Durham University

celebrate science

Programme of events and activities to try at home

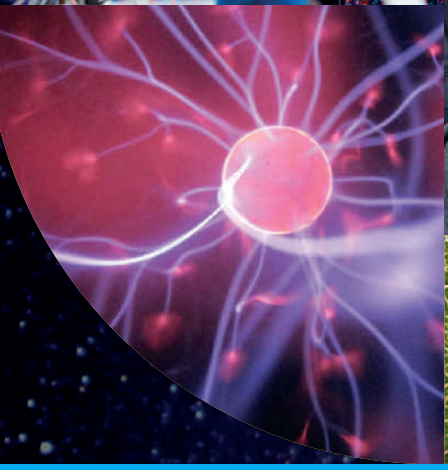
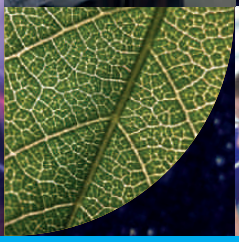
Tuesday 25 – Thursday 27 October
10am until 4pm
Palace Green, Durham

Durham University invites you to

celebrate science 2022

Enjoy 3 fun-packed and fascinating days of FREE family activities.



★ **Free Family Festival** ★ **Visit: durham.ac.uk/celebrate.science** ★

CUR/10/22/224

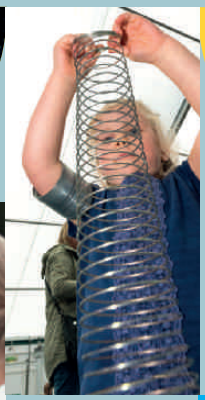
So what are you waiting for?

celebrate science

Welcome

to another 3 fun-packed and fascinating days of FREE events, activities and experiments celebrating science.

'Celebrate Science' is here again! Children of all ages can visit the marquee on Palace Green, the heart of Durham's World Heritage Site, to carry out amazing experiments, participate in astonishing hands-on activities and create their very own inventions! With a great range of practical activities designed to appeal to all the family, 'Celebrate Science' makes a great half-term day out. Our team of volunteers are on hand throughout the event to chat about everything from skeletons to the stars.



You can even sit back, relax and soak up the scientific atmosphere in the marquee café.

This booklet contains a variety of activities for you to try at home to continue to Celebrate Science!

Contributors to Celebrate Science 2022

Science Ambassadors from local secondary schools:

Bishop Barrington Academy;
Consett Academy;
Hartlepool Sixth Form;
Longfield Academy;
St Bede's School and Sixth Form College, Lanchester;
Wolsingham School.

Durham University:

Department of Biosciences
Department of Chemistry
Department of Earth Sciences
Durham Energy Institute
Department of Engineering
Institute for Computational Cosmology
Department of Mathematical Sciences
Department of Physics
Department of Psychology
Department of Sport and Exercise Sciences

Partners:

Artist Helen Schell;
Beamish Museum;
Institute of Physics;
Locomotion;
North Pennines AONB;
Procter and Gamble

Science and the Senses

How important are our senses? How do they work together to help us understand the world around us?

We all know that we have five senses: Can you name them?

But can you name any extra senses?

Hint 1: Close your eyes and touch your nose. How did you do this?

Hint 2: Stand eyes closed and balance. How did you do this?

Draw a Skull

Here is a picture to inspire you

Grab some paper, a pencil, an eraser and a pencil sharpener.

Can you draw some of these animal skulls?

Can you create and 'discover' a new animal and draw its skull to record your findings?

You can find the answers on page 13.

Hunt the Dinosaurs Word Search

O N Y E A A P A T O S A U R U S F Y D S
I H G Y F S F F Y T O O E W E J P C I N
G O L I T F R C Q U X I I Y J O X T P T
U H H K G B R A C H I O S A U R U S L I
A O H Z S A A V M M I C R O R A P T O R
N R U Z P D N N S Q V P M B P I K B D A
O V S Q S N E O K T T R D S E T F N O L
D Q Y J K Y D B T Y E T Z T T M J B C L
O B F H G P L I V O L G B E P F G W U O
N Q K I J B T I L M S O O U M V H T S S
S P I N O S A U R U S A S S J R K V W A
G T R I C E R A T O P S U A A R W K Z U
M K H X W Z R Q Q V L D I R U U D M T R
O G R N F W D E F W U W B H U R R U A U
S Y P K R D W A F N Z P Z L Q S U U E S
A T Y R A N N O S A U R U S Z I J S S Q
S B H V Y P C U T P T B E R C U U W R T
A A Y R R C J D I L O P H O S A U R U S
U Q J F R Y I A R C H A E O P T E R Y X
R V E L O C I R A P T O R Z N J O E M A

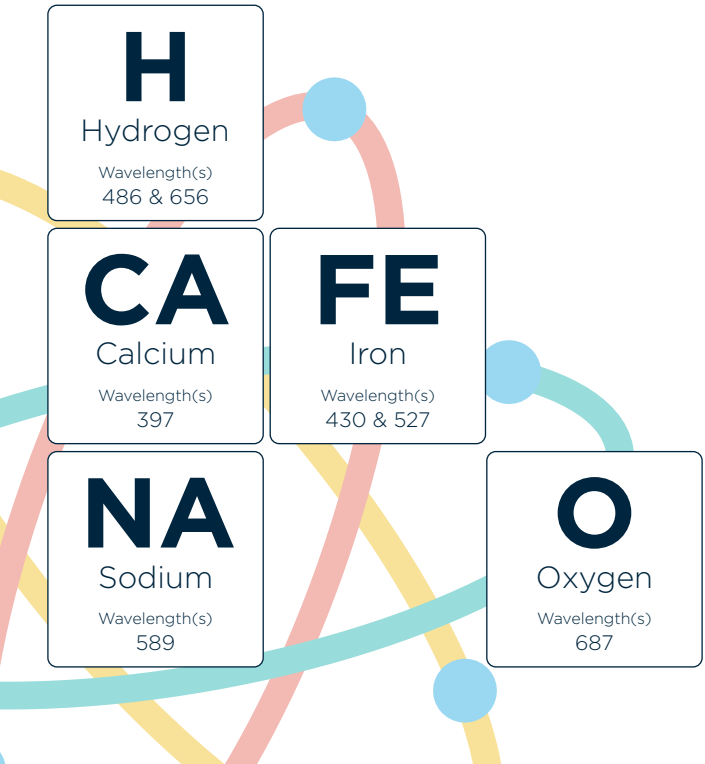
Giganotosaurus
Tyrannosaurus
Brachiosaurus
Archaeopteryx
Dilophosaurus
Spinosaurus
Ankylosaurus
Microraptor
Stegosaurus
Velociraptor
Apatosaurus
Triceratops
Iguanodon
Diplodocus
Allosaurus
Mosasaur

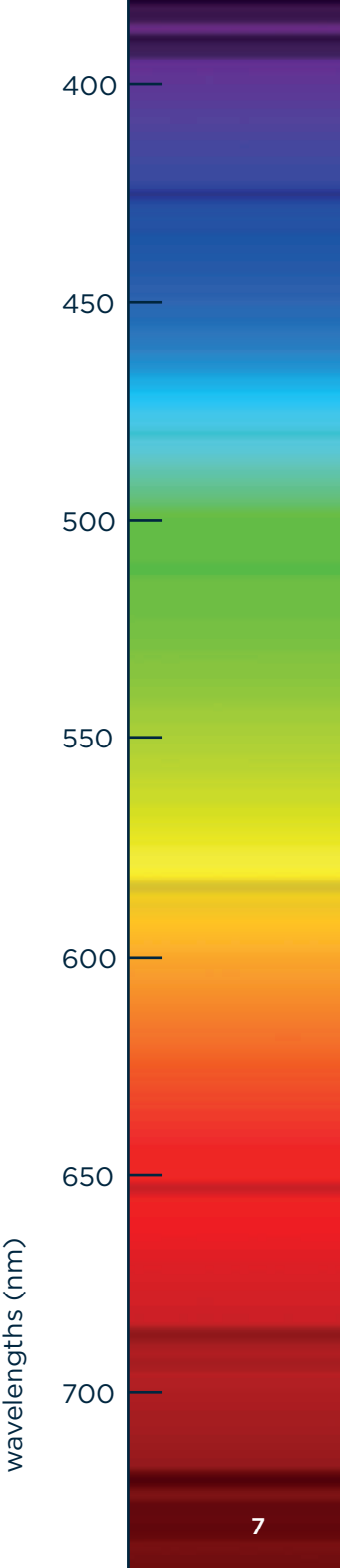
What can light tell us about atoms?

We can see what colours (or wavelengths) light is made up of by passing it through an angled piece of clear material like glass or plastic. White light, like the light from a torch, is made up of all the colours of the rainbow!

The Sun also gives off white light, but if we split up the colours and look carefully, we see that there are dark bands where some wavelengths (colours) are missing. This is because atoms in the Sun can absorb these colours, so they don't reach us here on Earth.

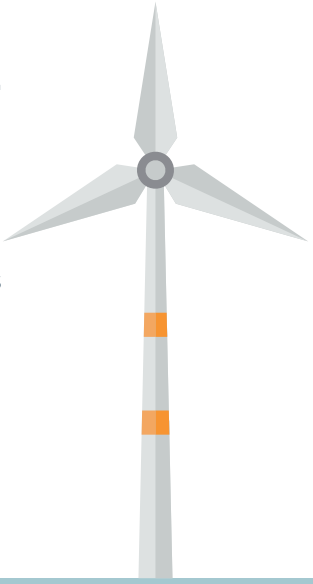
Here are some chemical elements. Can you match each of these with the colour they absorb? (Draw a line or colour them in!)





Wind Power!

We use electricity for so many things. How many can you think of?



We can generate electricity from the wind. As there is (nearly!) always wind available and we don't use it up, this is a renewable energy source.

We have used wind as an energy source for hundreds of years, and today we have wind turbines on land and sea. The wind turns the turbine's blades, which then slowly turn a large cylinder called a shaft. This shaft is connected to several gears that make a smaller shaft turn faster, driving a generator. This produces the electricity which can then be used in our homes, schools and businesses.

A problem to think about...

The cost of electricity has risen. Pete uses lots of different electrical appliances at home and wants to know how much electricity he is using and how much this costs. He has recorded how often he uses each in the table below.

He has also found out how much energy each uses every time it is used. This is recorded in kWh (kilo Watt hours) which is a unit of energy.

The cost of electricity has risen to **£0.21/ kWh**.

Can you help Pete find out how much he is spending?

Use the table below to work it out. You might need a calculator.

Dishwasher	1.2kWh per use	Used 7 times a week
Tumble Dryer	4.5kWh per use	Used once a week
Washing Machine	2.1kWh per use	Used 3 times a week
Boiling the Kettle	0.1kWh per use	Used 35 times a week
Watching TV	0.4kWh per use	Used for 14 hours a week

Pete spends... **£** Per Week

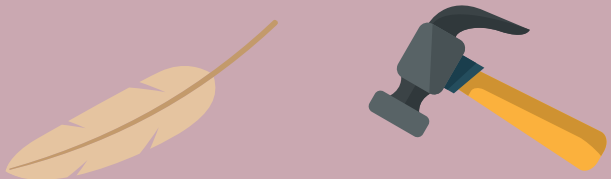
Steaming Streamlining

Why are trains streamlined?

When an object moves through air it meets wind resistance. This creates a force called drag, which slows it down. A pointed or rounded object creates less drag than an angular one. Therefore, fast trains are designed with a rounded front, known as streamlining. In 1938, Mallard reached the speed of 126mph, setting the world speed record.

What a drag!

Drag happens when an object moves through the air. The Moon has no atmosphere so what do you think would happen if we dropped a feather and a hammer on the Moon?

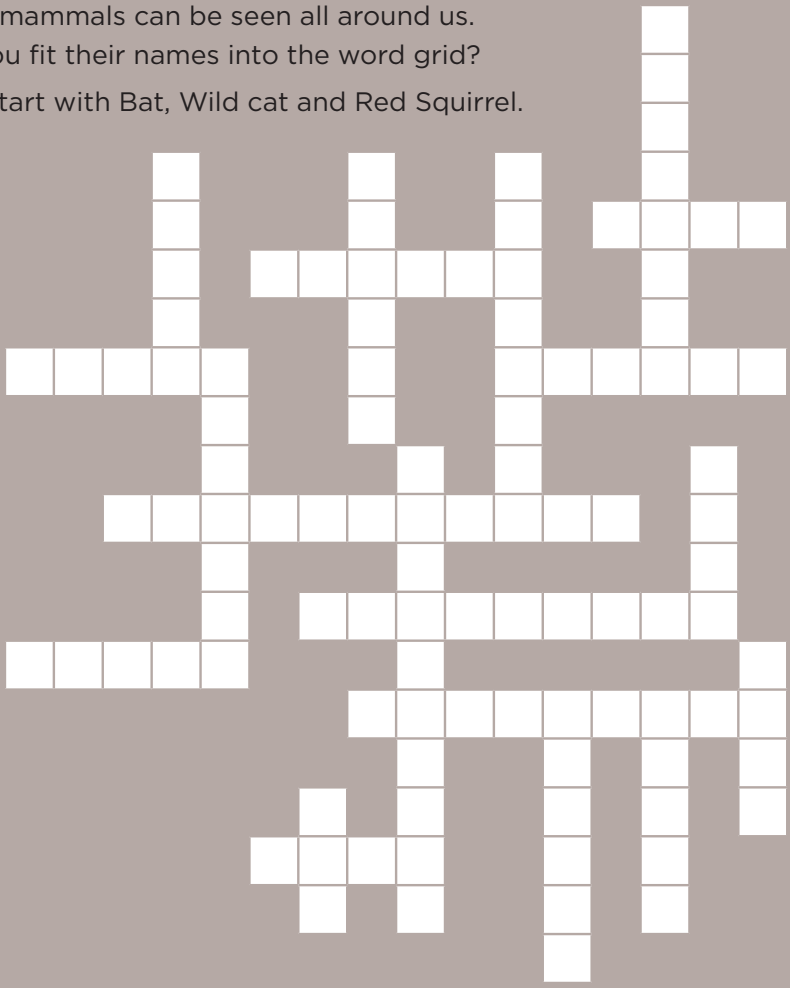


You can find the answers on page 13.

Marvellous Mammals Word Grid

These mammals can be seen all around us.
Can you fit their names into the word grid?

Hint: start with Bat, Wild cat and Red Squirrel.



3 letters
Bat

4 letters
Deer
Hare
Mole
Seal

5 letters
Mouse
Otter
Shrew
Stoat

6 letters
Badger
Beaver
Red fox
Weasel

7 letters
Wild cat

8 letters
Hedgehog
Wild boar

9 letters
Field vole
Water vole

10 letters
Pine marten

11 letters
Red squirrel

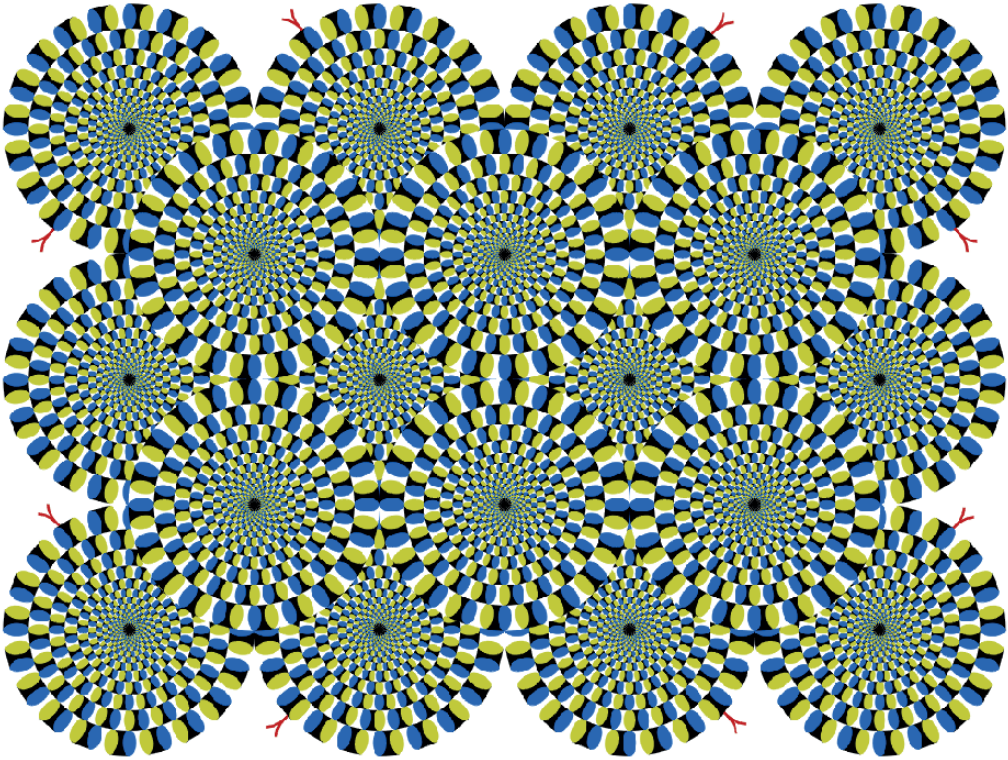
Make it to the Moon

NASA is returning to the Moon with its five Artemis missions, and humans will set foot on the Moon in 2025. We are planning to build a 'Moon Village' on the lunar South Pole within the next 30 years. Imagine you live on the Moon: What would it be like?

Design and make your own moon rocket, moon house with garden, moon rover, or robot using recycled materials.

Rotating Snakes?

If you feel dizzy when viewing the illusions cover one eye and look away!
If you have photosensitive epilepsy, please do not use the illusions.



Stare at the snakes. What do you see?

It's just a picture but it looks as though the snakes are moving.

If you stare at part of the picture, that part appears to be still but all the bits around it seem to be moving. These bits at the side are in our 'peripheral vision'.

There are a few different ideas about why this happens. We think our brains are trying to figure out the different colours, contrasts and shapes in the picture.

With grateful thanks to Akiyoshi Kitaoka

The Answers

Science and the Senses

Our five senses are:
Vision, hearing, touch, taste, smell

Our extra senses are:

- Proprioception: the sense of body position we get from the receptors in our muscles and joints
- Vestibular sense: the sense of balance in our inner ear

Wind Power!

Which appliance is costing the most?

Using the values from in table we find:

Dishwasher costs £1.76 each week

Tumble dryer costs £0.95 each week

Washing Machine costs £1.32 each week

Boiling Kettle costs £0.74 each week

Watching TV costs £1.18 each week

The dishwasher costs the most to run each week!

What a drag!

Unlike the Earth the Moon has no atmosphere which means there's no air resistance and the feather and the hammer would fall at the same rate!

Activities at other Durham University Attractions

A host of events will be taking place across Durham University visitor attractions as part of the Celebrate Science 2022 Festival. From FREE children's craft activities to science and nature trails, there's so much to see and do. Explore our other venues to see what else you can discover.

Oriental Museum

Elvet Hill, Durham DH1 3TH, Open Monday to Friday 10am – 5pm; Saturday, Sunday and Bank Holidays 12pm – 5pm

Wednesday 26th October, 10am - 11am:

Little Dragons:
Little Dragons is the Oriental Museum's group for under 5s. Our sessions include songs, story time, crafts, role-play, gallery hunts and object exploration!

Wednesday 26th October, 1pm - 3pm:

Celebrate Science at the Museum

Drop-in activity, free of charge, suitable for families and children aged 5 - 11 years.

Astrolabes were used to help people navigate using stars. Come and see the museum astrolabe and make a glow in the dark starry picture.

Botanic Garden

Hollingside Lane, Durham DH1 3TN, Open daily 10am – 5pm

Set in 25-acres of parkland just to the south of the city, the Botanic Garden is a wonderful place to explore the science of nature. Follow trails through the varied landscapes of the garden, enjoying artwork along the way. The Botanic Garden hosts a regular programme of activities and events. For more details visit: **durham.ac.uk/whatson**

We'd like your help

We hope you enjoyed Celebrate Science. We'd really appreciate it if you could help us make the next one even better by giving us your feedback here

smartsurvey.co.uk/s/Z8KPTS/

Get Involved at: #celebratescience

We would like to thank the following organisations for their contributions:

REECE FOUNDATION

BEAMISH THE LIVING MUSEUM OF THE NORTH

LOCOMOTION

IOP Institute of Physics North East

NORTH PENNINES Area of Outstanding Natural Beauty

Made possible with Heritage Fund

P&G Procter&Gamble

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CONSETT ACADEMY

Hartlepool Sixth Form

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