





SCHOOLS PROGRAMME

SCIENCE SHOWS AND WORKSHOPS



BOOK NOW: 0131 553 0321

generationscience.co.uk



GENERATION SCIENCE POWERED BY EDF ENERGY

EDF Energy is proud to be a sponsor of *Generation Science*, a programme which successfully brings science, technology, engineering and maths [STEM] into local communities by educating young learners about the wonders of science.

We are committed to investing in the next generation of Scottish minds. In 2018 we welcomed over 1,300 young people to our hands-on STEM workshops at Edinburgh International Science Festival and we were able to help thousands of families learn more about low-carbon living through our involvement in the *Ecoville* exhibit in Edinburgh city centre.

Each year, EDF Energy welcome thousands of schoolchildren through the doors of our visitor centres at Hunterston B and Torness, where our guides talk them through how electricity is made before taking them on a tour to the heart of the power station.

Our *Pretty Curious* programme aims to inspire teenage girls to pursue a career in STEM through workshops and online resources. In addition to this, our online education programme, *The Pod*, provides free curriculum linked resources and runs national campaigns on energy, science, sustainability and youth social action for 4–14 year olds, reaching over half the schools in the UK.

We are excited to be working with Edinburgh International Science Festival, an organisation that is committed to inspiring and educating the next generation with STEM.

BOOK NOW: 0131 553 0321

'An outstanding workshop delivered by knowledgeable enthusiastic team members! An excellent, fun introduction to programming!'

TEACHER. CHAPLETON PRIMARY SCHOOL

'High quality, well organised resources. The two presenters were enthusiastic, fun and knowledgeable. Good rapport with the young children. Impressed by what was achieved in the session.'

TEACHER, TARLAND PRIMARY SCHOOL

'Absolutely fantastic! Cannot suggest any improvements - everything from presenter and resources to content and information were amazing! Best science show we have had! HUGE thank you!'

TEACHER, ST JOSEPH'S PRIMARY SCHOOL, EDINBURGH

'A great morning for all! The pupils thoroughly enjoyed the workshops, as did the staff and we all learnt a lot. Would highly recommend to others.'

TEACHER, MINISHANT PRIMARY SCHOOL

'An absolutely fantastic session. Resources were awesome, staff were wonderful - so organised and enthusiastic and had rapport with our kids. Excellent session, very well received and can't wait to welcome you back for the next sessions booked.'

TEACHER, CARSTAIRS PRIMARY SCHOOL

HELLO AND WELCOME TO THE 2019 GENERATION SCIENCE PROGRAMME

We bring unique and inspiring science lessons direct to your school with interactive shows and hands-on workshops.

As the UK's largest science education outreach provider, we visit schools all over Scotland, inspiring young learners with the wonder of science and its real world applications. Our vision is of a world where the value of science and technology is recognised and celebrated, in order to achieve a brighter and more sustainable future. Through *Generation Science* we aim to improve the provision of science education in Scottish primary schools and support teachers to deliver the Curriculum for Excellence.

I'm delighted to present an exciting programme of activities for our 2019 schools tour, including fan favourites: *Smart Grid* and *Robo Constructors*. From getting started with coding to uncovering the science of sound, learning about the human body or exploring the solar system, all our educational shows and workshops have been specially designed to bring science to life and leave your pupils informed, inspired and engaged.

Spring touring dates are **28 January** to **22 March** and our summer tour runs from **29 April** to **24 May**.

Please get in touch with us to discuss your needs and book early to ensure you get your first choice of dates.

Best wishes



Joan Davidson
Generation Science Manager

WHAT CAN YOU EXPECT FROM GENERATION SCIENCE?

- A fun, interactive environment where everyone gets out of their seats and gets involved
- Exciting demonstrations explaining key concepts in a unique and memorable way
- Fully equipped workshops delivered by expert science communicators
- All activities are linked to the Curriculum for Excellence
- Handy teacher resource packs
- Flexible bookings. We come to you when you want us to!
- Support for science weeks, transition projects or individual science days

BOOK NOW!

Call our team on **0131 553 0321** or email generationscience@scifest.co.uk.



DOWNLOAD OUR TEACHER RESOURCE PACKS

Visit generationscience.co.uk to find notes with ideas to help you further explore the science behind our activities.



CFE STRAND

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ACTIVITY NAME	DESCRIPTION
Little Giants	A highly interactive show that takes pupils into the wonderful and vital world of bees
- Day or Night?	An entertaining storytelling show looking at the Sun, Moon and Earth
Space Base	An out-of-this-world show where pupils travel through time and space in a digital planetarium
Smart Grid	An interactive show that looks at how we generate, distribute and use electricity
Bricks and Blocks	A hands-on workshop where pupils get started with coding in a robot sports training camp
LEGO [®] Mindstorms	A fun, challenging and engaging programming workshop where LEGO° robots come to life
Robo Constructors	An interactive hands-on robot building workshop
Body Builders	A fast-paced and funny show where pupils learn how the human body is put together
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Body Builders Get Fizzy	A fast-paced and funny show where pupils learn how the human body is put together A highly interactive chemistry workshop that always gets an amazing reaction
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Get Fizzy	A highly interactive chemistry workshop that always gets an amazing reaction
Get Fizzy Fizz, Boom, Bang	A highly interactive chemistry workshop that always gets an amazing reaction A hands-on chemistry workshop that sparks the interest of older pupils
Get Fizzy Fizz, Boom, Bang Ella's Wobble	A highly interactive chemistry workshop that always gets an amazing reaction A hands-on chemistry workshop that sparks the interest of older pupils A storytelling workshop where pupils build instruments and become part of the narrative
- Get Fizzy - Fizz, Boom, Bang - Ella's Wobble - Marvellous Magnets	A highly interactive chemistry workshop that always gets an amazing reaction A hands-on chemistry workshop that sparks the interest of older pupils A storytelling workshop where pupils build instruments and become part of the narrative A hands-on workshop which explores magnetic forces with younger pupils A workshop where pupils join the teddy bear team to investigate forces, movement



6 LITTLE GIANTS THE SHOW ABOUT BEES

SHOW DESCRIPTION

Buzzy, the giant honeybee, leads pupils into the wonderful world of bees in this highly interactive show.
Learn how a bee's body is different from ours and find out how bees and flowers work together. Then join our Beekeeper on a magical mystery tour of a beehive and follow Buzzy on a trip to giant flowers, make pollen trail patterns and suck up nectar – just like

LEARNING OUTCOMES

- Identify the key differences between insects and humans
- Recognise that honeybees and bumblebees are different
- Recall the role of the worker bee in the hive community
- Describe how bees carry pollen from one plant to another
- Describe how bees communicate with one another by dancing
- Identify the importance of honeybees in the ecosystem

CfE links: Biodiversity and

interdependence

Age suitability: P1–3

Duration: 1 hour

Audience capacity: 30 pupils

Space required: Hall or gym

Price: £168 for one show,

£310 for two, £455 for three



SHOW DESCRIPTION

An entertaining storytelling introduction to night and day looking at the Sun, Moon and Earth. Join Benny and Jack on a journey of discovery as they learn what children in different places around the world are doing at exactly the same time. Why is one child getting up just as another goes to bed? Mind-boggling questions answered in a colourful and interactive show.

LEARNING OUTCOMES

- Recall that the 'time' at any point on Earth depends where the Sun is in the sky
- Recall that at any moment, somewhere on Earth it is day and somewhere else it is night
- Describe that the Earth moves around the Sun and the Moon moves around the Earth
- Describe that the side of the Earth facing the Sun is in daytime, and the side facing away from the Sun is in nighttime

CfE links: Space
Age suitability: P1-3
Duration: 1 hour

Audience capacity: 70 pupils

Space required: Hall or gym **Price:** £168 for one show, £310 for two, £455 for three





8 SPACE BASE EXPLORING THE SOLAR SYSTEM

SHOW DESCRIPTION

Travel through time and space in our amazing digital planetarium. Pupils learn how scientists and astronomers explore the universe as we take a closer look at our solar system, then navigate through the stars to distant planets and galaxies to uncover the hidden mysteries of the universe. A truly out-of-this-world learning experience, originally created by science museum *We The Curious*.

LEARNING OUTCOMES

- Identify that heliocentric means sun-centred
- Describe our solar system as a heliocentric system with planets of different sizes and compositions orbiting at different distances from the Sun
- Recall that scientists can use light which we can't see to observe objects in the universe
- Appreciate the relative size and location of the Earth within the universe

CfE links: Space **Age suitability:** P4–7

Duration: 1 hour **Audience capacity:** 30 pupils

Space required: Hall or gym **Price:** £168 for one show, £310 for two, £455 for three

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F SMART GRID THE RENEWABLE ENERGY SHOW

SHOW DESCRIPTION

In this theatrical show, pupils will be transported through the process of creating electricity to its use in the home. Join Alex and Lee as they complete their assignment on new and current technologies to get their coveted A-grade. By investigating with our team, pupils will explore renewable and non-renewable energy generation, their connection to the smart grid and will uncover the implications for our future energy consumption.

LEARNING OUTCOMES

- Identify that moving a magnet past a circuit produces electricity
- Recognise that electricity can be made by generators which are driven by turbines
- Recognise the impact of electricity generation on the environment
- Recall that a smart grid distributes electricity efficiently and is composed of smart ways to generate, distribute and use electricity

CfE links: Energy sources and

Age suitability: P4–7

Duration: 1 hour

Audience capacity: 70 pupils **Space required:** Hall or gym



10 BRICKS AND BLOCKS GET STARTED WITH PROGRAMMING

WORKSHOP DESCRIPTION

Join the robot sports training camp where our coaches will put you through your paces. Pupils learn about robots and coding as they use a LEGO* WeDo kit to build their own goalkeeper and program it to play. Then it's time to test everyone's skills in the *Robot World Cup* penalty shoot-out. How many attempts can your goalkeeper save?

LEARNING OUTCOMES

- Describe what robots are and why they are useful
- Recognise that the order of instructions is very important
- Identify that a computer program is a set of instructions
- Create basic computer programs for robots to perform simple tasks
- Recall that a robot will only do what it is programmed to do

CfE links: Technologies
Age suitability: P1–3
Duration: 1 hour

Audience capacity: 30 pupils **Space required:** Large classroom



LEGO® MINDSTORMS CHALLENGE THE FUN PROGRAMMING WORKSHOP 1

WORKSHOP DESCRIPTION

Learn how to program a robot to follow commands and navigate its way around our obstacle course. Bring LEGO* robots to life in this fun and engaging hands-on introduction to programming and robotics. The session will end with the ever-popular hip-hop dancing robots!

LEARNING OUTCOMES

- Describe what a robot is and why they are useful
- Create basic computer programs for robots to perform simple tasks
- Troubleshoot basic computer programs to identify why a robot is not performing as expected
- Recall how different sensors can be used to control a robot's movement
- Explain the concept of 'unlimited' when referring to computer programming
- Explain the concept of a 'loop' when referring to computer programming

CfE links: Technologies **Age suitability:** P4–7

Duration: 1¼ hours

Audience capacity: 30 pupils **Space required:** Large classroom





12 ROBO CONSTRUCTORS HANDS-ON ROBOT BUILDING

WORKSHOP DESCRIPTION

Welcome to the world of *Cubelets* – the expandable modular robotics system. In this fun, fast-moving workshop, pupils will become mini-robot engineers, exploring open-ended challenges to create their own novel, wacky and useful robots! The simple and intuitive *Cubelets* system allows participants to concentrate on learning about the rules of robotics and logic, without having to worry about challenging builds or programming.

LEARNING OUTCOMES

- Describe what robots are and why they are useful
- Recall how different sensors can be used to control a robot's movement
- Describe how to build robots with different configurations using different senses and actions
- Identify how different components can change the behaviour of a robo
- Troubleshoot the construction of a robot to identify why it is not performing as expected
- Use critical thinking, teamwork and problem solving skills to complete challenges

CfE links: Technologies **Age suitability:** P4–7 **Duration:** 1¼ hours

Audience capacity: 30 pupils **Space required:** Large classroom

Price: £168 for one show, £310 for two, £455 for three



SHOW DESCRIPTION

Learn how the body is put together in this fast-paced, funny, interactive show and discover why it's so important to keep it in good shape. In the Teaching Hospital, meet Dr Watson and Nurse Treat-It-Better. who will illustrate common ailments and show you how to stay healthy.

LEARNING OUTCOMES

- Recall the main parts of the musculoskeletal system including bones, joints, muscles and tendons
- Name key parts of the digestive system and recall the process of digestion
- Identify key parts of the circulatory system and recall how the heart pumps blood around the body
- Describe the respiratory system, with reference to lungs, diaphragm and alveoli
- Identify the importance of a healthy lifestyle in maintaining a healthy body

CfE links: Body systems and cells

Age suitability: P4–7

Audience capacity: 70 pupils

Price: £168 for one show,

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KYOWA KIRIN

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14 **GET FIZZY** CHEMISTRY FOR BEGINNERS

WORKSHOP DESCRIPTION

This highly interactive workshop encourages younger pupils to investigate the mysteries of mixtures and learn about solids, liquids, gases and fizzes. A unique and inspiring chemistry experience that always gets an amazing reaction!

LEARNING OUTCOMES

- Recall the main differences between solids, liquids and gases, including:
- solids stay the same shape no matter what container they are in
- liquids take the shape of the container they are stored in
- gases are difficult to keep in a container and they go everywhere
- Identify that by mixing different chemicals together we get different results
- Explain that we can use experiments to discover answers to questions

CfE links: Properties and uses

of substance:

Age suitability: P1–3 **Duration:** 1¼ hours

Audience capacity: 30 pupils **Space required:** Large classroom



FIZZ, BOOM, BANG THE ADVANCED CHEMISTRY WORKSHOP **WORKSHOP DESCRIPTION**

popular, hands-on workshop gives into the world of chemistry. Pupils to create cool, colourful chemical reactions, while an introduction to the scientific method aims to

LEARNING OUTCOMES

- how acid or alkali something is
- Define a chemical reaction as when two or more things are mixed together, they change and produce
- List four signs of a chemical reaction including production of heat, light, gas
- Recall that a solid will dissolve or react smaller pieces
- Identify the main steps in the scientific and variables (P6-7 only)

CfE links: Properties and uses

Age suitability: P4-7 **Duration:** 1¼ hours

Audience capacity: 30 pupils **Space required:** Large classroom

Price: £168 for one show.



16 WELLA'S WOBBLE THE MAKE AND KEEP SOUND WORKSHOP

WORKSHOP DESCRIPTION

Join Ella on her rhyming journey into the wonderful world of sound. This interactive storytelling workshop allows even the youngest pupils to build their own instruments and become an integral part of the story discovering how sounds are made and how they move.

LEARNING OUTCOMES

- Identify that sound is a vibratior
- Recall that an echo is produced when sound bounces off surfaces
- Recognise that different animals produce different sounds
- Express that we can use different materials to produce different sounds
- Recall that 'pitch' is the word used to describe whether a sound is high or low
- Relate that high-pitch noise is produced with fast vibrations and low-pitch noise is produced with slow vibrations

CfE links: Vibrations and waves

Age suitability: Nurseries and P1–3

Duration: 1 hour

Audience capacity: 30 pupils

Space required: Large classroom

or hall

Price: £168 for one show,

310 for two, £455 for three





MARVELLOUS MAGNETS THE MAGNETIC DISCOVERY SHOW

WORKSHOP DESCRIPTION

Welcome to the mysterious world of magnets. In this engaging, hands-or workshop our storytellers introduce concepts such as magnetic attraction and repulsion, fields and poles. Interactive supported play allows pupils to explore magnetic forces first hand as they learn about the effects they have on the world around us – like the amazing Northern Lights

LEARNING OUTCOMES

- Describe that magnets have a north and a south pole
- Recall that like poles repel and opposite poles attract
- Identify that magnetic materials are often made from iron
- Describe that magnets have invisible magnetic fields around them which are strongest at the poles
- Recall that the Earth has a north and south pole and a magnetic field

CfE links: Forces

Age suitability: Nurseries and P1–3

Duration: 1 hour

Audience capacity: 30 pupils

Space required: Large classroom

or hall

Price: £168 for one show,

310 for two £455 for three





18 ? READY, TEDDY, GO! THE FORCES AND MOTION WORKSHOP

WORKSHOP DESCRIPTION

Forces, movement and motion are investigated by our popular teddy bear team in a series of fun and engaging activities for the whole class. Our inquisitive bears reveal the principles of gravity, friction and movement demonstrated through challenges that connect science concepts to the real world.

LEARNING OUTCOMES

- Explain that a force is something that makes objects move
- Name pushing, pulling, gravity and friction as examples of forces
- Recall that floating and sinking are the results of forces from water and gravity
- Describe that gravity is a force pulling objects to the ground
- Describe that friction is a force acting between objects and slowing them down
- Recognise that making predictions is a good scientific method of experimenting

CfE links: Forces
Age suitability: P1-3

Duration: 1¼ hours

Audience capacity: 30 pupils Space required: Hall or gym Price: £168 for one show,

£310 for two, £455 for three





™ GOOD VIBRATIONS THE SCIENCE OF SOUND

SHOW DESCRIPTION

Uncover the mysteries of music as we explore what sound is and investigate pitch, volume and amplification. This highly interactive show is packed with illuminating demonstrations featuring slow motion videos and an amazing airzooka amongst many others. Pupils even get to test their own voices as we use digital technology to create a unique recording with the class

LEARNING OUTCOMES

- Explain that sound is produced by objects vibrating
- Describe that sound travels through a medium by passing a vibration from particle to particle
- Define pitch as the word used to describe how high or low a note is
- Recall that the pitch of a sound depends on the speed at which vibrations are occurring
- Describe that the volume of a sound depends on the size of the vibrations
- Recognise that digital music allows easy manipulation of music and sounds

CfE links: Vibrations and waves

Age suitability: P4–7

Duration: 1 hour

Audience capacity: 70 pupils Space required: Hall or gym Price: £168 for one show,

F310 for two £455 for three





POWER FROM THE PEOPLE GENERATING ELECTRICITY FROM US

WORKSHOP DESCRIPTION

Discover the secrets of electricity first-hand in this stimulating interactive workshop. Pupils explore what electricity is, how it can be stored and even create some themselves using our specially designed hand generators. Then we'll introduce our mini robotic creatures, the Hexbugs, and set the challenge to charge them up for a race round our track.

LEARNING OUTCOMES

- Recognise that electricity is a form of energy
- Explain that electricity is the flow of electrons around a circuit
- Recall that moving a magnet past a circuit produces electricity
- Describe how we can use human movement to produce electricity
- Describe how the amount of electricity produced depends on the number of magnets, coils in a wire and speed of movement
- Recall that a capacitor is a device for storing electricity

CfE links: Energy sources and

Age suitability: P4–7 **Duration:** 1¼ hours

Audience capacity: 30 pupils

Space required: Hall Price: £168 for one show, £310 for two, £455 for three

supported by





#SCIFIVE TEACHERS!WELCOME TO OUR FESTIVAL

SCIENCE FOR £5

Generation Science is part of our year-round programme, which includes the two-week Science Festival in Edinburgh over the Easter holidays.

Attend Festival events for only £5 with #SciFive Teachers. The discussions and workshops will inspire your teaching practice and provide real-world examples for your students. Search for #SciFive Teachers when the programme is launched and start planning.

- Explore real-life links to the Curriculum for Excellence
- Offer engaging examples of STEM jobs and careers
- Provide a lively addition to your CLPL

Sign up to our mailing list at sciencefestival.co.uk/teacher-resources to hear about exclusive #SciFive offers.

The next Edinburgh International Science Festival runs from 6–21 April 2019.



WITH SPECIAL THANKS TO ALL OUR PARTNERS

As a registered charity we simply couldn't deliver *Generation Science* without the support of our partners. In 2018 their support allowed us to reach over 58,000 children as we visited a third of all Scottish primary schools.

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Generation Science Club is a network of individuals and companies dedicated to engaging the next generation in science and technology. Members donate funds to help ensure our school shows and workshops can be enjoyed by all pupils – wherever they are and whatever their economic background.

WITH PARTICULAR THANKS TO

Alex and Rhona Callander

Edina Trust

Edna Bird

Joe Faraday

John Hylands

Dr George Ronald Inglis

Dr Richard Kimberlin

Dr Chris Masters

Mairi Mickel

The Nimar Charitable Trust

lan Ritchie

Scottish Qualifications Authority

Barry and Helen Sealey – The BEST Trust

University of Edinburgh

Ian Wall

If you're interested in funding our work, you can find out more about how you can support us on our website at sciencefestival.co.uk/supporters or by contacting our Development team on development@scifest.co.uk.

WHO WE ARE

Generation Science is the schools touring programme from Edinburgh International Science Festival. Each year we visit primary schools all over Scotland to bring science to life in classrooms with our highly interactive shows and hands-on workshops.

We operate our Festival and Education programmes as the Edinburgh International Science Foundation, an educational charity founded in 1989. Our mission is to inspire, encourage and challenge people of all ages and backgrounds to explore and understand the world around them – and to communicate the educational, social and economic benefits of science, technology, engineering and mathematics

We currently engage with more than 350,000 people every year through our Festival and Education programmes and with 30 years of experience in delivering high quality engaging events we are a leader in our field.

Our next *Generation Science* schools tour runs 28 January–24 May 2019 and the next Edinburgh International Science Festival will take place from 6–21 April 2019.

To find out more about what we do, visit sciencefestival.co.uk

Scottish Charity Registration No: SC003790
EDINBURGH INTERNATIONAL SCIENCE FESTIVAL
Harbourside House
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Edinburgh
FH6 6NF

generationscience.co.uk

BOOK NOW

The best way to book is to call us on:

2 0131 553 0321

Monday-Friday 8.30am-4.30pm

We can advise when the tour is near you and answer any questions you have about the shows and workshops.

You can also contact us by email: generationscience@scifest.co.uk

F TOURING DATES

SPRING TOURING DATES: 28 JANUARY-22 MARCH

SUMMER TOURING DATES: 29 APRIL-24 MAY

We come to you, when you want us to. We are trying to lighten our carbon footprint so we may suggest dates when a show is in your area.

AT THE READY

Before calling us you might find it useful to have the following information:

- Title of show/workshop required
- Number of performances required
- Class and number of pupils
 - Preferred date
- Dates that are not suitable
- Email address (preferably a class teacher)

7 TEACHER RESOURCES

More information about *Generation Science* shows and workshops, including downloadable teacher resource packs with additional science explanations and activities, is available online:

generationscience.co.uk

#SCIFIVE TEACHERS

Festival science for £5 sciencefestival.co.uk/teacher-resources

Generation Science is committed to reducing our impact on the environment

