



UNIVERSITY OF
LIVERPOOL

*Faculty of Science &
Engineering*

Year 12 STEM Masterclasses

18th to 20th June 2018

A day of hands-on practical activities for A-level students
in our stunning Central Teaching Laboratories &
Engineering Active Learning Laboratory

Just £5
per
student



Chemistry

Computer Science

Electrical Engineering
& Electronics

Engineering

Environmental
Sciences

Mathematics

Physics

09.00 – 09.30	Arrival
09.30 – 09.50	Welcome and introduction
09.50 – 11.35	Practical session 1
11.35 – 11.55	Session on UCAS applications
11.55 – 12.40	Lunch break
12.45 – 14.30	Practical session 2
14.30 – 14.45	Plenary Session

Several options to choose from - your two practical sessions can be in the same or different subject areas (see overleaf)

TEACHERS:

To register your school for places and provide us with the information needed to invoice the schools for the students who book on, go to
<http://tinyurl.com/uolyr12schools>

STUDENTS:

Once your school is registered, to sign up, go to:
<http://tinyurl.com/uolyr12req>

Both forms works on smartphones
in Chrome and Firefox, avoid IE9 !

<p>Chemistry: <i>Let There Be Light (must be studying A-Level Chemistry)</i> Investigate a photo-catalytic reaction and see how light and an inorganic catalyst can be used to purify water. Follow the reaction by spectrophotometry.</p>
<p>Chemistry: <i>Creation in Chemistry (must be studying A-Level Chemistry)</i> Learn techniques of synthetic organic chemistry in a state-of-the-art lab. Prepare a sample of a local anesthetic. Use IR spectroscopy, thin layer chromatography and melting point determination.</p>
<p>Computer Science: <i>Artificially Intelligent Lego (must be studying any A-Level science)</i> Come and experiment with Artificial Intelligence in action. Hear about state-of-the-art applications and the challenges in building these. Learn about issues with, and techniques for, programming robots to give them autonomy. Through our Lego robots we will give you an insight into some issues that are of core concern for Artificial Intelligence.</p>
<p>Electrical Engineering and Electronics: <i>How to Communicate During a Zombie Apocalypse (must be studying A-Level Maths)</i> Learn the basics of radio communication for when you might need it the most. During this workshop you will be modulating, transmitting, receiving and demodulating speech and other signals that may give you the tips to survive the zombie wasteland!</p>
<p>Engineering: <i>Movers and Shakers (must be studying A-Level Maths)</i> Your team have been successfully won a contract to design the next office building for E4A Construction within an earthquake-prone city. Before proceeding, you have decided to create a simple model of the building to test it in an earthquake simulation. You will also need to consider commercial viability and trade construction materials on the open market.</p>
<p>Environmental Sciences – Geology/Volcanoes: <i>Turtle Island - Volcanic hazards (must be studying any A-Level science)</i> How do scientists predict volcanic eruptions & their associated hazards? Investigate the hazards of living on a volcanic island & learn how to create a hazard map & reduce the risks. Where is it safe to live and work? Where would you evacuate to safely in the event of a volcanic eruption? Make your predictions, then see how well you fare... can you save the people of Turtle Island?</p>
<p>Environmental Sciences – Ocean Science: <i>Avalanches and Life in the Ocean (must be studying any A-Level science)</i> What happens when river water enters the sea? Use some water, salt and a bit of food colouring tanks to experiment with the physics of how salty water and freshwater behave when they meet each other, and learn the importance of the resulting circulation to the survival of marine animals.</p>
<p>Maths: <i>The Dragon Quiz (must be studying A-Level Maths)</i> Compete against other students in the Dragon Quiz to solve mathematical challenges. Take on the Dragon Masters in a team of 4, can you claim the Dragon's treasure?</p>
<p>Maths: <i>Mathematical Marvels (must be studying A-Level Maths)</i> Academics from across the Department of Mathematical Sciences will deliver a range of interactive and exciting talks about the applications of their research to the real world.</p>
<p>Physics: <i>How to Survive on the International Space Station (must be studying A-Level Physics)</i> In this experiment, small groups will investigate the radioactivity of a radioactive source and the effect of using various attenuating materials placed in between the radioactive source and the detector. This is the basis of radiation shielding.</p>
<p>Physics: <i>Particle Tracks (must be studying A-Level Physics and Maths)</i> Using data from Cern, you will use mathematical analysis to identify the different particles that can be found in the Large Hadron Collider.</p>

NB: we can't guarantee that all workshops will be run on all days, but we will try to give you 2 of your 3 selected sessions.

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