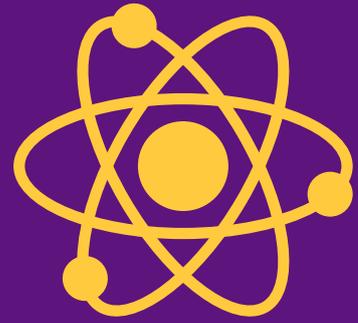
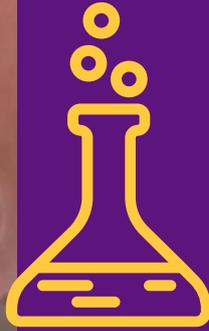


Midlothian Science Festival

#MSFSCHOOLS2021



MIDLOTHIAN SCIENCE FESTIVAL ONLINE SCHOOLS PROGRAMME 2021



SECONDARY SCHOOLS

11th - 29th October 2021



THE UNIVERSITY of EDINBURGH
Easter Bush
Science Outreach Centre

organiser of the MSF Schools Programme

Welcome to the Midlothian Science Festival Online Schools Programme 2021

The Midlothian Science Festival Schools Programme is part of the **Midlothian Science Festival**, a volunteer-led charity that aims to share science with people across Midlothian. The schools programme is coordinated by the University of Edinburgh's **Easter Bush Science Outreach Centre** and is made possible by **local scientists and STEM organisations** that offer exciting, interesting and inspiring workshops for our Midlothian learners.

The aims of the MSF schools programme are to:

- **Inspire and engage** Midlothian learners in science and discovery.
- **Cultivate curiosity** and communicate the power of knowledge and creativity to change our world view.
- Encourage young people to **understand the real-life application of science** and **discuss the issues surrounding it**, to equip them to become well-informed citizens, involved in decision making.
- **Raise the aspirations** of local young people, giving them opportunities to meet and speak with scientists, and helping to cultivate the next generation of scientific explorers.

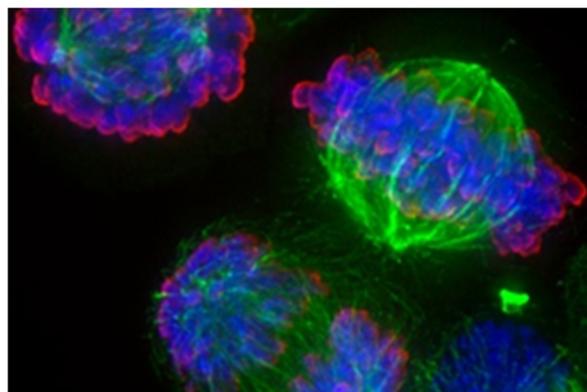
For the second year, we are delighted to be able to bring an online version of the festival to your classroom. All of the activities in this year's programme are offered **free of charge** and include live online workshops, *Meet our Scientists* digital sessions, outdoor learning activities, teacher CLPL sessions and resources to use in your classroom. All of this from organisations doing innovative science right here on the doorstep of your school!

How to book

To book please **email the contact for the workshop** then tweet about your involvement using **#MSFSchools2021**. Please note that session numbers are limited, so **book early** to avoid disappointment.

For general enquiries email eb soc@ed.ac.uk

You can download a digital version of this programme at www.ebsoc.ed.ac.uk



**Book
Now!**

Marvellous Microscope Tricks - Experiment-along

S1

Wellcome Centre for Cell Biology | University of Edinburgh



In this fun, hands-on, session you will learn about the range of microscopes researchers at the Wellcome Centre for Cell Biology use to access the tiny building blocks of life- cells! This workshop is a hybrid between a science show and workshop, participants will watch some demonstrations and “experiment-along” with us.

Microscopes are a vital tool in scientific research and this is particularly true for researchers at the Wellcome Centre for Cell Biology research. Each demonstration

will relate to a different type of microscopy including magnification, fluorescence and electron.

For the “experiment along” section, teachers will need to collect the easily found, household, resources in advance of the workshop.

A full kit list will be sent to you before the live session, so that you have enough time to collect all the items. The workshop can be run with every pupil having their own kit, in small groups, or with one kit and having the teacher selecting pupils to take part at different stages.

- **Key subject links:** Biology, physics, cells, world of work
- **Key topics:** cells, microscopes, working in science, hands-on investigation
- **Duration:** Depends on age of pupils, 60 minutes max.
- **Number of classes per session:** More than one class can **from your school** can join this session
- **Please note:** The session will be beamed into your classroom via the class teacher’s computer and via your school’s preferred online platform.

Dates available: Monday 11th October, Tuesday 12th October, Wednesday 13th October, Thursday 14th October, Friday 15th October, Tuesday 26th October, Wednesday 27th October, Thursday 28th October, Friday 29th October

To book this session contact Sarah-Jane Judge
s-j.judge@ed.ac.uk



Fun and Puzzling Maths

S1 - S3

School of Mathematics | University of Edinburgh



University staff and students will *visit* your school and share their passion for Maths. By showing magic tricks and engaging the class in problem solving activities, they will make everyone excited about Maths.

The [Edinburgh Maths Circle](#) has been an immensely popular event over the past few years. In 2018, thanks to funding from the Glasgow Mathematical Journal Trust and Edinburgh City Council, we have begun a programme to spread the Maths Circle initiative widely

across Scotland. During this is a virtual school visit we will use some of our most popular activities to spark curiosity in you learners and help them develop their mathematical thinking skills.

- **Key subject links:** mathematics
- **Key topics:** numeracy, problem solving, maths games
- **Duration:** 30- 50 minutes (depending on age of pupils)
- **Number of classes per session:** More than one class can **from your school** can join this session.

If you are interested in running a Maths Circle at your school [click here](#) for more information. To see how Maths Circles work in a primary school setting [see](#) what the pupils of Preston Street Primary School.

Dates available: Tuesday 12th October, Wednesday 13th October, Thursday 14th October, Wednesday 27th October, Thursday 28th October

To book this session contact Francesca Iezzi Francesca.iezzi@ed.ac.uk

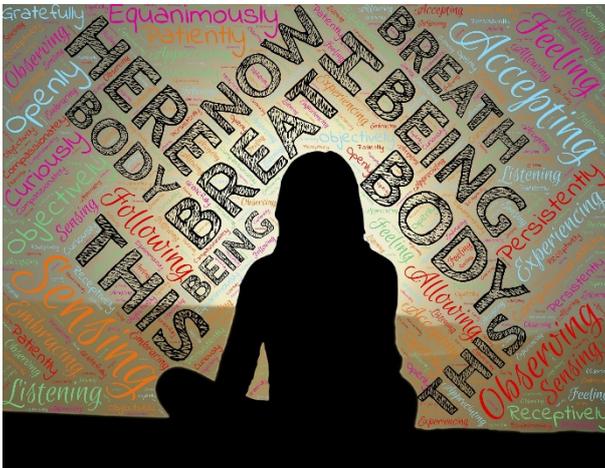


THE UNIVERSITY of EDINBURGH
School of Mathematics

Conscious Breathing for Teens

S1 – S4

School of Health in Social Science | University of Edinburgh



Breathing — it sounds like such a simple, automatic thing! Well, if it is true that it is automatic, it is false that it is an easy thing, especially if we talk about deep breathing. In this workshop, you and your pupils will learn some of the benefits of breath and breathing exercise. What do you need to attend? Just your breath!

In this online workshop, your pupils will learn some of the basic principles of the physiology of breathing and breathing exercise. These exercises, if practised regularly

for a couple of minutes a day, can be particularly helpful to regulate possible stress related to daily teaching activity and for the pupils to facilitate the transition from one academic task to another, promoting focusing and concentration, emotion regulation, and control of their actions and behaviour.

At the end of the workshop, there will be a surprise for the pupils! They will be invited to represent to create a classroom “mindfulness jar”, where to collate good memories of gratitude of their daily learning activity together.

- **Key subject links:** Biology, Health and wellbeing
- **Key topics:** respiration, mindfulness, resilience, gratitude
- **Duration:** 50 minutes
- **Materials:** breath & comfy clothes. Optional: a yoga mat or a cushion to sit on
- **Number of classes per session:** More than one class can **from your school** can join this session.

Dates available: Monday 11th October, Tuesday 12th October, Wednesday 13th October, Tuesday 26th October, Wednesday 27th October

To book this session contact Simona Di Folco Simona.DiFolco@ed.ac.uk



THE UNIVERSITY of EDINBURGH
School of Health in
Social Science

"It was brilliant! Great links to the curriculum and real life examples throughout! The active learning really encouraged enthusiasm for the topic!"



Find out about our amazing animals and the exciting work that we do to protect them in the wild. A fun workshop live from Edinburgh Zoo hosted by one of our Discovery & Learning Team.

An interactive online workshop* hosted by one of our Discovery & Learning Team. The session will be live from Edinburgh Zoo and will feature live animals, conservation information and quiz questions for the class. They will find out what zoos do, amazing animal facts and have the opportunity to ask questions.

- **Key subject links:** Biology
- **Key topics:** nature, wildlife, animals, conservation, biodiversity
- **Duration:** Depends on age of pupils, 60 minutes max.
- **Number of classes per session:** More than one class can **from your school** can join this session
- **Please note:** The session will be beamed into your classroom via the class teacher's computer and via your school's online platform.

* Content of session is differentiated depending on the age of the group booking

Dates available: Monday 11th October pm, Wednesday 13th October, Friday 15th October, Monday 18th October and Wednesday 27th October

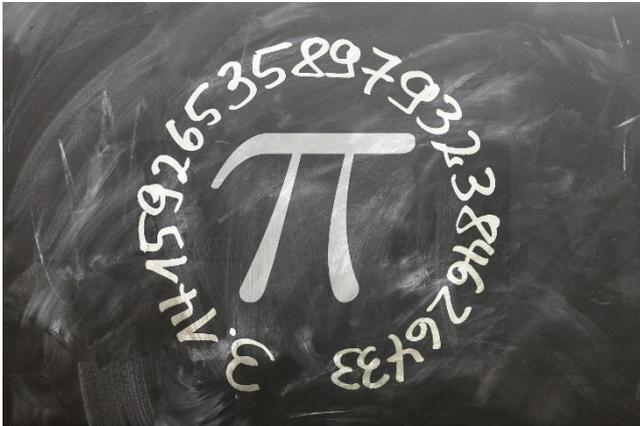
To book this session, please contact Karen Swift
education@rzss.org.uk



Mind Games: Cracking Codes in Maths and Languages

S1 – S6

School of Mathematics | University of Edinburgh



This interdisciplinary workshop lies at the interface between Mathematics and Linguistics. Pupils will exercise their problem-solving skills, explore the numbers systems or the grammatical structure of foreign languages and decipher unfamiliar scripts.

We will adopt an interdisciplinary approach. The aim is using problem-solving skills to decipher script in unfamiliar languages. The ultimate goal of this workshop is helping students to get a better appreciation of

disciplines such as Mathematics and Linguistics, and an awareness that Mathematics is everywhere, and that STEM and the Humanities are much more interlinked than we expect.

- **Key subject links:** mathematics, modern languages
- **Key topics:** problem solving, grammar, modern languages
- **Duration:** 50 minutes
- **Number of classes per session:** More than one class can **from your school** can join this session.

Dates available: Tuesday 12th October, Wednesday 13th October, Thursday 14th October, Tuesday 26th October, Wednesday 27th October, Thursday 28th October

To book this session contact Francesca Iezzi Francesca.iezzi@ed.ac.uk



THE UNIVERSITY of EDINBURGH
School of Mathematics

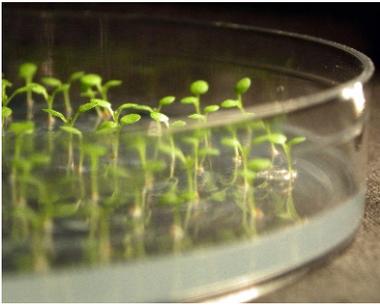


THE UNIVERSITY of EDINBURGH
School of Philosophy, Psychology
and Language Sciences

Plant Power

S5 & S6

Institute of Molecular Plant Sciences, School of Biological Sciences, University of Edinburgh



How do plants respond to changes in their environment? Join our **Plant Scientists** to answer this question. At least a week before the session, using simple **free equipment** that will be sent to your school, pupils will set up a **growth experiment** using cress seedlings. At the online session, pupils will discuss their results with our scientists, find out more about their research via short videos and chat, and have the opportunity to ask them about their day to day work and science careers.

NOTE: if you cannot fit in the experiment, we can still do an online session with your class, with our Plant Scientists

About the experiment: this will serve as a hook for discussing our research in plant sciences and why it is important. We want to demonstrate just how adaptable plants are by highlighting two areas of our research: the way in which plants respond to light and physical touch.

- Pupils will receive kits containing cress seed, compost, plastic pots and holding tray, black card, and a green light filter. **Each pupil will receive a separate kit** in a plastic bag, packed and sealed several days before posting. Access to a sink will be required for watering, and seedlings will need to be left near a window for light (dimensions of holding tray = 15 x 20cm).
- **At least 1 week before the online session**, following simple instruction slides e-mailed to the teacher, pupils will sow the seeds and proceed to grow the seedlings in the following conditions: daylight, dark, green light filter, and daylight + touch stimulus twice a day. It should take pupils about 30 min to set-up the pots.

About the session: during the online video call, we will **discuss the experiment results** and will use them as a basis for exploring our **current plant sciences research** and our **science careers**, in combination with short videos, chat and Q&A. Two of our Plant Scientists and a Host will be present.

To find out more about our research [click here](#).

- **Key subject links:** Biology
- **Key topics:** plant sciences, food supply, photosynthesis, topical science, scientific method, STEM careers
- **Duration:** 45 minutes (online session)
- **Delivery:** The session will be beamed into your classroom via the class teacher's computer and preferably via your school's online platform.

Dates available: Monday 11th October, Tuesday 12th October, Wednesday 13th October, Thursday 14th October, Friday 15th October, Tuesday 26th October, Wednesday 27th October, Thursday 28th October, Friday 29th October



THE UNIVERSITY of EDINBURGH
School of Biological Sciences



To book this session contact Janet Paterson janet.paterson@ed.ac.uk



Join us for a workshop on digital delivery, what works, what doesn't, what to try and what to avoid. Perfect for teachers everywhere.

An interactive online workshop hosted by one of our Discovery & Learning Team, is for teachers of all age groups.

There's been a theft at the Zoo... an important birthday cake is missing... but who dunnit?! This Digital Delivery workshop for education professionals is looking for investigators unafraid to take *whisks*, and will give you hands-on experience using a range of technology to *batter* solve the cakey mystery - and explore digital storytelling, remote presentation skills and ways to engage online audiences along the way.

We'll investigate budget friendly (mostly free!) tips and tools including Virtual and Augmented Reality, QR codes, audience interaction, digital wellbeing, video editing, online quizzes and more crumby cake puns, to solve the mystery and bake sure everyone gets their just desserts!

- **Key topics:** Digital storytelling, online engagement, digital education tools
- **Duration:** 2 hours, and will run in the afternoons of the two Fridays during the festival.

Dates available: Friday 29th October*

To book this session, please contact Karen Swift at education@rzss.org.uk



*If you cannot make this session please let Karen know and we will try to accommodate you in a future session.

Bioinformatics in Schools - Teacher CPD

S1 – S6 Teachers

4273pi Project, University of Edinburgh



The 4273pi project is bioinformatics education programme. We design and deliver workshops to schools and provide free teaching materials.

This CPD event will introduce teachers to our free bioinformatics resources and three curriculum-linked bioinformatics workshops – one for S3/N4/N5 Biology, and one for Higher Biology / Human Biology / Ad Higher.

I did this course two years ago and found it extremely useful. I have included it for the last two years as a practical in the higher course.

About the workshop

- In our S3/National 4 & 5 workshop, *Bioinformatics: Food Detective*, we use free online resources to identify which species are found in DNA sequences obtained from a pork sausage. There are a couple of surprises!
- Our Higher/Advanced Higher workshop, *Bioinformatics: The Power of Computers in Biology*, uses a case study of the GULO gene – involved in vitamin C production – to reinforce the topics of mutations, nutrition, and evolution.
- We will introduce our brand-new online PCR workshop for Higher Biology and Higher Human Biology.

Delegates will be left ready to use bioinformatics in their own teaching, and we will encourage you to use your *new learning* in the classroom. The event is suitable for those who have not used bioinformatics before, as well as those who have.

We will also provide each delegate with a **free resource pack including a Raspberry Pi computer pre-loaded with bioinformatics software**, an excellent **bioinformatics textbook** and **practical guides**.

More information and resources at: <https://4273pi.org> Follow us on Twitter: [@4273pi](https://twitter.com/4273pi)

- **Key subject links:** Biology, Computing Science
- **Key topics:** Bioinformatics, DNA sequences, Mutations, PCR
- **Duration:** 2 hours

Dates available: Tuesday 12th October 5 – 7 pm
Friday 29th October 2 – 4pm

To book this session contact Stevie Bain stevie.bain@ed.ac.uk



THE UNIVERSITY of EDINBURGH
School of Biological Sciences

About the sessions

Meet our Scientists is a virtual interactive session where you can *beam a scientist* live into your classroom (well almost!).

The session will give your pupils a unique opportunity to learn about some of the local science happening on their doorstep, hear about different career paths and give them the opportunity to ask their own questions. Sessions like this can increase pupils' curiosity in STEM, help raise awareness of STEM careers and support pupils to reflect on their own science-related skills.



Every session will:

- Begin with a 5 minute video or talk from the scientist, followed by a Q&A with pupils via the class teacher
- Last for 20 - 40 minutes (depending on age of pupils and number of scientists participating in the session)
- Cover a specific area of science/research
- Feature at least one scientist

To book a session, **contact the person noted in programme** with some dates and times that work for you, and await confirmation of your place.

How will it work? The tech bit...

How will the virtual video call be set up?

- ✓ **Invite the scientists to an online meeting** via your usual platform i.e. Teams, Zoom, Google Classroom.
- ✓ We recommend that you set-up an additional **“test session”** (a week before the class session) where you meet the scientist for a short 10 minute meeting to test that they can access the platform you are using and have a chat with them about what they are going to talk about. This is an opportunity for you to ask any questions and tell the scientists about the learning your pupils have done that is relevant to the session.
- ✓ The **teacher computer will be the only computer from the school connected to the virtual session**, and multiple classes from your school can join in on one session. Connect the computer to your digital whiteboard so that your pupils can see and hear the scientist.
- ✓ The **teacher is responsible for coordinating and communicating the questions from their pupils** to the scientists, whether this is via submitting the questions beforehand via the online form, a teacher controlled microphone or typing questions in the meeting's chat box.

How will we be able to chat with the scientists?

- ✓ During the *test session*, let your **visiting virtual scientist** know if the **webcam and microphone** of the teacher computer can be on (check your own local school rules). Having the class webcam and microphone on makes for a more engaging session but if this not possible **don't worry!** The session can be conducted through the **chat box function** i.e. the teacher can type in questions on behalf of the pupils.

How to get the most out of Meet our Scientists

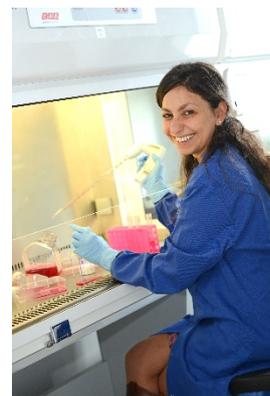
It's not very often that you have the opportunity to interact with scientists. I knew that science was broad and multi-disciplinary but I had no idea of just how much potential and flexibility there was, it has made me very excited about my future.

S5 pupil, Glasgow

Meeting scientists is an **opportunity for your pupils to learn about the world of work** in scientific research and **explore the skills** needed to work in science.

To make the most out of *Meet our Scientists* we have suggested some activities that could be done to:

- ✓ encourage **meaningful discussion** about pupils' own skills
- ✓ explore their **impressions of science jobs**
- ✓ challenge some typical **stereotypes associated with scientists**
- ✓ help you and your pupils explore the *Developing the Young Workforce* "I can" statements



Activity 1- Asking your question

Read the profile of the scientist (in this programme) together as a class and have a discussion about the scientist in a small groups or as a class.

- **Discussion prompts:** *What does do? Where do they work? Did anything surprise you? What skills do you think needs to do his/her/their job? What do you already know about this area of science? What more would you like know?*

**ASK YOUR
QUESTIONS NOW**
[HTTPS://EDIN.AC/3JAKIFO](https://edin.ac/3JAKIFO)

Ask pupils to work individually or in pairs to come up with a question they would like ask. The question could be about the scientist's work, their career, their motivations for getting into science etc. Please **submit the questions [via this link](#) before the session**. During the live session we will answer as many as possible, and we will also be taking some questions live!

Activity 2 Find out More

In the programme we have included the webpages, blog posts and podcasts of the organisations that our scientists work for. Challenge your pupils to look at some of the research stories on the website(s) and find out more about the research. They could prepare:

- A social media post about the story, a short presentation for their peers, or a short written summary.

Activity 3 Post-Session Activities

1. Write the question *What skills do you need to work in science?* on the board.
2. Give each group a large piece of paper and marker pens. Encourage them to think back to the scientists they met and the science investigations they do themselves.
3. Prompt the pupils to think about the skills they need to do scientific research.
4. When finished, ask them to swap their poster with another group and compare them.
5. Give each group their poster back, and give them five minutes to add to it, if they wish to.
6. Stick all posters up on the wall and discuss their findings.

Common themes:

Determination

Flexibility

Ability to organise own work

Attention to detail and accuracy

Patience

Creative thinking

Good observation skills

Teamwork skills

Written and oral

communication skills

Curiosity

Numeracy skills

- **Discussion prompts:** *Which of these skills do you have? Would you like to work in science? Would you like to be a scientist? What are the different fields/places/ways that you could work in science?*

Take pictures of your pupils' creations and post them on Twitter

#MSFschools2021

@EBSOClab @MidlothSciFest

Meet our Scientists: Nelly Mak & Sarah Yusoff

S1 & S2

Infection Medicine, University of Edinburgh

In this *Meet the Scientist* session your pupils can talk with two scientists! Both are PhD students, which means that they are studying to become a professional scientists.

They will talk about their studies and explain how they work in the lab. After this short talk your pupils will be able to ask them questions during a 10-15 minute Q and A.



THE UNIVERSITY of EDINBURGH
Infection Medicine



Job title: PhD Students

Hello, I'm Sarah! I travelled from Malaysia to the UK to broaden my knowledge and become a better virologist. My motivation is to protect people from viruses, especially the one I am working with called Herpes simplex virus type 1, which can cause cold sores and blisters around the mouth. I enjoy hiking and exploring new cities when I need inspiration.

I'm Nelly, I moved here from Hong Kong when I was 16 to study microbiology. Viruses fascinate me because they can make us really sick even though they are tiny and can only be seen under powerful microscopes! I am now trying to understand how cells in our body protect themselves from viruses like influenza virus and coronavirus. Outside the lab, I like having fun with animals and learning languages.

Both of us use **CRISPR** in our work, a technology that won the Nobel Prize in 2020. CRISPR works like a pair of scissors that can be used to **cut and edit DNA**. In our projects, we use CRISPR to look for important regions in our DNA that help us **fight off viruses**.



Find out more about where Nelly & Sarah work by [clicking here](#).

- **Key subject links:** Biology
- **Key topics:** microorganisms, viruses, DNA, health, disease, STEM careers
- **Duration:** 45 minutes
- **Number of classes per session:** More than one class can from your school can join this session, the session will be beamed into your classroom via the class teacher's computer and preferably via your school's online platform.

Date available: Thursday 28th October, Friday 29th October

To book this session contact Crystal Lei yuhua.lei@ed.ac.uk

Meet our Scientist: Pujitha Raja

S1 & S2

Infection Medicine, University of Edinburgh

In this *Meet the Scientist* session your pupils can talk with Pujitha Raja, she is a PhD student, which means that she is studying to become a professional scientist.

She will talk about her studies and explain how she works in the lab. After this short talk your pupils will be able to ask her questions during a 10-15 minute Q and A.



THE UNIVERSITY of EDINBURGH
Infection Medicine



Job title: PhD Student

Hey! I am Pujitha Raja from India. I moved to Edinburgh when I was 24 to pursue a research career. I was back in 10th grade when I first came across something called “cloning”, and that was when I started dreaming about duplicates of human beings and mutants like we see in the movies! I learnt about “Dolly the sheep” and how the brilliant scientists managed to make a copy of her. This encouraged me to take up a PhD involving molecular biology and cloning techniques.

My research at Infection Medicine involves working with an infectious bug – *Klebsiella pneumoniae* and figuring out how it is so resistant against drugs, causing many untreatable antibiotic infections. In the lab, I do lots of cloning, using radioactivity (like Marie Curie) to track the genes inside the bug and studying why *K.pneumoniae* is such a powerful bug and can survive in such hostile conditions.

In my free time, I enjoy cooking, making beautiful cosmetics and going on “walks” around Scotland to enjoy some fresh air in the woods.



Find out more about where Pujitha works by [clicking here](#).

- **Key subject links:** Biology
- **Key topics:** microorganisms, bacteria, antibiotics, health, disease, STEM careers
- **Duration:** 45 minutes
- **Number of classes per session:** More than one class from your school can join this session, the session will be beamed into your classroom via the class teacher’s computer and preferably via your school’s online platform.

Date available: Thursday 28th October, Friday 29th October

To book this session contact Crystal Lei yuhua.lei@ed.ac.uk

Meet our Scientist: Dr Samantha Griffiths

S1 to S4

Infection Medicine, University of Edinburgh

In this *Meet the Scientist* session your pupils can talk with Samantha Griffiths, she is a **virologist** which means she works with **viruses**.



THE UNIVERSITY of EDINBURGH
Infection Medicine

She will talk about how she became a virologist and explain how she works with viruses in the lab. After this short talk your pupils will be able to ask her questions during a 10-15 minute Q and A.



Job title: Research Scientist

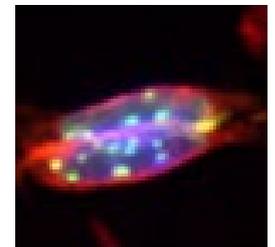
Hello! My name is Sam, and I have been living and working in Edinburgh for 17 years. I'm a virologist.

When I was a teenager, I got to do some work experience in a microbiology lab, in a hospital. This laboratory looks at samples of **gross body fluids** taken from people who are ill. It was exciting and interesting "**detective**" work – looking at **bacteria** and other things in wee, poo, snot, and all sorts of other fun stuff to figure out **how they cause diseases** and make people poorly!

This really got me interested in **infections and diseases**, and I went to University to study this.

Now, I work on **viruses** – trying to find out more about the ways we can fight off viruses, and how the viruses can escape our own defences.

In the lab we can make viruses **glow fluorescent green** so that we can see them inside cells. Using a microscope, I took a picture of a cell that has been infect with a virus. *Can you see the little green viruses in the picture?* The virus here is called herpes simplex virus, it causes cold sores.



Find out more about where Sam works by [clicking here](#).

- **Key subject links:** Biology
- **Key topics:** microorganisms, viruses, immune system, health, disease, STEM careers
- **Duration:** 30 minutes
- **Number of classes per session:** More than one class can from your school can join this session, the session will be beamed into your classroom via the class teacher's computer and preferably via your school's online platform.

Date available: Monday 11th October, Tuesday 12th October, Thursday 14th October, Friday 15th October, Tuesday 26th October, Thursday 28th October, Friday 29th October

To book this session contact Crystal Lei yuhua.lei@ed.ac.uk

**ASK YOUR
QUESTIONS NOW**
[HTTPS://EDIN.AC/3JAKIFO](https://edin.ac/3JAKIFO)

Meet our Scientist: Rocío Martínez-Aguilar

S4 to S6

MRC Centre for Reproductive Health, University of Edinburgh

In this *Meet the Scientist* session your pupils can talk with Rocío Martínez-Aguilar, a vibrant and dynamic researcher working in **reproductive health** at MRC Centre for Reproductive Health (CRH).



THE UNIVERSITY
of EDINBURGH

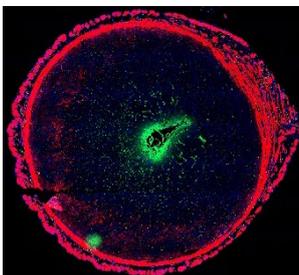
She will talk about entering a **career in STEM**, reflect on her own experiences and give examples of the activities she carries out as part of her role (highlighting how varied every week in the **life of a scientist** can be). There will also be a **Q&A session** and Rocío is happy to give advice and guidance on STEM careers.



Job title: Postdoctoral Researcher

My name is Rocío and I am originally from (very sunny) Spain. I moved to Scotland in 2020 after getting a job in the Maybin lab at CRH (I completed work experience in this lab previously, in 2017).

I have always been very curious about how cells work and coordinate to keep us alive and healthy, so I applied to study Biochemistry at University. One of my teachers was so passionate about Immunology that it seemed to be infectious (pun intended!), and I rapidly became more and more interested in this field.



Mouse uterus with muscle cells
stained in red

Since then, I have been exploring how the **immune system** has a vital function even in the strangest of places, like the **lining of the womb**. My job includes running a variety of lab experiments and attending seminars to keep up to date with the latest advances in my research field. In my spare time I love to play with my cats, travel, and get tattooed!

In my research I try to **understand how the endometrium regenerates** each month **without scarring**. Learning about this process can help us to **discover new treatments for people with heavy menstrual bleeding**.

Find out more about where Rocío works by [clicking here](#).

- **Key subject links:** Human Biology, Biology & Chemistry
- **Key topics:** human reproduction, immunology, stem cells, menstruation STEM careers
- **Duration:** 30 – 40 minutes
- **Number of classes per session:** More than one class from your school can join this session

Dates available: Tuesday 12 October, Wednesday 13 October, Thursday 14 October, Tuesday 26 October, Wednesday 27 October, Thursday 28 October

To book this session contact [Ginnie Clark ginnie.clark@ed.ac.uk](mailto:ginnie.clark@ed.ac.uk)

**ASK YOUR
QUESTIONS NOW**
[HTTPS://EDIN.AC/3JAKIFO](https://edin.ac/3JAKIFO)

Online Activities



We have collated online resources **specifically for the Midlothian Science Festival Schools Programme**, there is something for everyone!

Through our Padlet, you will find a selection of high quality, resources for teachers and families from **local STEM organisations** that have kindly contributed to this year's festival.

These activities can be **accessed at any time**, they are all **free** and can be done **in the classroom or at home**.

You can access this resource for Midlothian Schools by [clicking here](#).

You will find activities from:



If you use these resources with your class please do let us know by "liking" on the Padlet and using the hashtag **#MSFschools2021** and **@EBSOclub @Midlothscifest** on Twitter!

If you have any general questions about this resource please email epsoc@ed.ac.uk

To share this Padlet on your school social media channels use this link <https://bit.ly/2TMfzRO>

During the Midlothian Science festival why not encourage some family learning. Science @Home is a series of simple, **hands-on activities for families** to do at home. Every activity is linked to **real-life research**, explores how science is done, encourages curiosity and is fun!

These step-by-step, fun, **curriculum-linked investigations** develop understanding of how science works and prepares young explorers (8-14 year old) to create their own investigations.

Each Science @Home Investigation pack includes:

Do your experiment

- Cover half the tray with dry soil and the other with wet soil.
- Place the worm on the boundary so that it can feel both soils, with its head on the dry soil.
- Start your timer.

When the worm moves its whole body to one side, stop your timer.

Repeat with other two earthworms.

Where is an earthworm's head?

- Earthworms move forward, head first, so look at its movement.
- If it is an adult earthworm it will have a saddle nearer its head end.

1	tail
2	saddle
3	head

What did you discover?

1. Write down the results of your experiment in this table:

Worm number	Did it move to the wet or dry soil?	How long did it take to move its whole body to one side?
1		
2		
3		

2. When we do an experiment, we make a summary of what we found out. This is called making a conclusion.

Do your worms prefer wet or dry soil? Write your conclusion here.

3. Look back at your hypothesis (prediction), was it correct?

What next?

Repeat the experiment but this time place the head on the wet side.

Don't forget to:

- Make your hypothesis
- Do everything else in your experiment in exactly the same way as the first time.
- Write down your results
- Make a conclusion

More ideas!

Do worms prefer light or dark? Use a torch and a piece of card, cover half of the tray with the card and shade the torch on the other half. How will you know if the worms prefer light or dark?

Can worms feel touch? Using a clean cotton bud, touch the worm gently along its body at two or three points (e.g. head, middle and tail. Does it react? Can you measure this?

Which types of food do worms like? Place the foods at different edges of the tray, place the worms in the middle and cover the tray so it is dark. Wait for 5 minutes. How will you know what food worms prefer? Is it important to put the same amount of food?

Workbook with instruction guide

That can be downloaded and printed or used on a mobile device. With guiding questions to support your families through their investigation.

Do rats like being tickled? Real-Life Research

This is Tayla Hammond and she is a scientist here in Edinburgh, studying at The Roslin Institute and Scotland's Rural College. She spends her time as a scientist studying the behaviour of animals, just as you have done.

"I love the variety in science, yesterday I was tickling rats and today I am watching their natural behaviour!"

Scientists, like Tayla, ask questions and answer them using the scientific method just as you have. Read about Tayla's investigation then look at the questions.

What did Tayla need?

- 14 rats (11 pairs)
- Cotton glove
- Night vision camera
- Ultrasonic sound recorder

How did Tayla do her investigation?

- Tayla took 24 boy rats and chose half of them at random to be tickled. The other half were not tickled.
- Each rat was then moved to the handling arena and tickled or not tickled for 2 minutes.
- Any ultrasonic noises were recorded during the 2 minutes of the experiment.

What did Tayla want to find out?

Rats make ultrasonic (very high pitched) noises when they are happy! Observing when rats make these noises tells scientists what rats like and don't like. Tayla wants to know if rats like to be tickled.

What did Tayla discover?

During the tickle test the tickled rats made 3x more ultrasonic noises than the non-tickled rats.

What is Tayla's conclusion?

Rats like to be tickled. She also observed that the rats looked forward to tickling!

Think and discuss

- What activities do you think rats do that make them happy?
- Why do you think Tayla kept the rats in pairs their cages?
- How many rats were tickled?
- What do you think it is important to understand positive emotions, like happiness, in animals?

A critical reading text

About the work of our scientists, to help develop your pupils' scientific thinking.

A guide for grown-ups

1. About this resource

This series of simple hands-on activities aims to support families to do Science @Home and is brought to you by the Junior Bush Science Outreach Centre at the University of Edinburgh. All of our activities are based on the scientific method, which is used in school and in scientific research to answer scientific questions. This resource can be used to encourage your young science explorer(s) to ask and answer their own scientific questions. It also gives a little peek into how scientists at the Roslin Institute answer their own questions about science. Share your investigations by tagging @EBSOCiA @roslininstitute

2. Advice about supervising the activity

- This activity has been designed for 8-13 year olds. Younger children will need more support with reading through the instructions and carrying out the investigation.
- Read and follow the instructions with your young science explorer; this activity is to be carried out by children working with a grown-up. The adult is fully responsible for carrying out this investigation safely.
- Do not eat or drink during the experiment just like in a science laboratory!
- Collect worms from your garden, stamping on the ground can help bring the worms to the surface, especially if the weather has been dry.
- When handling soil wear suitable gloves.

Worm welfare checklist:

- Complete section 2 of the activity, the answer to all statements is "true".
- Worms should not be handled or kept in the light for more than 20 minutes at a time.
- Worms need to keep their skin wet so they can breathe, we recommend you sprinkle or lightly spray water on them as you work with them.
- Return the worms to where you found them when your experiment is finished.

Wash your hands with soap and hot water after handling soil and worms.

3. The Scientific Method

All good investigations begin with a question, the scientific method is how scientists answer those questions.

HYPOTHESIS Predict: what do you think the result will be?

METHOD How are you going to do your investigation?

RESULTS What did you see? Can you measure it? Can you make a table or a graph of your results?

CONCLUSION What did you find out? Was your hypothesis correct? If not, why do you think this?

4. Worm Fact file

Do worms have noses? No, they don't, but they have special receptors that can react to chemicals.

Do worms have eyes or ears? No, they don't, but they have receptors on their bodies that are sensitive to light and vibrations.

Do worms have mouths? Yes, they have a mouth at one with no teeth.

Can worms feel touch? Yes, they can feel touch. Their head has more nerve endings than its tail so it is more sensitive at its head end.

5. Find out more about this research

You can read more about the science behind our Real-Life Research activity by reading this [page](#) on the Roslin Institute website.

@EBSOCiA | www.ebsoc.ed.ac.uk | ebsoc@ed.ac.uk

A guide for grown-ups

That gives some tips and hints about the investigation and the scientific method.

Science Explorer

CONGRATULATIONS TO:

FOR COMPLETING THE SCIENCE INVESTIGATION:

"Do worms prefer wet or dry places?"

THE UNIVERSITY OF EDINBURGH
Junior Bush Science Outreach Centre

ROSILIN | MidSci | Science

A certificate

To reward young people's scientific achievement.

We have **three Science @Home activities** available to download for free from www.ebsoc.ed.ac.uk.

Acknowledgements

We would like to thank all the organisations and people that have contributed to the Midlothian Science Festival Schools Programme this year. It would not have been possible to create this programme and run the schools programme without them.

We would also like to thank the Scottish Government and Midlothian Council who support the festival.

Finally, a **big thank you to you** for bringing the Midlothian's Science Festival into your classroom! We are acutely aware of the continuing challenges and barriers that exist inside and outside the classroom, which you and your pupils are navigating on a daily basis. We sincerely hope that this programme is fully accessible and that you are able to embrace STEM and the opportunities on offer over the period of the Festival. Please do share what you get up to with your pupils by Tweeting #MSFSchools2021 @EBSOClab @MidlothSciFest.

The Midlothian Science Festival Schools Programme is coordinated by the [Easter Bush Science Outreach Centre](#) to keep in contact with us you can follow us on Twitter [@EBSOClab](#) or join our [mailing list](#).

If you have any feedback about this year's programme we would like to hear from you! You can contact the Midlothian Science Festival Schools Programme Manager, Jayne Quoiani at jayne.quoiani@roslin.ed.ac.uk



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Science Outreach Centre