES

Bring the wonder home and explore science and maths with our hands-on activities the whole family can do together.



#### PLAY OUR GAMES AND APPS

Play our free games, such as Total Darkness and Launchball, and discover more about how science and maths affect the world around us.

<https://learning-resources.sciencemuseum.org.uk/>

Explore the London Science Museum's fascinating scientific stories, objects in 3D, engaging videos and home teaching activities. Get stuck into mini challenges and kitchen chemistry experiments.

# BRITISH SCIENCE ASSOCIATION



New British Science Association Library of Home Learning Activities

<https://collectionslibrary.crestawards.org/>

Have a browse through the home learning projects and CREST Challenges. These have been selected to be used at home with parental support or set as teacher facilitated distance learning.



Star Home Learning



SuperStar Home Learning



Bath bomb challenge



Make your own fizzy drink



What makes bread rise

## THE MET OFFICE



<https://www.metoffice.gov.uk/weather/learn-about/met-office-for-schools/other-content/diy-activitiesand-experiments>

Explore bitesize, hands-on activities to use in the classroom or do at home during lockdown.

## NATWEST – Money Based Activities



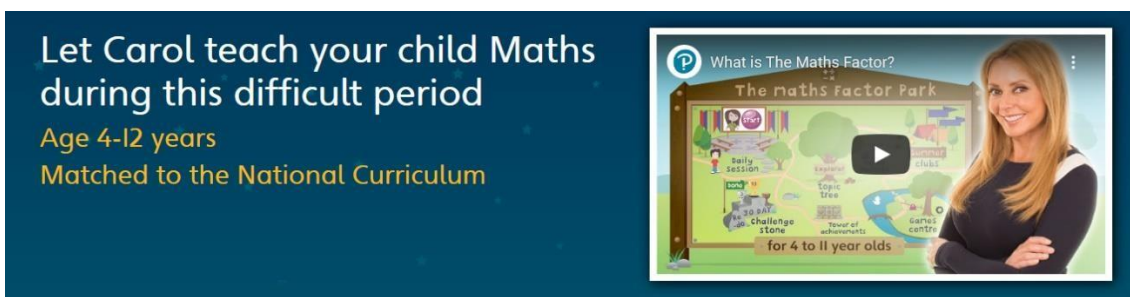
**MoneySense – a free financial education programme for 5-18s**

With fun activities, games and resources that help teach children about money at home, as well as in schools.

<https://natwest.mymoneysense.com/home/>

These free, fun, interactive learning activities and games are a great way to introduce the concepts of money to young people.

## THE MATHS FACTOR



Let Carol teach your child Maths during this difficult period

Age 4-12 years

Matched to the National Curriculum

What is The Maths Factor?

The maths factor Park


for 4 to 11 year olds

<https://www.themathsfactor.com/>



## BBC Bring the Noise

**Bring the Noise**




**I AM A ROBOT**  
**SING, SIGN & DANCE**

**I am a Robot sing, sign and dance challenge**

Your chance to feature in a Bring the Noise music video and learn three skills at the same time.


CHALLENGE



**Music for Key Stage 1**

Classroom resources and teacher guides for music teaching in primary schools with children aged five to seven-years-old.

KS1



**Music for Early Years**

Classroom resources and teacher guides for music teaching with primary school children aged four to five-years-old.

EYFS

<https://www.bbc.co.uk/teach/bring-the-noise>

The BBC Bring the Noise website has a huge amount of brilliant interactive musical resources. Why not start with this one about 'Found Sounds' <https://www.bbc.co.uk/teach/bring-the-noise/foundsounds/z7k847h> and get creative with musical instruments you can find around the home !

## JAMES DYSON FOUNDATION

186,000 engineers will be needed annually in the UK through to 2024. But, to inspire the engineers of tomorrow, we need to show young people that engineering is relevant - and exciting. Our free resources do just that.

<https://www.jamesdysonfoundation.co.uk/resources.html>

Here at STEMFirst we LOVE the James Dyson Foundation STEM Resources. There are some great Careers information for schools and parents, but also the fantastic set of CHALLENGE CARDS which contain a range of STEM challenges that can be done individually, as families or could even be used



to set up a virtual competition. Download them for free at:

<https://www.jamesdysonfoundation.co.uk/resources/challenge-cards.html>

CHALLENGE CARDS

## ARE YOU READY FOR A CHALLENGE?

Can you skewer a balloon without popping it? Coat a nail in copper? What happens when you plug a clock into a potato?

DOWNLOAD CHALLENGE CARDS



## INSTITUTE OF PHYSICS - Marvin and Milo



<http://www.physics.org/marvinandmilo.asp>

Explore physics the exciting way, by trying out simple and fun experiments using resources that you can find around the home. There are loads to try!

## POLAR EXPLORER



<https://www.stem.org.uk/welcome-polar-explorer-programme>

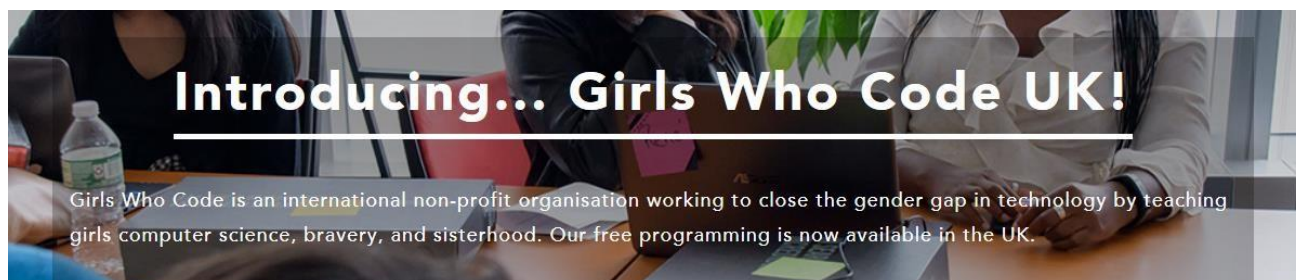
The Polar Explorer programme encourages and supports schools who are keen to raise aspirations and attainment in science, technology, engineering and mathematics (STEM) and aims to inspire the next generation of scientists and engineers.

Plan for an expedition to the Antarctic.

Design and create the best snowshoes.

Whether you are a school, educator or potential Polar Ambassador, discover free resources, further information about the programme and how to get involved.

## GIRLS WHO CODE: At Home Activities



<https://uk.girlswhocode.com/>

We know that parents, educators, and girls are looking for support and connection during these challenging times. In response to the COVID-19 pandemic, Girls Who Code is making CS educational activities available for download free of charge, to anyone who wants to access them.

They will release activities weekly — some online, some offline, of varying levels of difficulty—over the course of the next few months. Each activity will include a feature of a woman in tech who pioneered innovative technology.



## VIRTUAL HIKE

*Difficulty Level: Intermediate-Advanced*

In honor of Earth Day this week, we encourage you to explore and celebrate some of your favorite places in the outdoors. Where would you like to go and what would you want to do and see on your outdoor adventure? In this tutorial, learn how to use JavaScript to create a virtual hike, so you and your friends can visit a national park, explore a state park, or even travel to a different country! The possibilities are endless!

DOWNLOAD THE ACTIVITY

## ALGORITHMIC ARTIST GAME

*Difficulty Level: Beginner*

We love games! Not only are games a great way of connecting with other people, but they are also a chance to be playful and adaptive in the face of a challenge. In this unplugged game, you will create algorithms – or instruction sets – by telling a player how to recreate a drawing you made. In a program, algorithms are how we communicate to the computer what we want it to do. Once you've played a few rounds, we'll show you how to mod the game to make it your own!



DOWNLOAD THE ACTIVITY

# MISSON X

Train like an astronaut for families!



[https://www.esa.int/Education/Expedition\\_Home/Train\\_like\\_an\\_astronaut\\_challenges](https://www.esa.int/Education/Expedition_Home/Train_like_an_astronaut_challenges)

It's time to get up, move our bodies, and train like an astronaut!

Every two weeks Misson X participants receive a new physical activity challenge to practice your agility, endurance, coordination, and strength- just like real astronauts need for their missions.

# RAISING ROBOTS

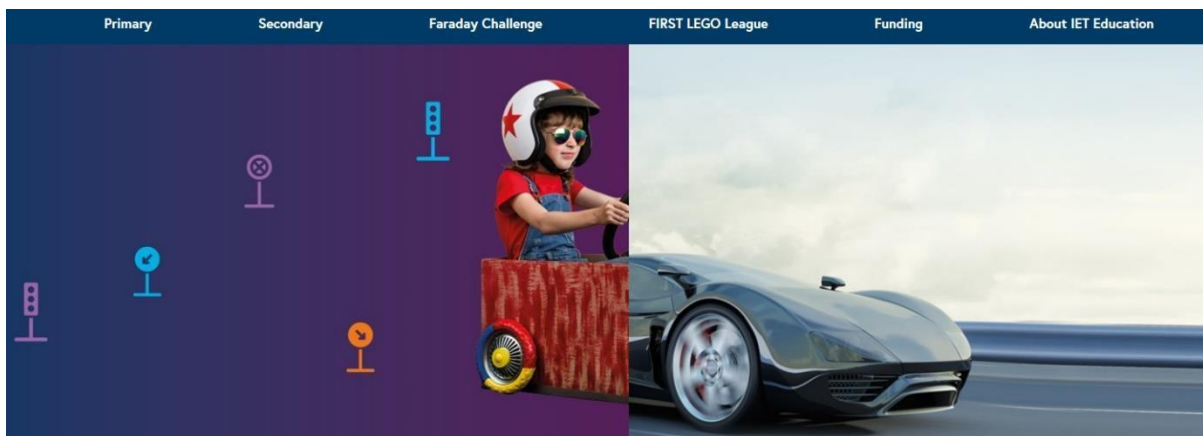


Raising Robots Challenges - <https://raisingrobots.com/keep/>

For those lucky people amongst us that can get their hands on LEGO MINDSTORMS robots – take a look at these fantastic free challenges from the wonderful people at Raising Robots.

Get ahead with understanding the challenges for either Tomorrows Engineers Robotics or First LEGO League and maybe your team/school could win in the national competitions next year!

## INSTITUTE OF ENGINEERING AND TECHNOLOGY (IET)

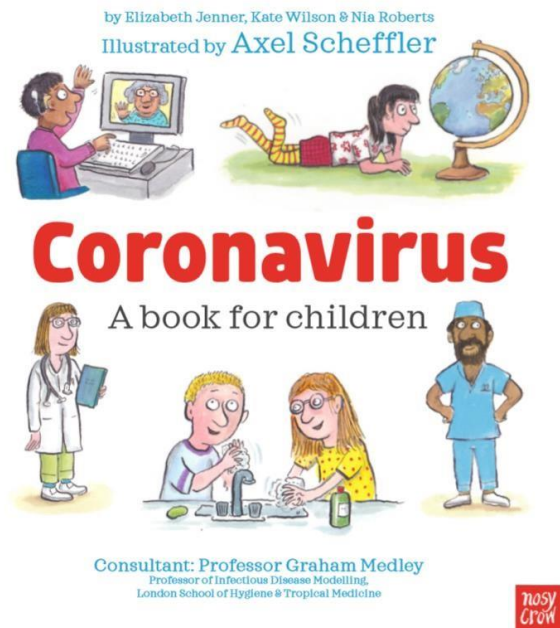


<https://education.theiet.org/campaigns/look-at-me-now/>

Brand new activities, games and resources to have a go at with your children! Get creative, invent and consider engineering as a possible and real future career.



# NOSY CROW – CORONAVIRUS BOOK FOR CHILDREN



<https://nosycrow.com/wp-content/uploads/2020/04/Coronavirus-A-Book-for-Children.pdf>

Axel Scheffler (Gruffalo fame) has illustrated a digital book for primary school age children, free for anyone to read on screen or print out, about the coronavirus and the measures taken to control it. Published by Nosy Crow, and written by staff within the company, the book has had expert input: Professor Graham Medley of the London School of Hygiene & Tropical Medicine acted as a consultant, and the company also had advice from two head teachers and a child psychologist.

The book answers key questions in simple language appropriate for 5 to 9 year olds:

- What is the coronavirus?
- How do you catch the coronavirus?
- What happens if you catch the coronavirus?
- Is there a cure for the coronavirus?
- Why are some places we normally go to closed?
- What can I do to help?
- What's going to happen next?

## DIGITAL MAKING AT HOME



Let's make some music!

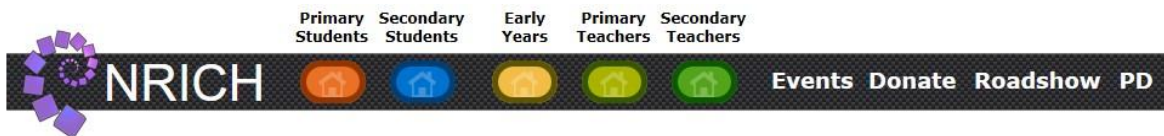


Celebrating Earth Day with code

[https://www.raspberrypi.org/at-home/?utm\\_source=codeclub&utm\\_medium=covidbanner&utm\\_campaign=dmah](https://www.raspberrypi.org/at-home/?utm_source=codeclub&utm_medium=covidbanner&utm_campaign=dmah)

Join the Raspberry Pi Foundation team as we code and create projects at home. Every Monday we'll share a theme that will inspire you to have fun, solve problems, and express yourselves creatively with technology. Code along with us or create something on your own.

## NRICH MATHS RESOURCES

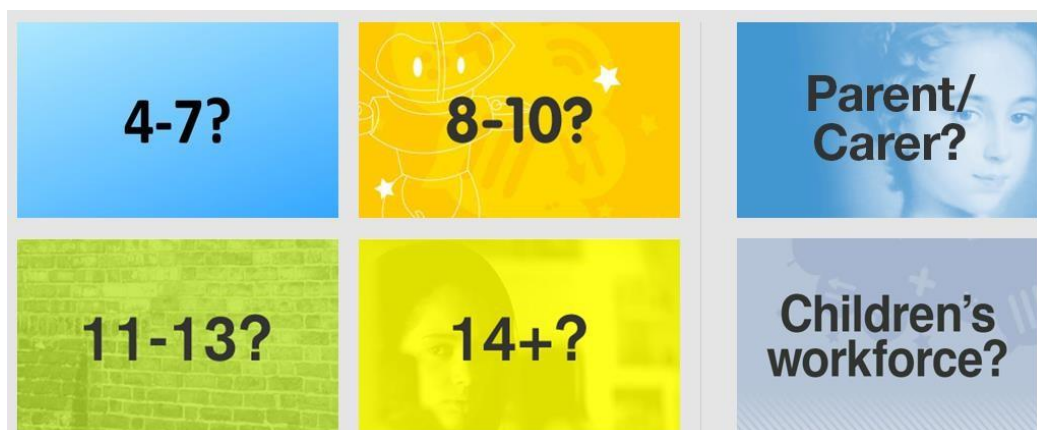


### stemNRICH

<https://nrich.maths.org/stemrich>

stemNRICH is a collection of resources exploring the maths involved in STEM. These are some great challenges for students to do in teams, to use as teaching resources, for family challenges and just to exercise those brain cells!

## THINKUKNOW – Online Safety



<https://www.thinkuknow.co.uk/>

Thinkuknow provides advice from the National Crime Agency (NCA) on staying safe online. You can follow the above link to appropriate advice and guidance for each of the above age groups.

## STEM Learning Course: Running STEM Clubs Online



<https://www.stem.org.uk/cpd/ondemand/467561/running-stem-clubs-online>

STEM Learning have introduced an online course for teachers, educators, parents or STEM Ambassadors who want to run a STEM Club remotely or online.

The course takes place over one week through an online community group on the STEM Learning website, with a total duration of two to three hours. The course pages will remain open for access for 10 weeks.

If you would like to book, you can complete the steps at any time during the week and at the end of the week you will be directed to a 30 minute webinar/teach-meet where you can ask questions and

discuss ideas arising during your learning. There are various start dates available so there's sure to be one that's convenient for you to join!

**Dates:**

**04 May 2020 18 May 2020 01 June 2020 15 June 2020 29 June 2020 13 July 2020**

For STEM Club resources go to :

<https://www.stem.org.uk/stem-clubs/featuredresources>

## THE GREAT BUG HUNT 2020



<http://www.schoolscience.co.uk/bughunt>

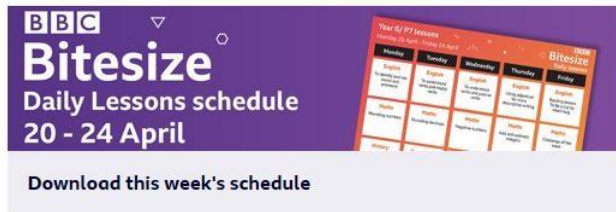
Due to the closure of schools, we have opened up this competition to all primary school children (and their parents!)

Our challenge is pretty simple – take your children into the garden or any outside space you own and see what bugs they can find!

Simply point them at the nearest hedges, flower beds, trees, long grass, logs, stones, rocks (well, you get the picture)... let them explore and then report back to us what they have found.



## BBC bitesize



<https://www.bbc.co.uk/teach/bitesize-daily-schedules-teach/zdtwjhv>

You and your students can now access regular daily lessons from BBC Bitesize in English, maths and other core subjects, on the BBC Bitesize website and also in special programmes broadcast on BBC iPlayer and BBC Red Button. Regular daily lessons for students up to Year 10.

## CBEEBIES – Bitz and Bob



<https://www.bbc.co.uk/cbeebies/shows/bitz-and-bob>

Bitz & Bob create amazing things for their toys to play with and then bring their stories, ideas and toy friends to life through the power of their shared imaginations.

Helen from STEMFirst has been the Engineering Consultant for this show since its inception – and we can highly recommend watching with your younger children, making the STEM contraptions and trying to solve the challenges yourselves. Get involved and help inspire about STEM and Engineering from a very early age!

# STEM Ambassadors

Finally let's talk about our STEM Ambassadors!

STEM Ambassadors are an incredible resource. They are inspirational people from industry and STEM backgrounds who can support your schools with anything STEM related.

STEMFirst is one of 19 STEM Hubs in the UK, and we look after the STEM Ambassadors in Lancashire and Cumbria.

Take a look at our statistics from last year:



Though we do not expect any face-to-face links over the next months, our STEM Ambassadors are still available for on-line support. Have a look at our website for more information

[www.stemfirst.com](http://www.stemfirst.com)