

## Week One: 2<sup>nd</sup> - 9<sup>th</sup> July 2019

### Lego Robotics

Session length: 3.75 hours

Workshop leader: *The Curiosity Hub*

Curiosity Hub is a leading provider of STEAM (Science, Technology, Engineering, Arts & Maths) enrichment in Sussex, UK. Founded by Jacqueline Currie, an aerospace engineer and STEAM educator. The Hub have reached thousands of children and families at schools, colleges and science festivals across the region.



The Curiosity Hub approach:

- Focus on creative, hands-on activities
- Small group setting
- Experienced, enthusiastic and DBS-checked leaders
- Welcoming and inclusive learning environment
- Latest in educational technology including Lego Robotics, Minecraft EDU & Animation
- Make friends, learn new skills and have fun!

Find out more at [thecuriosityhub.com](http://thecuriosityhub.com)



	Session Description	Learning Outcomes
<b>Session 1</b> 5 <sup>th</sup> July 2019	Follow in the tracks of the Curiosity Rover and search for life on Mars!  In this workshop, students will work in groups of 2-3 to assemble and learn to program robots using Lego Education Mindstorms EV3 robotics kits.  Students will build robotic rover-style robots along with sensor and motor attachments, and use programming software to complete planetary exploration challenges!	<ul style="list-style-type: none"> <li>• Build a Lego Mindstorms EV3 robot</li> <li>• Program the robot to move</li> <li>• Design and build sensor and motor attachments for more advanced programming challenges</li> </ul>
<b>Session 2</b> 8 <sup>th</sup> July 2019	Are you ready for the Mindstorms challenge?  Students will work in groups of 2-3 to program, experiment with and modify a rover-style robot to solve puzzles and complete challenges!  We'll learn to use the software engineering cycle (Design, Program, Test, Improve) to create efficient programs and discover there is often more than one solution!	<ul style="list-style-type: none"> <li>• Program the robot to complete challenges and solve puzzles</li> <li>• Learn to use the software engineering cycle</li> </ul>

## Week Two: 9<sup>th</sup> - 16<sup>th</sup> July 2019 CSI

Session length: 3.75 hours

Workshop leader: Jon Bates, *Sci High*

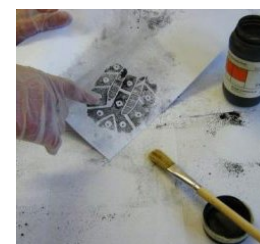
The sessions are run by Jon Bates, a highly experienced, degree qualified forensic scientist. Jon has been a forensic scientist for more than 25 years, visiting crime scenes, working in the laboratory and presenting evidence at Courts of Law. He is now one of the top forensic science educators in the UK and works extensively in schools and colleges, teaching forensic science and delivering workshops.

Sci High provides forensic science events unrivalled in their scientific breadth and depth. The sessions are busy and interactive with great science. They combine science with drama and role-play allowing students to demonstrate critical thinking, creativity and acting ability – great events for all personality types!

Modern aspects of forensics are covered with real scientific depth and the forensic scientist presenter provides plenty of real-world detail.

Alongside the science, students learn about the Criminal Justice System in the UK and how courtroom trials are carried out. The best way to learn science is to combine it with enjoyment and fun – and these sessions do just that!

Find out more at [scihigh.co.uk](http://scihigh.co.uk)



	Session Description	Learning Outcomes
<b>Session 1</b> 12 <sup>th</sup> July 2019	<p>Students work in teams to solve an aggravated burglary. Some of the students role-play suspects for the crime and explain why they are innocent.</p> <p>Then, students act as Scene of Crime Officers dressed in white coverall suits, masks and gloves and examine the crime scene following a professional protocol. Another students acts as a police officer to guard the scene and deal with any visitors.</p>	<ul style="list-style-type: none"> <li>• Develop an in-depth understanding of how biology, chemistry and physics are used in forensic science investigations</li> <li>• Understand the central bases of forensic science work: Locard's Principle; evidence preservation; the chain of continuity; objectivity and impartiality; the theory of evidence interpretation</li> <li>• Develop an in-depth understanding of the importance of DNA analysis in forensic science</li> <li>• Appreciate the importance of meticulous practical work and objective, critical thinking in scientific investigations</li> <li>• Understand how teamwork and effective communication are central to professional scientific work</li> <li>• Appreciate some essential aspects of the British criminal justice system and its relationship to fundamental human rights</li> </ul>
<b>Session 2</b> 15 <sup>th</sup> July 2019	<p>Students then carry out a lot of forensic science practical work including fingerprints, blood patterns, footwear marks, DNA interpretation, document analysis, paper chromatography and mobile phone forensics. The background science of the evidence – biology, chemistry and physics – is considered in detail. The manner in which forensic evidence is interpreted is discussed. The way that DNA and digital evidence has changed forensic science is covered in depth.</p> <p>Finally there is a role-play courtroom trial in which students, dressed in courtroom attire, role-play the judge, jury, barristers, forensic witness and accused.</p>	

## Week Three: 16<sup>th</sup> - 23<sup>rd</sup> July 2019 Architecture, Maths and Design

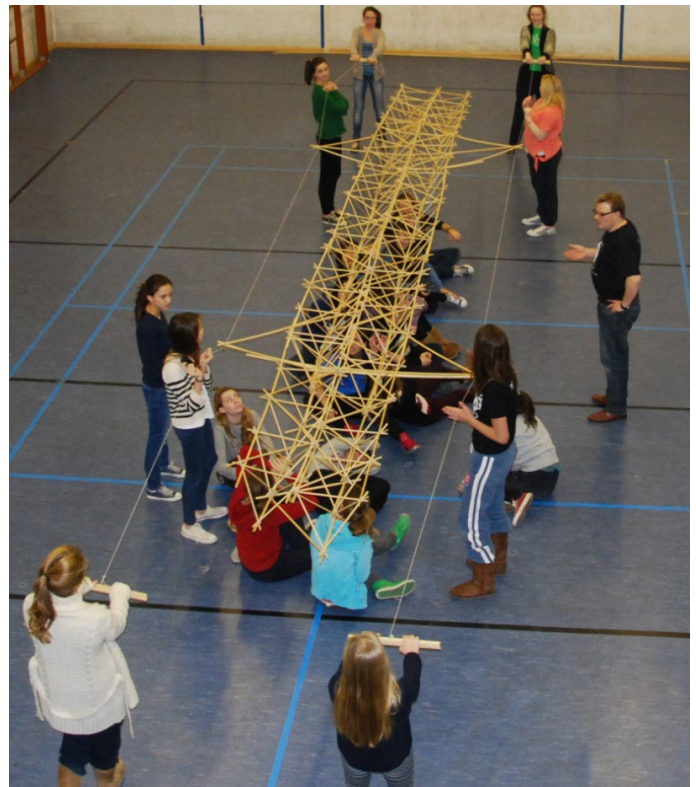
Session length: 3.75 hours

Workshop leader: Mr Martin Jennings, *Architecture Workshop Cambridge*

Martin BA(Hons) Architecture with Interiors Manchester Metropolitan University. Martin has worked for Architecture Workshop since May 2000. He has worked extensively as an architectural technologist in architectural practices in Manchester, Bristol and Cambridge.

[Architecture Workshop Cambridge](http://architectureworkshops.org) is a small education association which has run hands-on, fun and educational activities for all Key Stages and abilities since 1996. These workshops are designed to enhance the curriculum, linking Maths and Science, with Design Technology, and History. The workshops help develop students as creative thinkers, effective participants, independent enquirers, reflective learners, self managers and team workers, through a combination of individual, group work, design, problem solving and creativity.

Find out more at [architectureworkshops.org](http://architectureworkshops.org)



	Session Description	Learning Outcomes
<b>Session 1</b> 19 <sup>th</sup> July 2019	Two exercises introduce students to the idea of building to scale and negative space; 1) Using dowel and rubber bands students build modular structures (tetrahedra) that form part of a larger whole. This is discussed, firstly as a geometric structure and then with the addition of 1:50 scale model figures a piece of architecture. 2) With large pieces of dowel students work in teams to build a temporary shelter in one of three environments. These are discussed as 1:1 scale structures. These structures are photographed and sketched for later use.	<ul style="list-style-type: none"> <li>• Understanding scale and ergonomics</li> <li>• Introduction to negative space</li> </ul>
<b>Session 2</b> 22 <sup>nd</sup> July 2019	Students are made aware of the “positive” and “negative” spaces within the built environment and that it is this relationship, that the architect has fashioned, that differentiates architecture from other building. Using simple materials and these basic ideas they asked to make a series of spatial maquettes, which are scaled using model figures. Students further explore their ideas of architecture by building large scale versions of their spatial maquettes. They construct models of the London and York Millennium bridges, exploring the differences and similarities between the two types of suspension bridge.	<ul style="list-style-type: none"> <li>• Appreciation and understanding of positive and negative space</li> <li>• Insight into how Artists and Architects work</li> </ul>

## Week Three: 23<sup>rd</sup> -30<sup>th</sup> July 2019 Space Balloon

Session length: 3.75 hours

Workshop leader: *Classtronauts, Sent Into Space*

This series of workshops will be run by Sent Into Space, the world's leaders in near space exploration. They apply cutting-edge research and innovation to create inspiring educational experiences.

Classtronauts is an educational programme provided by Sent Into Space, where students conduct their very own near-space launch.

Sent Into Space has conducted over 400 launches, of which over 100 have been through the Classtronauts programme.

Find out more at [sentintospace.com](http://sentintospace.com)



	Session Description	Learning Outcomes
<b>Session 1</b> 26 <sup>th</sup> July 2019	Students explore the background of gravity, forces, and space. They will learn about the physics of high altitude balloon flight, basics of relevant engineering such as insulation and weight management, composition of upper atmosphere. Taking part in a Q+A session to explore the topics further, students will have opportunity to ask their questions to real space launch experts.  Students will then discuss and select the item to be featured in the balloon launch, that will go into space and placed in front of the camera to be monitored.	<ul style="list-style-type: none"> <li>• Explore the physics behind high altitude balloon flight</li> <li>• Introduce the basics of relevant engineering such as insulation and weight management</li> </ul>
<b>Session 2</b> 29 <sup>th</sup> July 2019	Students will prepare for the launch and see a high altitude balloon launch from the site.  Students follow the journey of the balloon using sophisticated weather modelling software and real-time positional data to predict the landing site and race to retrieve the payload.	<ul style="list-style-type: none"> <li>• Investigate the amount of lift that is generated by one or more helium balloon</li> <li>• Indicate and identify the forces acting on objects during flight</li> </ul>

## Week Four: 30<sup>th</sup> July - 6<sup>th</sup> August 2019

### Stop Motion Movies and 3D Printing

**Session length:** Each session is 3.75 hours

**Stop Motion workshop leader:** *The Curiosity Hub*

Curiosity Hub is a leading provider of STEAM (Science, Technology, Engineering, Arts & Maths) enrichment in Sussex, UK. Founded by Jacqueline Currie, an aerospace engineer and STEAM educator, the Hub has reached thousands of children and families at schools, colleges and science festivals across the region.

Find out more at [thecuriosityhub.com](http://thecuriosityhub.com)



**3D Printing workshop leader:** *Learn by Layers*

3D Printing will change design and manufacturing like computers and coding have changed how we operate every day. That's why it's imperative that children are taught about this ground breaking technology.

Over the past four years Learn by Layers have taught hundreds of teachers how to 3D print by running workshops for schools. They have also delivered training sessions internationally, most recently at the 'International STEM conference' in Singapore.

Find out more at [learnbylayers.com](http://learnbylayers.com)



	Session Description	Learning Outcomes
<b>Session 1</b> 2 <sup>nd</sup> August 2019	Lights, camera, action! Students will work in pairs to create short stop-motion movies using HUE Animation software and webcams.  They first learn about the science and technology behind stop-motion, including vision and the brain.  They then explore storytelling and create storyboards, before bringing their creations to life with sets, scenery and clay characters.  Students will also learn how to create special effects, credits and add sound to their films.  After the workshop, the students' movies can be downloaded or emailed.	<ul style="list-style-type: none"> <li>• Create a short stop-motion animation film</li> <li>• Create a storyboard of the movie</li> <li>• Create sets, scenery and characters</li> <li>• Add sound, credits and special effects to the movie</li> </ul>
<b>Session 2</b> 5 <sup>th</sup> August 2019	In this session students will learn how 3D printers operate and the concept behind the technology.  They will learn about all the different materials available that you can 3D print with and the environmental factors involved with 3D printing.  Students will then learn how to create 3D designs using the latest 3D CAD software and then how to slice the models ready for 3D printing.  Students will be tasked with learning the concept of parametric modelling allowing them to create designs that can be 3D printed. In the session students will be taught how to create a customised smart phone case that can be 3D printed.	<ul style="list-style-type: none"> <li>• Learn how 3D printers work</li> <li>• Understand how to create designs for 3D printing using Fusion 360</li> </ul>