

# STEM FESTIVAL PROGRAMME

21 & 22 JUNE 2018



# STEM Festival Programme

## 21 & 22 June 2018

Welcome to the St Chris STEM Festival 2018.

Over the course of two days you will get the opportunity to choose a whole host of different workshops to take part in.

Please see the enclosed information to help make your choice and let your Advisor know.

As well as the workshops included in this programme, everyone will take part in:

- Medical Marvels Workshop
- Code Breaking Workshop

Throughout the festival we will be raising money for the Hitchin Hedgehog Preservation Society.

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## WORKSHOP OPTIONS

### Visit Wobbly Bottom Dairy

This is a rare opportunity to visit Wobbly Bottom Dairy to see how they make their cheese from milking the goats through to the final stages of making cheese. There will also be an opportunity for cheese-tasting!

The farm is run by Alan and Angela, who have been developing and perfecting their cheese-making craft since 2003. They manage every aspect of production, from what the goats eat to the finished product which is sold wholesale at farmers markets and food festivals.



### Molecular Gastronomy / Chemistry in Cooking



In this session you will be given an introduction to molecular gastronomy. You will be looking at food science and making delicious edible treats, exploring the science of emulsions and their use in cookery.

### Chain Reaction Dominos

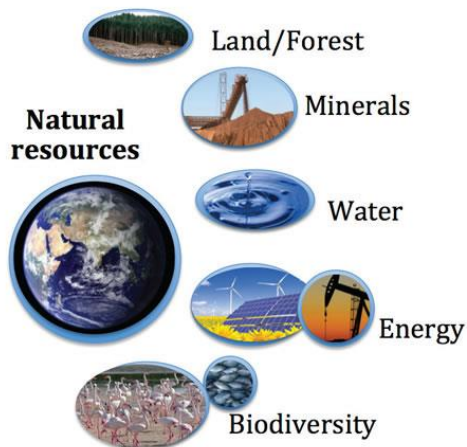
This workshop will involve constructing a domino cascade to mimic a chain reaction.

You will work as a team to see just how long you can make the domino cascade...



## The Economics of Climate Change and Environmental Degradation

*"Climate change is a result of the greatest market failure the world has seen. The evidence on the seriousness of the risks from inaction or delayed action is now overwhelming. We risk damages on a scale larger than the two world wars of the last century. The problem is global and the response must be collaboration on a global scale."* Sir Nicholas Stern



Climate change poses new problems for all of us. How we address the problems we can foresee - "The known knowns" - and the ones we cannot - "the known unknowns and the unknown unknowns" - are critical ones that future economists and policymakers will be forced to address.

Even before our reserves of oil and other fossil fuels are exhausted, the release of the CO<sub>2</sub> will have changed the climate of the planet in incalculable ways. We will have to confront a less fertile and more inhospitable environment. The competition for resources, clean water, refugee crises, rising sea-levels, the spread of diseases will provoke new conflicts. We could see a rise in xenophobia and populists offering counterfactual and simplistic answers to complex questions.

But what are the solutions? How can we cooperate on an international level when so many of our politicians seem determined to turn their backs on international cooperation and undermine the value of treaties and commitments?

What costs will we face if we take decisive action to offset climate change? And what are the costs of inaction?

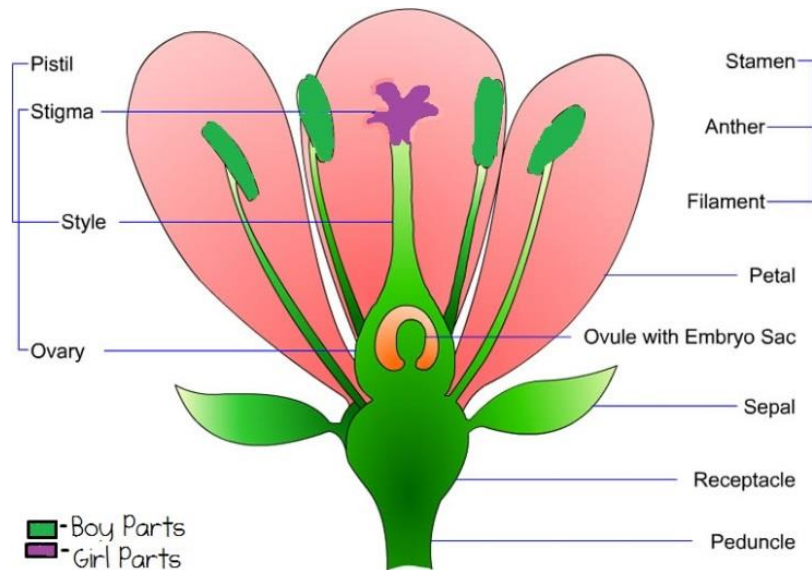
Can we rely on the ingenuity of the free market and corporations doing 'the right thing', or will success rely on action by governments enforcing limits and regulation and making us work together?

We will look at these and many other questions that relate to the economics of climate change.



## Le Festival des Sciences/ El Festival de las Ciencias

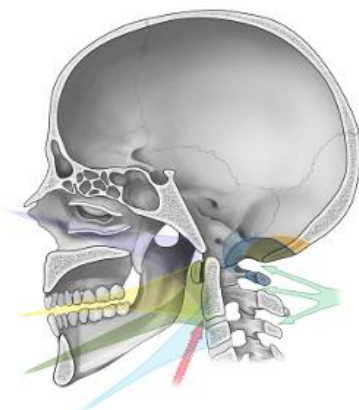
In this workshop you will discover the work of some famous French and Spanish scientists and their scientific discoveries. The session will involve both English, Spanish and French. Students will also have the opportunity to do their own research and presentations.



You'll also have the opportunity to dissect a flower and complete a scientific drawing of it. You'll also see how scientific language is closely related to Spanish, French and German – and you might even delve into the world of Latin language!

## Dissection Masterclass

In this workshop you will have the opportunity to be guided in the dissection of a real rat and dog fish, allowing us to see what lies inside these organisms and how their structure is adapted to their function. In the medical field, this knowledge is what informs treatments and interventions when things go wrong with these organs. We shall discuss what can go wrong in the structures that we observe during the dissection and what can *theoretically* be done to fix these problems - some of the ideas may happen to be existing treatments whilst others might be treatments to developed and offered in the future!



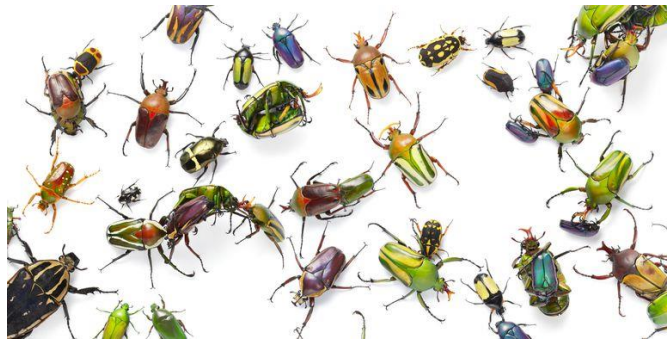
## Plants, Potions & Poisons: A Historical Ramble through Herbology!



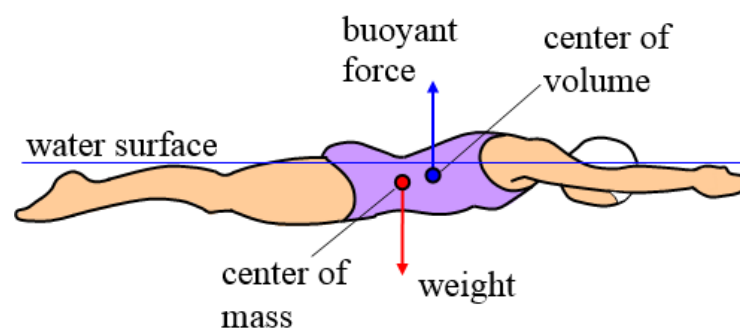
Interested in how some of the most famous murders in history were committed? How medieval herbalists decided which plants would cure which part of the body? Which plants made beer and which plants were deodorants? All this and astounding anecdotes from history too!

## Bugs in Boxes

In this workshop you will have the chance to make a community art piece which will be displayed in Science and inspired by the idea of 'bugs in boxes'. The art piece will involve several media: graphics, illustration, etching, 3D and textiles.



## The Science of Swimming and the Physics of Floating



In this session you will explore how science helps us (in comparison to other animals) to move through and float on the water through some FUNdamental activities!

## Eggcelent Constructions

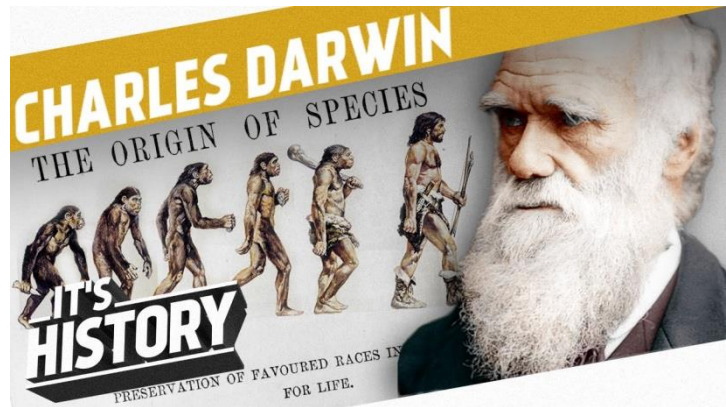


Use an array of recyclable materials to construct a landing platform that will hold and protect a raw egg, dropped from above. The higher the egg can be dropped from, the more points will be gained!

We will start dropping eggs from 20cm and will go higher and higher in 20cm increments until the support fails...

## Creating Theatre

This will involve working on ideas for a new play about the life of Charles Darwin and the Theory of Evolution. You will need to be someone with a strong interest in drama and a desire to work hard on challenging material!



Activities will include drama games, improvisation, dialogue writing, character development, research, physical theatre and design exploration.

## Commemorative Filming of Festival



This will involve creating a film of the full two days of the festival: interviewing, filming, editing. Work as a team to create a lasting memory of all of the excitement and inspiration on display at the STEM festival!



## Extreme Paper Bridge Building



Your task is to build a bridge to withstand the test of time and a lot of weight.

You will be given paper and sellotape and will need to work as a team to construct the strongest bridge you can, before it is tested with weights to see how much it can withstand.

## Survival Skills

What would you do if you were stranded? Could you survive in the great outdoors? Can you work as a team? Test your survival skills "Bear Grylls style" in the great outdoors.



## Sugarcraft Botany



What do you get when you mix sugary sweetness and realistic flowers and leaves? Sugarcraft botany of course! Come and make incredible edibles and be part of our giant botanical cake which will be raffled off at the Summer Fair.

## Science Research Ethics Debate

In this session, you will work as two teams of up to four students and research and prepare arguments for the following parliamentary rules debate: *'This House believes that all animal testing in science research is immoral and unnecessary.'*



## Origami Organelles



In this session you will create and make plant and animal cells, heart and other organs using paper craft!

The only limit is your imagination! The finished pieces will be displayed after the festival in the Science Department.

## Orienteering

In this session you will be utilising a compass, pacing and general navigational skills.

We will be heading to the Greenway and, in pairs, you will have to find all the orienteering points to discover the code word which gives you access to the minibus home!

This will be a timed event with the fastest time winning a prize.



## Discovering DNA

This workshop will have a look at the structure of DNA and its importance.

We will make models which students can take home – or possibly eat. We will also have a go at extracting our own DNA from cheek cells.



## Puzzling Maths

Only 1%  
People  
Solved it..



This workshop will involve tackling a variety of fun, interactive puzzles.

Challenge yourself to see how many you can complete by the end of the session...

## Bread Making

In this workshop you will learn about and discover the science of bread making.

You'll also have the opportunity to make your own bread (and eat it afterwards...)



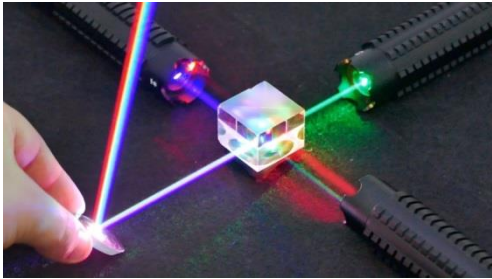
## Challenging Maths



In this workshop you will work as a team to compete against each other on logic-based and other challenging maths topics. Not for the faint-hearted!



## Lasers



This is a lecture, involving a visiting speaker who is coming to demonstrate how lasers work and show us the cool science behind lasers.

## Sound



Interested in knowing more about the science of sound? Then come along to this lecture on sound given by a visiting lecturer from the University of East Anglia – audience participation is encouraged!

## Fire investigation Talk



We are lucky to have the Chief Fire Officer from Baldock Fire Station visiting us for this session. You will find out about how the fire brigade investigate how fires start. This is an interesting opportunity to see science in the real world and is an introduction to both the world of forensic science and science and the law.

## Making Rockets

In this exciting session, you will see a demonstration of Newton's 3 laws of motion using air and water rockets.



## **Our Natural Worlds Rocks: A Geological Ramble**



An interactive activity looking at the local geology around Letchworth and the south east of England.

The session will focus on chalk, flint and sandstone and you will learn about how these rocks are made and what the effect of human activity is on our landscape. If you like doing experiments then this is the workshop for you.

## **Birds of Prey Demonstration and Talk**

The Birds of Prey Sanctuary in Biggleswade is bringing four different types of bird, including a barn owl, for this exciting session. You will be able to get up close to these fascinating birds. Not to be missed!



## **Change Ringing**



A fantastic opportunity to have a go at ringing church bells in the local tower of Weston church.

This is a great opportunity to experience something a bit different. Bell-ringing relies on your ability to sequence numbers and if you enjoy looking at patterns of numbers then this is the workshop for you!



## Spectroscopy in a Suitcase

(Sixth Form Chemists and Physics Students only)

Spectroscopy in a Suitcase – lead by Carys Thomas from the University of East Anglia, is an opportunity to gain hands-on experience with relevant techniques such as IR and UV-Vis spectroscopy in small groups. A fascinating workshop for older students.



## Team Building with the Fire Brigade



An opportunity to work with *real* fire officers and complete team building activities at Baldock Fire Station. You will get to wear breathing apparatus and communicate in a simulated fire environment. Please note that this workshop is not suitable for people who suffer from claustrophobia.

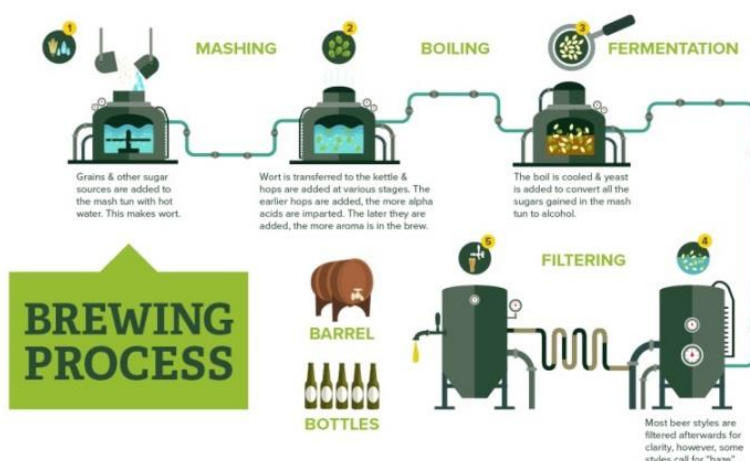
## Mathmagics

Visiting speaker David Hall will run a series of workshops on mathematics and mathematical challenges.

This will be a fun session – even for those who are not so keen on numbers!

**[Math+ $\Sigma$ agic]<sup>TM</sup>**  
mathmagic

## A Visit to Letchworth Brewery



How do you fancy learning the science of beer making? You will have the opportunity to visit a local brewery and discuss the science of brewing with a master brewer.

## Ice Station Andy

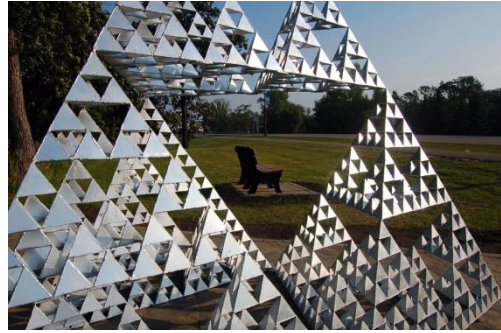


This session explores the nature of liquid nitrogen in detail. You will see a series of experiments and the effect of very cold temperatures on gasses, solids and liquids. There may even be some explosions and the opportunity to make ice-cream...although we can't guarantee cornets and flakes...

## Pyramid Building

In this workshop you will be building a fractal tetrahedron pyramid.

The only limit is your imagination and the size of the school field, as you work as a team to build the biggest pyramid possible.



## Our Natural World Photography



Ever fancied photographing the natural world in all its technicolour glory? Then this is the workshop for you.

During this session, you will have the opportunity to digitally capture animals, insects or plants.

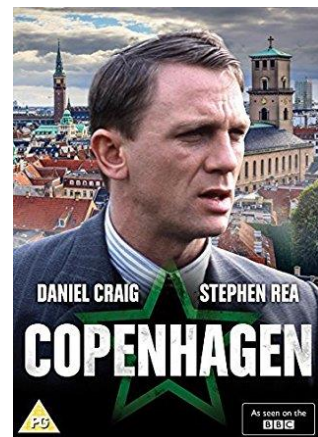
## Film Screening: Gorillas in the Mist and Copenhagen



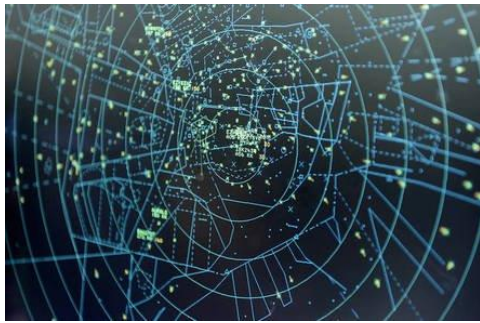
*Gorillas in the Mist* is an Oscar-winning film about the ground breaking work of naturalist Dian Fossey who spent time in Rwanda documenting the life mountain gorillas.

*Copenhagen* is set in the Second World War and features a theoretical meeting between physicists Neils Bohr and Werner Heisenburg in 1941 to discuss their work and past friendship.

It also revolves around Heisenberg's role in the German atomic bomb program during the Second World War.



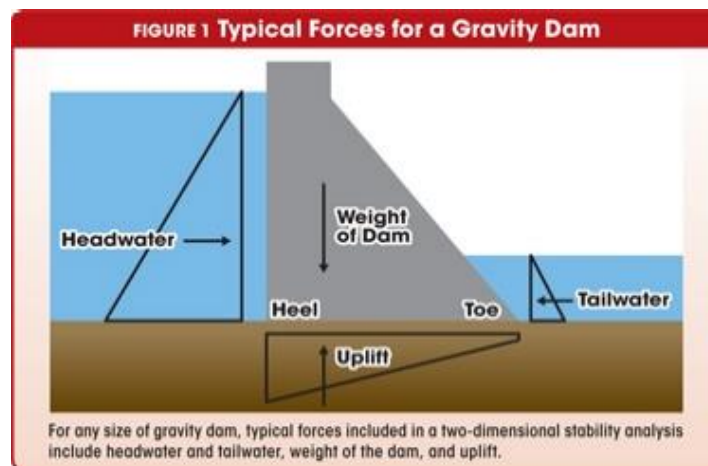
## Air Traffic Control



Ever wondered how they organise all the planes landing at an airport? Find out what skills you need to become an air traffic controller and if you have what it takes! The session will be led by an experienced air traffic controller and promises to be a fascinating introduction to the role.

## Stability of Dams

(Suitable for Sixth Form students only)



For this session, you will apply your knowledge and understanding of force vector diagrams to sketch and discuss how forces may cause different forms of movement if unbalanced.

## The Rotating Parrots



Don't worry, this won't involve real-life parrots.

Instead, you will be using the centre of mass to design and construct revolving (plastic) parrots on a perch.

An unusual and interesting workshop!



## A Trip to Building Research Establishment (BRE)



BRE is the world's leading Building Science Centre and this is an exciting opportunity to visit and tour the centre, where there will be the opportunity to look at fire resistant materials (and test them.)

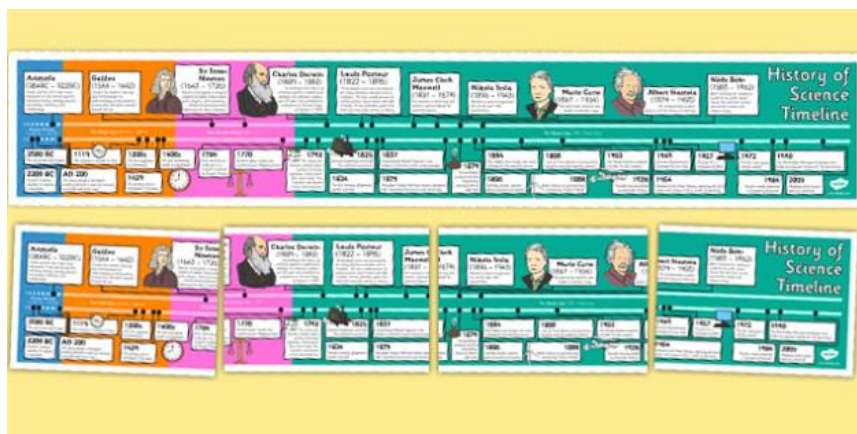
The visit will take a whole morning so please be aware that your other workshop choices might be limited. Great opportunity if you are keen on CDT.

## Hedgehog Homes for St Chris

Hedgehogs are some of our rarest creatures in Britain, with numbers declining each year. Here at St Chris we are going to build hedgehog homes (and possibly hotels) and feeding stations and site them in Arunwood. Part of this workshop involves a hedgehog talk from a local rescue centre.



## Science Timeline



In this workshop you will be creating a huge timeline of scientists and their discoveries to make a visual display.