Chemistry: *Let There Be Light* *(must be studying A-Level Chemistry)*

Investigate a photo-catalytic reaction and see how light and an inorganic catalyst can be used to purify water. Follow the reaction by spectrophotometry.

Chemistry: *Creation in Chemistry* *(must be studying A-Level Chemistry)*

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 & melting point determination.

Computer Science: *Artificially Intelligent Lego* *(must be studying any STEM A-Level)*

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.

Electrical Engineering and Electronics: *How to Communicate During a Zombie Apocalypse* *(must be studying A-Level Maths)*

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!

Environmental Sciences – Geoforensics: *Who Dunnit?* *(must be studying any STEM A-Level)*

Solving a murder mystery using forensic environmental sciences - and finding out what else we can discover by using the scanning electron microscope (SEM).

Environmental Sciences – Geography: *Inside an Environmental Time Machine* *(must be studying any STEM A-Level)*

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.

Maths: *The Dragon Quiz* *(must be studying A-Level Maths)*

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?

Maths: *Mathematical Marvels* *(must be studying A-Level Maths)*

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.

Orthoptics: *The science of Seeing* *(must be studying A-Level Physics)*

How does your eye work? What causes problems with vision? How can we see further or better?

Physics: *How to Survive on the International Space Station* *(must be studying A-Level Physics)*

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.

Physics: *A Radioactive Cat has 18 Half Lives* *(must be studying A-Level Physics & Maths)*

In this workshop, we will explore the world of nuclear physics using coins, dice and the head of a (non-alcoholic) beer! From studying these simple things, we will be able to create a model for nuclear decay and perform a mathematical analysis of some real radioactive data. Disclaimer: No radioactive cats were harmed in the creation of this workshop