

# MadLab

## Children and YP Workshops Brochure

Autumn 2018



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# 1 MISSION

**Welcome to MadLab**, the UK's longest-running and **most active** makerspace. We're passionate about making Science, Technology, Arts and computing not only fun – but relevant, compelling and exciting – to a broad and rapidly growing spectrum of users.

MadLab's creative workshops are great for children, offering engaging learning experiences that can be aligned with the curriculum.

MadLab also works on behalf of organisations, schools, local councils, third sector and creative/ tech organisations, to deliver making and digital courses to their users.

*"I brought my 10 year old brother to Make Stuff because he was interested in a job in programming like me - and now he knows that's what he definitely wants to do. We have found out about more courses now at MadLab and have already signed up."* 21 year old attendee at Make Stuff in Bury

Previous clients include: Arts Council England, FutureEverything, Jaguar Land Rover, The Prince's Trust, The Wellcome Trust, Nesta, The Nominet Trust, The University of Manchester, Manchester Metropolitan, Brighter Sounds, Whitworth Art Gallery, Manchester City Council, and John Lewis.

**FACILITATOR COSTS:** £350 for a full day (8-hours)/ £200 for a half day (4-hours) - price excludes VAT

## **Contact us:**

email: [learn@madlab.org.uk](mailto:learn@madlab.org.uk)

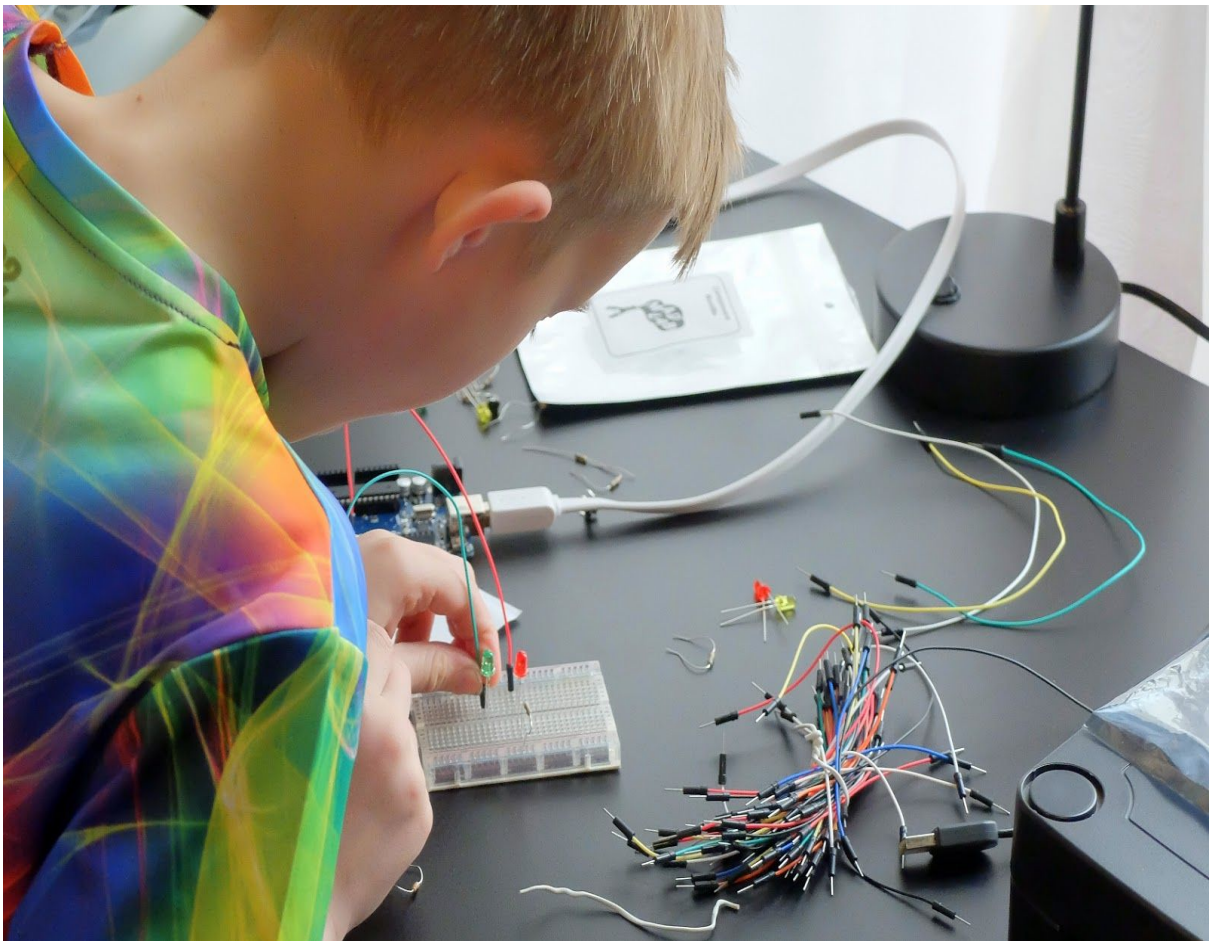
twitter: @madlabuk

phone: 07894278487

address: MadLab @ PLANT, Redfern, Dantzic Street, NOMA, M60 0AE

## 2 ELECTRONICS

MadLab is an excellent place for children of all ages to learn and be creative. Our workshops are suitable for schools, events and libraries to host. Workshops can be tailored to suit each audience and age range.



## **i. LEARN TO SOLDER**

The 'I Can Solder Badge' is a basic soldering kit that provides the ideal platform for teaching people how to solder. A couple of minutes and the deft wave of a soldering iron, and you'll soon have a flashing badge to wear with pride!

Our Learn to Solder workshop is best run as a drop-in session. Each badge takes just 5 – 10 minutes to complete, and one facilitator can instruct up to four people at one time.

***Suitable for beginners aged 8+. Material costs £2.50/person up to 100 badge kits or £2.00/person over 100 badge kits***

## **ii. ARDUINO**

Have a go at coding with electronics in this taster session workshop. Learn to connect & configure the Arduino, upload programs, prototype circuits & interact with different components.

This workshop will take you through setting up the Arduino, and creating circuits to run example codes.

***Suitable for beginners aged 12+. No kit charge - up to 10 participants. Basic take home Arduino kits charged at £62/ person.***

## **iii. GET THE BUG FOR CODING WITH CODE BUG**

A fun and engaging introduction to easy drag-and-drop programming and electronics. CodeBug is a Manchester-born initiative, designed to give children a fun and engaging introduction to drag and drop programming and electronics.

In just a few clicks you'll program this versatile little computer to display your own message. By the end of the session, you'll have created a scrolling name badge and a many-faced bug!

***Suitable for beginners aged 7+. Materials cost £15/person for a take home Code Bug.***

#### **iv. CODING WITH THE MICRO:BIT**

The BBC micro:bit is a pocket-sized codable computer that allows you to get creative. From making an interactive badge to hand-held electronic games you'll be a coding whizz in no time.

***This workshop is suitable for beginners aged 11+. Materials cost £12/person for a take home micro:bit.***

#### **v. OTTO ROBOTS**

Otto is an interactive robot that anyone can make. It's open-source, [Arduino](#) compatible and 3D printable, the perfect opportunity to build and have your very first robot, learn robotics and have fun.

NB. Otto needs to be 3D printed prior to the workshop. This workshop is ideal for testing a new 3D printer or getting to grips with 3D printing and electronics at the same time.

***This workshop is suitable for those who have played with basic electronics before aged 11+. Each Otto kit costs £22, plus 3D printing costs (available on request).***

***All prices are exclusive of VAT.***

## 3 RASPBERRY PI

All our Raspberry Pi workshops are taught using the Pi-Top CEED, all equipment can be supplied by MadLab.



### i. CODING MUSIC

Learn to code creatively on the Raspberry Pi by composing or performing music in an incredible range of styles!

***Suitable for beginners aged 7+. There is no material cost for up to 20 participants.***

## **ii. HACKING MINECRAFT**

Explore the virtual world of Minecraft Pi, and use Python to manipulate the world around you.

Learn to teleport, set blocks within the Minecraft World, leave a trail of flowers as you walk, blow up huge TNT blocks on command, flow lava, and create your very own 'whac-a-block' game!

***Suitable for beginners aged 8+. There is no material cost for up to 20 participants.***

## **iii. PROGRAMMING SCRATCH**

With Scratch, you can program your own interactive stories, games, and animations – and share your creations with others in the online community.

This workshop teaches fundamental coding concepts such as sequencing, repetition, variables, selection and operators.

***Suitable for beginners aged 8+. There is no material cost for up to 20 participants.***

## **iv. PHYSICAL COMPUTING WITH SCRATCH**

Use Scratch to control the GPIO pins on a Raspberry Pi. Create simple circuits to flash an LED and control a traffic light system.

***Suitable for beginners aged 12+. There is no material cost for up to 20 participants.***

## **v. GAME DEVELOPMENT IN SCRATCH**

Put your basic coding skills into practice to create games in Scratch on the Raspberry Pi.

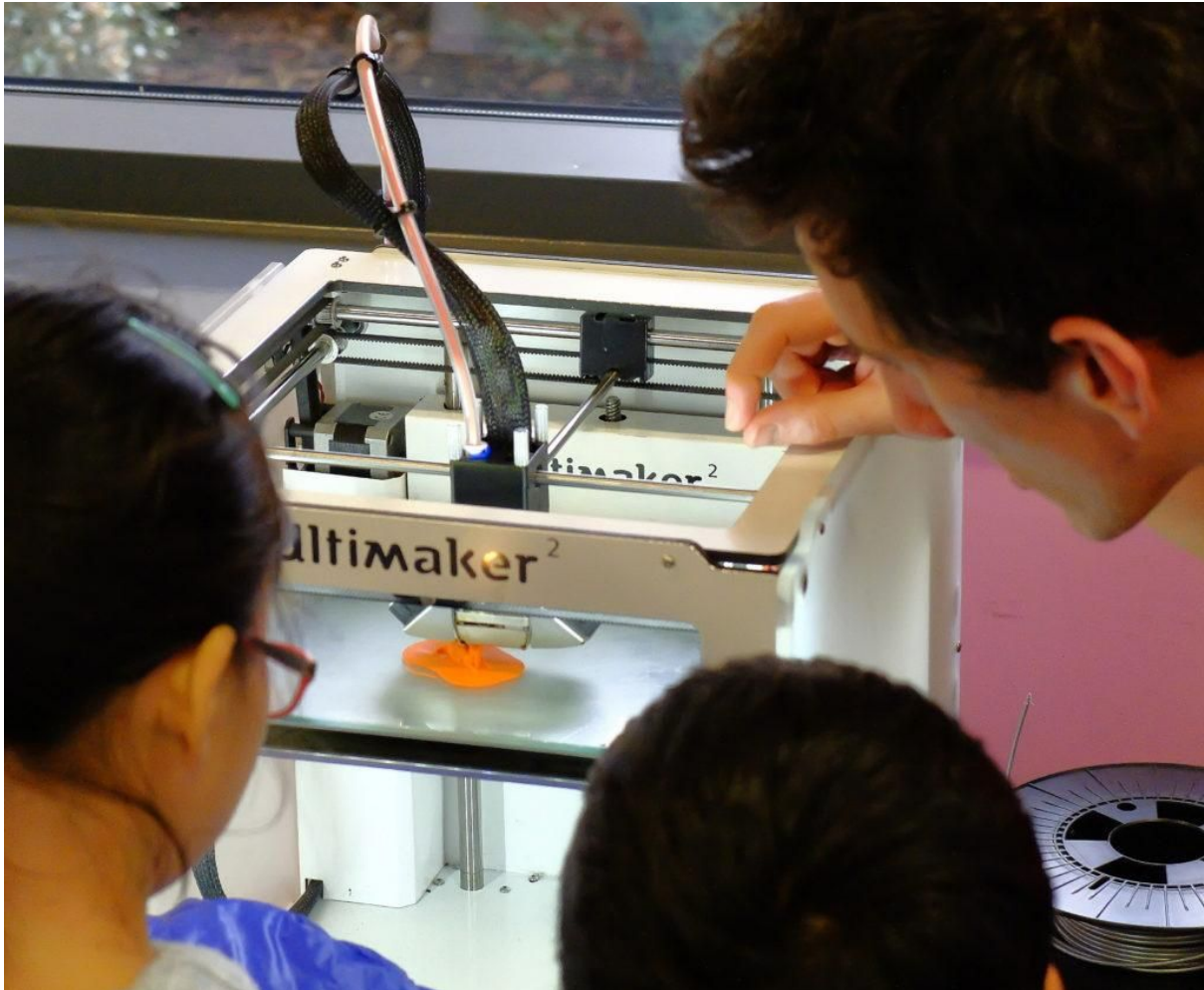
***Suitable for learners already comfortable with basic coding concepts in Scratch aged 12+. There is no material cost for up to 20 participants.***

***All prices are exclusive of VAT.***



## 4 SCIENCE AND DIGITAL MAKING

Sew and paint electronics or get messy with physics, our science and digital making workshops offer a fun, alternative approach to learning about science and technology.



## **i. SCIENCE BUSKING**

Our science demonstrations use simple everyday ingredients to conduct experiments that wow!

Get hands-on with engineering or messy with physics. With a large range of exercises we can tailor each session to your requirements.

***Suitable for beginners aged 6+. Science kits start from £100 for up to 50 children.***

## **ii. 3D PRINTING DEMO**

You've heard all about them, now see one in action! Our 3D printer will be running all day, come watch and maybe take home your own 3D printed mini mascot.

***Suitable for beginners aged 6+. £60 machine rental - demo items will be given away. Each item takes 30 - 60 minutes to print.***

## **iii. WEARABLE TECH**

Explore the future of fashion and technology and design your own tech tote bag. In a 2-hour session you'll construct a sewn circuit, sew with conductive thread and make your LEDs light up while having tons of fun along the way!

***Suitable for beginners aged 8+. Materials cost £90/ 30 person group.***

## **iv. CONDUCTIVE PAINT**

Get creative and bring it to life with a collaborative canvas of art & light. Use your imagination to draw simple image of your choice, while learning how to incorporate a battery and LED to complete a circuit, adding some twinkle to your picture.

***Suitable for beginners aged 8+. Materials cost £105/ 30 person group.***

***All prices are exclusive of VAT.***

## 5 PATTERNCRAFT

PatternCraft is an analogue to digital punch card reader that teaches the fundamentals of programming and encoding data through the write-once medium of a physical punched card.

With links to binary and the computing curriculum as a whole, PatternCraft is a cross curricula tool that can be used for in the support of STEM activities and support soft skill development in areas of creativity, problem solving, team working and communication.

Designed and created by Gemma May Latham, an artist and maker, Gemma is interested in the relationships between textiles and coding. Having only started to learn to code in 2012, Gemma endeavors to develop accessible methods for understanding code and computing theory. We offer a wide range of workshops using PatternCraft, detailed below.



## **i. BINARY MINECRAFT ANIMATION**

Explore how binary data is used to store images in the form of 0s and 1s and create images in Minecraft using punch cards. Following this introduction pupils will work in groups to design and program an 8x8 2D animation in Minecraft. Older children will have the opportunity to explore the Python coding behind the process and make changes to their animation by editing the code.

***Suitable for everyone aged 7+. Materials cost £1/ person.***

## **ii. ENCODING DATA**

Use punch cards to explore how binary is used to store data in the form of 0s and 1. Students will be learn how to convert denary numbers to binary and encode and decode numbers using Minecraft builds. The group will then progress to creating messages using the ascii alphabet and use punch cards to make text appear on screen.

***Suitable for children aged 7 - 14 years. Materials cost £1/ person.***

## **iii. PATTERNBEATS**

Examining the principles of using step sequencers as instructions for playing back music students will use binary to program machines, tempo and sounds in the creation of basic music compositions. Following this the group will be introduced to CSS coding and use it to customise the appearance of the PatternBeats Application.

***Suitable for children aged 11 - 16 years. Materials cost £1/ person.***

## **iv. PATTERNCRAFT & 3D PRINTING**

Use the PatternCraft punchcard reader and Minecraft to build 3D structures one layer at a time. Students will deconstruct 3D models to understand how a 3D printer processes 3D files before printing.

***\*\*This workshop could be combined with the Minecraft Turtles Session to draw out each individual layer in a series of steps\*\****

***Suitable for children aged 7 - 14 years. Materials cost £1/ person.***

## **v. PROGRAMMING TURTLES**

Use punchcards to program a set of instructions for the movements of a Minecraft turtle simulation. Explore how the physical punchcard is representative of a repeatable program that can be looped. Students will then use what they have learnt to predict a sequence of instructions and solve challenges in game.

***Suitable for children aged 11 - 16 years. Materials cost £1/ person.***

## **vi. INFRARED CIRCUITS**

Beginning with an introduction to PatternCraft, each student will make a punch card see their data translated into a Minecraft build. The group will then explore how the reader works, building infrared detectors using simple components and electronic prototyping boards. Students will be encouraged to test the detector using different 'punchcard' materials and varying hole sizes and draw their circuits using recognised symbols.

***Suitable for children aged 7 - 14 years. Materials cost £1/ person.***

## **vii. ENGINEER YOUR OWN READER**

Over a series of weeks pupils learn how the reader works using infrared LEDs and phototransistors. The group will then be challenged to design and create a housing for the circuits that will allow for cards to be read reliably. This would be best supported with laser cutting and 3D printing where available.

***Suitable for children aged 11 - 16 years. Materials cost £1/ person.***

## 6 ADDITIONAL INFORMATION

The duration of the workshop can be tailored to suit your requirements, the minimum for each being one hour. Many can be arranged as a drop-in session to run within a larger event, or as a package of workshops.

Facilitator times include travel, setup and clearing down. Drop-in workshops run for a length of time of your choosing. Please allow one-hour for setup and 30 minutes for clearing down. Please also note facilitator costs are in addition to any material costs detailed below, dependant on the number of facilitators required and the length of activity.

Unless otherwise specified. computers/laptops are not provided, these would need to be made available by the venue or provided by the learner. We would also require the venue to have open access to free wifi.

Workshops outside of Greater Manchester may also include travel and accommodation costs. All prices are exclusive of VAT.