

01 Brain waves

Dr Sarah Kuppen, Department of Psychology, Anglia Ruskin University

How do we know what goes on inside our heads? This workshop will explore the mystery of our minds and how we untangle what makes us us. As well as a short talk which will explain how we can use experiments to understand ourselves, we will be painting individual model brains showing each separate part and learning what it does. By the end of the session everyone will have their very own mini map of the mind!

Age: KS 1 Days: Th, F

Maximum number of pupils per session: 30

Laptop and data projector essential

02 Gurgling guts: the disgusting journey of your food

Dr Rebecca Fitzgerald, Dr Pierre Lao-Sirieix, Hutchinson-MRC Research Centre

Using experiments, movies and props we will explain the fantastic and disgusting journey of food in our guts. Learn about the organs and their role, and get an amazing insight into the human body!

Age: KS 2 Days: M, Tu, W, Th, F

Maximum number of pupils per session: 80

Data projector, three large tables and access to water essential



03 We are the brainy scientists!

Dr Amy Milton and Dr Dawn Eagle, Department of Experimental Psychology

A workshop on brain function. The workshop can be tailored to individual schools. Activities can include pupils conducting experiments into their reaction times and memory capacity, working together to draw and colour in pictures of brains, organs and nerve cells within the body (at life-size!) and model brains (plastic and jelly) for the pupils to play with.

Age: KS 2 Days: Tu am, W am, Th am, F am

Maximum number of pupils per session: 30

Large rolls of paper, pens, pencils, colouring pencils/felt tip pens, stopwatches (5), metre rulers (5) and paper on which children can record their data essential

04 The Moon and Meteorites

Dr Margaret Penston, Institute of Astronomy

Learn about the Moon as the Earth's closest neighbour in space and find out what you can expect to see with simple equipment. Learn about other bodies in the Solar System and even handle meteorites from outer space!

Age: KS 2 Days: M, Tu, W, Th, F

Maximum number of pupils per session: 35

OHP and data projector essential (projector with smartboard, if possible)



Schools Roadshow 2012

05 Life on the road – the importance of transport in living things

Jonathan Lawson, Gurdon Institute

A talk with demonstrations investigating the importance of transport systems in keeping living things alive and functioning. We will consider a range of different scales, from the circulatory system, through plant xylem and phloem to intracellular transport networks. We will discuss what happens when these systems break down and will give some consideration to their evolutionary origins, considering concepts such as cytoplasmic streaming and invertebrate circulation, from sponges to fruit flies.

Age: KS 2, 3, 4 & Sixth Form **Days: M, Tu, W, Th, F**

No maximum number of pupils

Data projector and sound essential

06 From weather forecasts to geoengineering

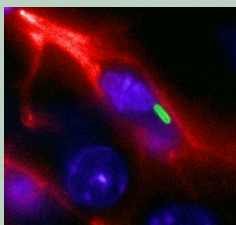
Dr Peter Braesicke, Department of Chemistry

How are weather forecasts made? How does weather relate to climate? How do changes in climate reflect in weather? Can we change our climate deliberately (so-called geoengineering)? In this talk we will discover about all aspects of weather and climate in this session as well as the answer to all these questions!

Age: KS 2, 3, 4 & Sixth Form **Days: M, Tu, W, Th, F**

Maximum number of pupils per session: 30

Data projector and white board essential



07 Blood, snot and puss – disgusting things that keep your body healthy

08 Friend or foe? How does your body know which are the right fights to pick?

Ed Roberts, Wellcome Trust Immunology Unit

Blood, snot and puss: Bacteria, viruses, fungi and parasites; you are constantly surrounded by a huge array of things which are trying to survive, so why aren't we constantly sick? We explore what organisms are out there which can cause you to

get ill. We'll discuss what the major barriers to infection are and this will include a hands on practical where we make synthetic snot to explore why it's such an important defence! We'll then talk about antibiotics and why they are not the answer to all infections.

Age: KS 2 & 3 **Days: M, Tu am, Th**

Friend or foe?: An interactive discussion exploring how the body recognises a threat to itself in a world full of 'foreign' objects which it needs to interact with, for example food. This introduction to immunology leads on to an examination of what happens when this goes wrong, such as with HIV and how we can manipulate the immune response by using techniques including vaccination.

Age: KS 3 & 4 **Days: M, Tu am, Th**

Maximum number of pupils per session: 30

Laptop and Projector essential for both sessions

Blood, snot and puss: Area that is easy to clean required as there may be some spills.

09 The multi-colour Universe

Dan Wilkins, Institute of Astronomy

This talk will explore the universe through the full electromagnetic spectrum, explaining the astronomical objects, processes and phenomena that can be observed at different wavelengths. See how the principles

of electromagnetic waves and optics help us build the world's largest telescopes to make stunning images and observations. Understand how our understanding of concepts in physics and chemistry such as waves, gravity, electromagnetism, gases and the periodic table explain astronomy from planets, moons and stars to galaxies, black holes and some of the most exotic and energetic phenomena in the Universe.

Age: KS 3 & 4 **Days: M, Tu, W, Th**

Maximum number of pupils per session: 60

Data projector essential



Schools Roadshow 2012

10 The science of electricity

Niraj Lal, Department of Physics

What uses more electricity: having a shower, or charging 400 phones? How much does it cost to boil a cup of water? What do spinning magnets in Little Barford have to do with powering lights in Cambridge? How do Buddhist singing bowls make solar panels more efficient? This talk takes a hands on look at how electricity works, and gets our brains ticking about what the electrical future will be like.

Age: KS 3 & 4 **Days: M, Tu, W, Th, F**

No maximum number of pupils

OHP and data projector essential. If audience larger than 50, a hands free microphone also required



11 Forgotten knowledge: the discovery and loss of a cure for scurvy

12 Alchemy and air (KS 4)

Dr Andrew Holding, MRC Laboratory of Molecular Biology

Forgotten knowledge Of all the slang names for the British, none is more iconic than 'Limey'. The term provokes majestic images of the Golden Age of Sail, when scurvy cost countless sailors their lives. The results of James Lind's work on the HMS Salisbury in 1747, which led to a cure, without doubt saved innumerable lives. Yet in Cherry-Garrard's account of Robert Falcon Scott's 1911 expedition to the South Pole, he writes: 'There was little scurvy in Nelson's days; but the reason is not clear, since, according to modern research, lime juice only helps to prevent it'. So why did Lind's results get forgotten?

KS 3 & 4 **Days: M, Tu, W, Th, F**

Alchemy and air In the summer of 1909, a German scientist, Fritz Haber, demonstrated a single chemical reaction that changed the world forever. His experiment showed for the first time that it was possible to convert the endless supply of nitrogen from the air into an invaluable resource that would define the first half of the 20th century.

KS 4 **Days: M, Tu, W, Th, F**

Maximum number of pupils per session: 40

Data projector essential



13 Future Technology

Dr Lata Sahonta, Department of Materials Science and Metallurgy

We humans are so successful because we want to understand how the physical world works, and we have learnt how to control the materials and energy around us to improve our lives. In the short time that humans have existed as a species, we have made amazing advances in health and medicine, finding sources of energy, designing new materials and machines, and we have even had the curiosity to explore space. In this talk we review some key technological discoveries that helped humans understand and control the environment, and we will look at some of the future technological advances, gadgets and medical procedures that will be used in the not-too-distant future.

Age: KS 3 & 4 **Days: M, Tu, W, Th, F**

Maximum number of pupils per session: 40

Data projector, screen and pc connector cable essential

14 The meaning of life and all that....

Dr Martin Welch, Department of Biochemistry

A one hour talk aimed at students with an interest in biology and the impact of genomics. We discuss DNA sequencing old versus new style and the impact of genomics. Ideas discussed will include – what will a knowledge of the genome (ours or any other organism) do for us? Why do it? Why not do it?

Age: KS 4 & Sixth Form **Days: M, Tu, W, Th, F**

Maximum number of pupils per session: 100

Data projector essential



Schools Roadshow 2012

15 The tools of astronomy

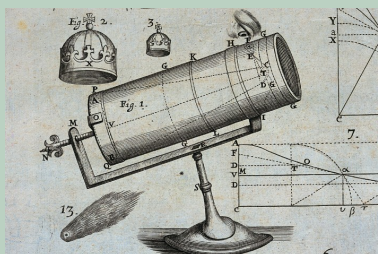
Jonathan Crass, Institute of Astronomy

For centuries people have looked up and studied the stars using just their naked eyes. However today, astronomers have a vast array of telescopes both on the ground and in space which they use to probe the cosmos. In this talk, we explore a brief history of the telescope and find out why it's so important to astronomers today. We look at why we need to use different wavelengths observations to find out how different astronomical systems and then finally conclude talking about real missions going on today and what they hope to discover.

Age: KS 4 & Sixth Form Days: M, Tu, W, Th, F

Maximum number of pupils per session: 100

Data projector, dark room and sound system essential



16 What is psychosis?

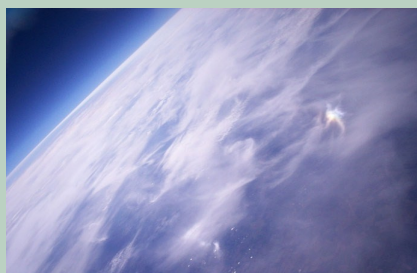
Dr Linda Scoriels, Department of Psychiatry

Psychosis is a mental disorder characterised by hallucinations, delusions, thought disorganisation, emotional imbalance, and cognitive dysfunctions. We will discuss each of these symptoms and try to explain their origins in the brain and in the environment.

Age: KS 1, 2, 3, 4 & Sixth Form Days: Tu am, W am

Maximum number of pupils per session: 40

Data projector essential



17 Beginners guide to astronomy (KS 1)

18 Life on other planets (KS 1)

19 Astronomy and light (KS 2)

20 Keeping up with the Universe (KS 4 & Sixth Form)

21 Building galaxies in an expanding Universe (KS 4 & Sixth Form)

Dr Lisa Jardine-Wright, Cavendish Laboratory

Five different lectures for different age groups, all of which aim to enrich our understanding of the Universe we live in.

Days: M, Tu, W, Th am, F

No maximum number of pupils

Data projector and screen essential

22 Resources and resilience

**Dr Aled Jones, Global Sustainability
Institute, Faculty of Science and
Technology, Anglia Ruskin
University**

Why is thinking about the availability of re-sources, such as oil and water, important for the future of the planet and who thinks about this in today's society? Which careers are impacted by science and scientific thinking and why is modelling important?

Age: KS 1, 2, 3, 4 & Sixth Form

Days: M, Tu, W, Th, F

No maximum number of pupils

23 Building animals from bones

Dr David Bainbridge, Department of Physiology, Development and Neuroscience

The enormous range of animal bodies we see in the world around us are often made from the same few basic components. The aim of this talk is to show how from such simple structures, complicated animals can form. Bones from the Veterinary Anatomy Department – including sawfish, crocodiles, walrus, parrots and anteaters – will be available to view and handle!

Age: KS 1, 2, 3, 4 & Sixth Form Days: M pm, Tu pm, W, Th, F

Maximum number of pupils per session: No maximum

OHP or data projector and laptop essential



The Cambridge Science Festival Schools Roadshow events are free talks, given at your school, by leading academics affiliated to either the University of Cambridge or Anglia Ruskin University. To book, visit www.cam.ac.uk/sciencefestival, or call 01223 766766.