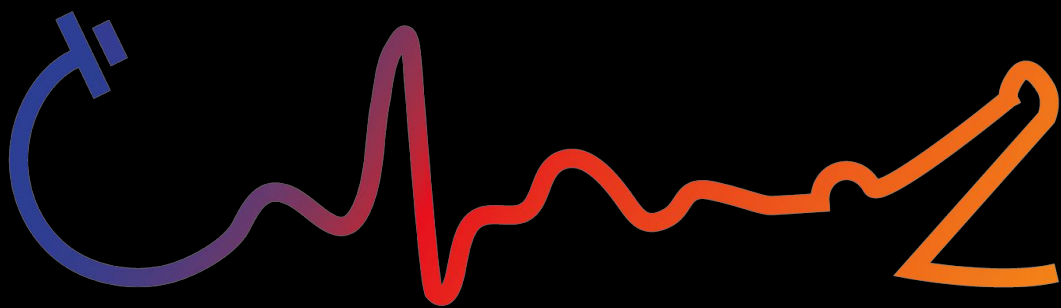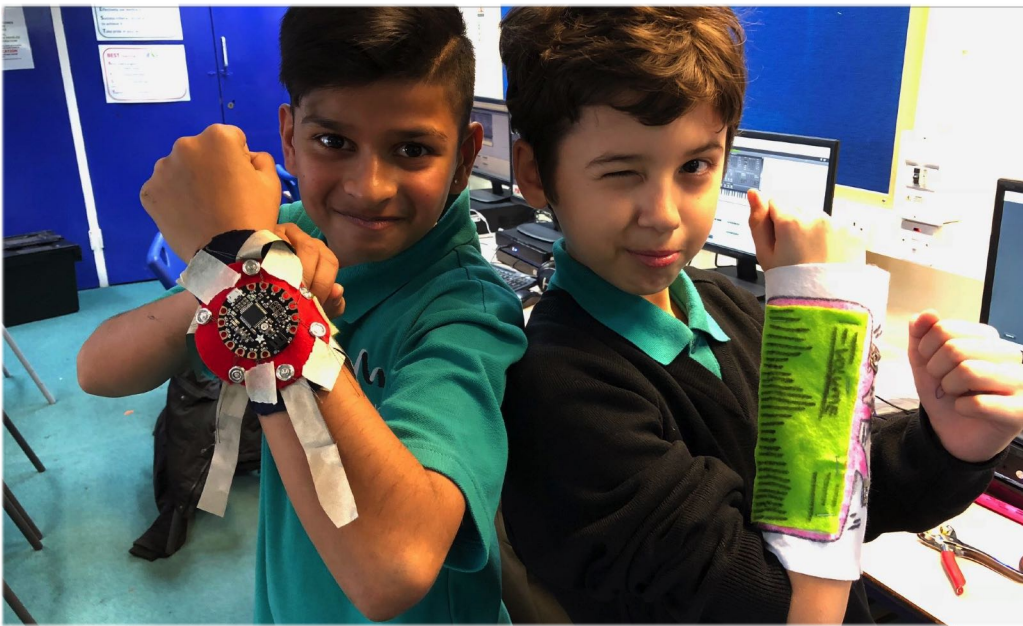# Workshop Proposals

conductive music

Because designing, breaking, and rebuilding

through play is awesome

makersBOOST

Because designing, breaking, and rebuilding through play is awesome

makersBOOST

conductive music

Inspiring creativity to see things differently

We love to design, build, push our inventions to the limit until they break, then take them apart, fix them, and learn everything about them. The joy of imagining and then bringing your own instrument to life is infectious and we want to share it. We want to inspire inventors who know what to do when stuff goes wrong. We want to show them how to embrace failure, to boost resilience and to grow, independently, through trial and error.

We thought we would share this with your school: bringing Music, the Sciences and Creativity together, in a fantastic new series of experiences.

A National Snapshot

Encouraging Gender Diversity in STEAM
58% of our students identified as girls.

Our students approve!
Our experiences were rated **9.5/10** by 1900+ students in 2017/18.

Learning Designers
44% can correctly define conductivity in science and music.

1 CIRCUITS
81% understand the positive-negative relationship.

2 CONDUCTIVITY
84% understand it well: 'Wood becomes conductive if you make it wet.'

3 'MARY HAD'
55% can play it on the fruit piano and understand the relative pitch concepts.
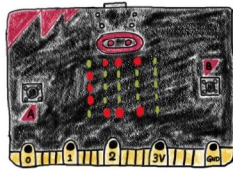
Experiment No.5

Making Music with the microbit

microbit.org → open Let's code

conductivemusic.uk/experiment5

conductive music

yui

Experiment No.12

Sound Wave
code.quirkbot.com

conductive music

conductivemusic.uk/experiment12

yui

Experiment No.13
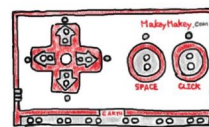
Score Reader
code.quirkbot.com
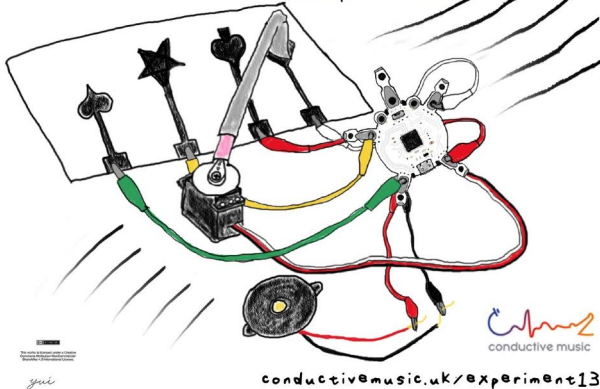
conductive music

conductivemusic.uk/experiment13

yui

Experiment No.19

Building an instrument with the MakeyMakey
3D Drums

MakeyMakey.com/remap

conductive music

conductivemusic.uk/experiment19

yui

ARTS COUNCIL ENGLAND

Artsmark
AWARDED BY ARTS COUNCIL ENGLAND

Makey Makey™
Ambassador Program

Choose your path:

fruit + music technology + electricity = awesome!
Year 4, Mead Primary - Romford

BARS	RHYTHM	BEATS	ELECTRICITY
75% understand what the length of a bar is in music.	78% correctly described and could clap along to basic rhythm in music.	85% successfully composed a rhythm for a 4-beat bar.	68% could define the property of "conductivity" in science, after our workshop.

Year 3-4: Exploring through everyday objects

What if we told you that you can plug a cable into an apple, to control a digital musical instrument? You might not believe your ears! Yet that's exactly what we'll do in our Year 3-4 workshop. And once they have learnt to play the fruit piano, to compose with it and to use a completely free browser-based software, we come back, draw a digital drumkit on paper and learn rhythms, simply because graphite is conductive.

Structure:

4 groups of 20+ students, to receive 2 x 1hr workshops over 2 days of your choice. Priority to be given to children from challenging background. Also the opportunity for you and your colleagues to join the *Lunch&Learn*, a 20' CPD session over lunch, for you to see how you can use it in your lessons.

Outcomes after the two sessions:

Understanding of the different voices (Singing, speaking, etc.); Conductive materials and a Conductor in Music; MakeyMakey Hardware with fingers, crocodile clips, fruit and drawings; Linear circuits; Relative pitch; Basic rhythmic subdivisions and collaborative composition; Browser-based software which they can continue using, for free, at home;

Photos? facebook.com/ConductiveMusic

2-day workshop for £800 or 1-day for £450
 info@conductivemusic.uk

> Quote
> Can we do more of this every Tuesday or you can come every day?
> Year 4, St Gerard's Primary - Rotherham

Some Opinions

Will you think of STEAM subjects differently?

"Yes, I have learnt so much. It has encouraged me to have a bigger interest." Year 5, Bolton Row Primary - Rotherham

Changing minds

80% say they will think of STEAM differently now. 52% say that Music is their favourite subject.

"I regret thinking it was going to be boring!"

Success!

"the graphite paper actually worked & conducted electricity!" Yr 5, Waltham Forest

A little more about the session:

During the first session, we introduce key music and computing activities, so that pupils can build their own digital musical instruments. The workshop will include simple explanations of electrical circuits, how to build a musical instrument with the MakeyMakey boards and fruit & vegetables, and to create an original music performance as a group or pair.

Once back, we will guide pupils through more advanced General Musicianship concepts such as relative pitch, body percussion and rhythmic composition. Pupils will design their own instruments, creating graphite-based circuits that, once connected, will become interactive interfaces. The session culminates with a brief collective performance and an introduction to composition.

Legacy:

This is our signature workshop, we have delivered it to 5k+ students over the past 6 years, and every time it has improved. We use browser-based, free music software soundtrap.com, so that your students can continue at home, following our online tutorials (conductivemusic.uk/experiment1. We offer CPD sessions through the *Lunch&Learn* scheme, so that you can incorporate this in your lessons!

Requirements:

I don't like it, I love it!
Year 5

- 1 computer per student (sharing in 2/3 possible), with internet access, audio enabled, and we can bring headphones if needed.

- Google Chrome with JAVA and Flash up-to-date

- 100 pieces of fruit (20 each of bananas, apples, potatoes, carrots and oranges) substitutes available.

- Number of students, and anonymous breakdown by challenging background (SEN, EAL, FSM, PRU, etc.)

- Risk Assessment, EqOpps, PublicLiability and Child Protection Policy is available at: bit.ly/cmourpolicy.
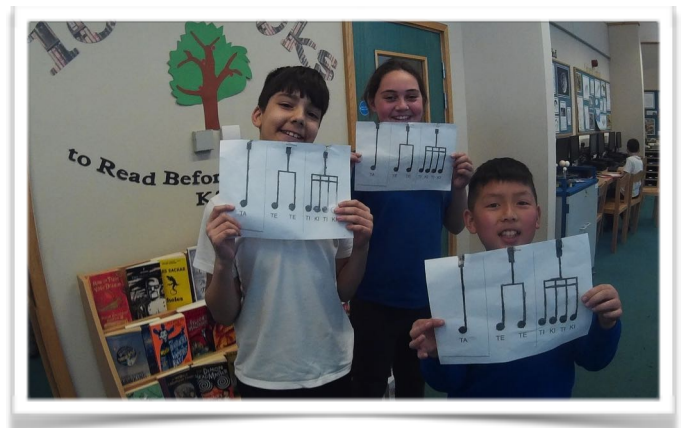
FROM HALIFAX
It was awesome…Thank You

YEAR 3
I want to come every Tuesday for this lesson

LEARNT SOMETHING?
That music is AWESOME!!!

FAVOURITE
My favourite part is when we made our own rhythm

Year 5 and 6: Code, look and listen

Surely, robots exist only in mad scientist labs, they are definitely very complicated and expensive, and they are going to take over the world like Skynet. Probably.

A few months ago we discovered Quirkbot. It was not designed to make music, but it can – it just does not know it yet! We made it into a perfect musical instrument. There is something absolutely magical about coding a tiny device whose lights change, whose arms move, all whilst making your first coded noise. We cannot wait to share this experience. It is all contained in tiny boxes with lots of lovely components which come together as a prototype robotic orchestra.

Structure:

4 groups of 20+ students, to receive 2 x 1hr workshops over 2 days of your choice. Priority to be given to children from challenging background. Also the opportunity for you and your colleagues to join the *Lunch&Learn*, a 20' CPD session over lunch, for you to see how you can use it in your lessons.

Outcomes after the two sessions:

Understanding of wave patterns (sine, square, etc.) applied to light, movement and sound; Linear circuits, crocodile clips, conductivity and basic digital/analog components; Relative pitch and sensors to control a melody; Quirkbot online coding platform; Collaborative composition and performance;

Photos? facebook.com/ConductiveMusic

2-day workshop for £800 or 1-day for £450
info@conductivemusic.uk

QUOTE

I would not change anything because I liked it and it was awesome!
Year 5, Ravenscroft Primary - Newham

A little more about the session:

As we start the session, your students will learn a browser-based free coding platform, which they can use at home, similar to Scratch. We will start by programming waves on the built-in lights and observing them. We will soon figure out how to build a lightsaber by attaching extra LEDs and light sensors - but we will want to see it move through a servo motor, which we can control through a slider. Finally, we have also built some piezo speakers, so we can listen to all these waves and make a collaborative composition.

When we return, with the students familiar with the interface and possibilities, we will expand by creating an interactive musical instrument using nothing but the Quirkbot, a servo, some paper and pencils. We will play some songs together and, we will use the same instrument to play Super Mario!

Legacy:

This workshop has become incredibly popular over the summer. We have built Robotic Orchestras in Rotherham, playing alongside a 32ft tall robot, and in East London, during a summer school, and are now rolling it out nationally. We use browser-based, free music software soundtrap.com, so that your students can continue at home, following our online tutorials (conductivemusic.uk/experiment1. We offer CPD sessions through the *Lunch&Learn* scheme, so that you can incorporate this in your lessons!

Requirements:

- 1 computer per 2 students.

- Google Chrome with JAVA and Flash up-to-date

- Quirkbot Plugin and driver (press upload on code.quirkbot.com)

- Number of students, and anonymous breakdown by challenging background (SEN, EAL, FSM, PRU, etc.)

- Risk Assessment, EqOpps, PublicLiability and Child Protection Policy is available at: bit.ly/cmourpolicy.

My favourite wave is the pulse, it reminds me of the heartbeat!   Year 5

| FROM ROTHERHAM	RATINGS	FROM HAVERING	SHARING IS CARING
u should come to our school more often	8.5/10 …and so many wonderful questions	I really enjoyed the lesson and working on this project. Thank You.	My computer teacher loves robots, so I will tell him about this amazing experience thank you x :)))

Year 7-8: Rock-a-bot

What if we collided creative coding, robots and music? When we saw the Quirkbot, a tiny turtle-like metallic creature, which can be part of a moving 3D structure entirely made by recycled straws…we fell in love. At the beginning, it was shy, it made no noise - but then we built tons of cables and adapters, giving it the power to create an entire robotic orchestra. We had to share this.

We will explore object-based coding on a free, browser-based platform. Your students will design and build their own 3D structure, the sensors which make it move, and will make a collaborative composition, for a group performance.
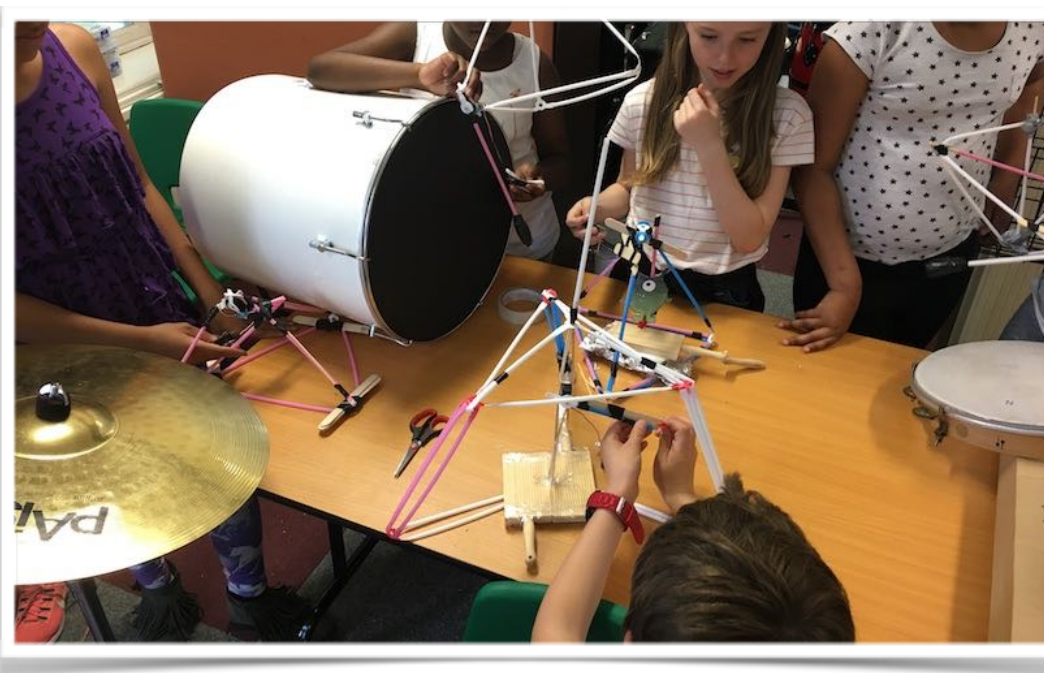
Structure:

1 group of 15 students, to receive a 2-day workshop, with priority given to those from challenging background. Also the opportunity for you and your colleagues to join the *Lunch&Learn*, a 20' CPD session over lunch, for you to see how you can use it in your lessons.

Outcomes after the two sessions:

Understanding of wave patterns (sine, square, etc.) applied to light, movement and sound; Block-based coding and basics of servo motors; Linear circuits and conductivity; Robot-based composition, synchronisation and pitch; Collaborative composition and performance;

Photos? facebook.com/ConductiveMusic
2-day workshop for £800 or 1-day for £450
info@conductivemusic.uk

> Quote
> You get the chance, once in a lifetime, that was super and I'll recommend it.
> *Year 7, Mayfield Secondary School - Dagenham*

Some Opinions

Raising aspirations!

70% of our students reported an increased interest in STEAM careers

Success!

86% reported increasing confidence in their own coding skills.

Student Response:

It's a great workshop where you learn to compose music even if you think you can't. *Year 8, The Albany School - Havering*

A little more about the session:

As they come into the room, your students will find a curious box full of components, which they may have not seen before. We will start by programming simple wave patterns (sines, etc.) onto LEDs, and before you know it, we build an attention-grabbing lightsaber. From here, we may want to control these patterns, so we connect a variety of sensors, then servo motors and then a speaker. By that point, we will have a basic, melodic instrument, with light, movement and sound - a robotic synaesthesia.

When they return from break, they will be able to design and assemble a 3D structure of their choice, with recycled straws and some tin foil. They will learn how to test and troubleshoot it, and will shortly have a robotic instrument at their disposal. We will improvise, create graphic notation, and learn what composers, conductors and performers do, working towards a collaborative performance by the end of day 2 - magic.

Legacy:

This workshop has become incredibly popular over the summer. We have built Robotic Orchestras in Rotherham, playing alongside a 32ft tall robot, and in East London, during a summer school, and are now rolling it out nationally. We use browser-based, free music software soundtrap.com, so that your students can continue at home, following our online tutorials (conductivemusic.uk/experiment1. We offer CPD sessions through the *Lunch&Learn* scheme, so that you can incorporate this in your lessons!

Requirements:

- 1 computer per 2 students.

- Google Chrome with JAVA and Flash up-to-date

- Quirkbot Plugin and driver (press upload on code.quirkbot.com)

- Number of students, and anonymous breakdown by challenging background (SEN, EAL, FSM, PRU, etc.)

- Risk Assessment, EqOpps, PublicLiability and Child Protection Policy is available at: bit.ly/cmourpolicy.

A fun confidence booster and very creative! brilliantly perfectly great   Year 8
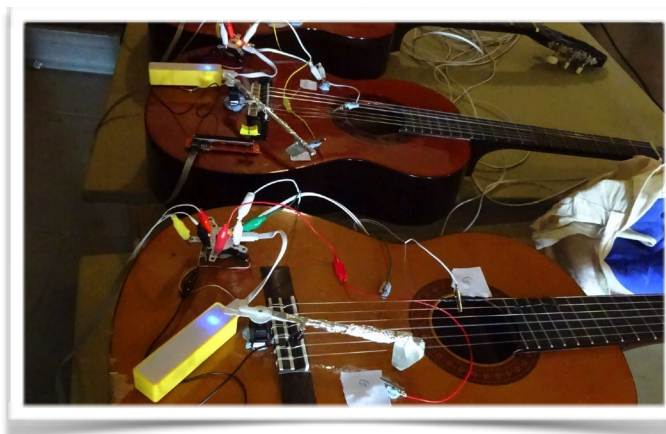
GCSE	TECH INTEREST	DIFFERENCE MADE	QUOTE
65% intending to take a Technology/ICT GCSE and 50% for Music GCSE after our workshop.	Only 32% expressed interest in a Technology or ICT GCSE before our workshop!!	49% of students stated that their experiences in our workshop made an impact on GCSE choices.	Everyone should give it a go if they enjoy science, math-related, technical music things. Year 8 student

Year 7-8: eWearables

They call it soft circuits. We think that fluffy madness is probably more appropriate. You get to tinker with conductive fabric and thread. Soft things with metallic fibres inside. You then attach them to a piece of felt and, through a few phases of love, despair and flash of genius, you get a digital plushie musical instrument. A USB cable is all you need to give it a voice, composing fantastic songs on yet another free browser-based music software, which the students can continue using at home - anytime!

Structure:

1 group of 15 students, to receive a 2-day workshop, with priority given to those from challenging background. Also the opportunity for you and your colleagues to join the *Lunch&Learn*, a 20' CPD session over lunch, for you to see how you can use it in your lessons.

Outcomes after the two sessions:

Basic understanding of computer programming; Soft circuits; Original electronic instrument using custom technology; Sound Design and composition skills on a browser-based free software; Access to a network of DIY and open-source music technology communities for employment/work experience opportunities, Develop interpersonal skills including feedback and teamwork;

> Quote
> You get to make cool music and instruments made out of materials that work every time you touch them
> *Year 8, The Albany*

Photos? facebook.com/ConductiveMusic

2-day workshop for £800 or 1-day for £450
info@conductivemusic.uk

Some Opinions

A teacher's quote

This program is perfect for today's curious, inquisitive and technologically orientated students.

How do we stay on the edge?

In partnership with TECHNE (Royal Holloway-led) and MAT (Queen Mary) Doctoral Training Centres

Student Response:

It's a great workshop where you learn to compose music even if you think you can't.
Year 8, The Albany School - Havering

12

A little more about the session:

We love taking everyday objects, like felt, and show our students that they can transform them in unthinkable ways, just by using some basic knowledge that they acquire in a single morning. Conductive fabric, thread, buttons and staples are all you need to make an amazing digital instrument, which could look like an Xbox controller, or a pizza, a flower, an augmented glove…good enough yet?

Well, the magic happens when you connect the USB cable to the computer and quickly learn soundtrap.com to make your own song, or collaborate with other people and compose together. We did indeed have a pizza performance, where each slice, with its own topping, had its own sound, and performer.

Legacy:

Our workshops would not be any good if the students would not be able to continue after we left. All of the software we use is free, cross platform, and does not require powerful computers. The materials we use are very basic and can be purchased via ebay or local shops, even the tiny devices are very cheap. The entire set is capped at £50. Finally, students receive ongoing support through our tutorials: conductivemusic.uk/experiment1 We offer CPD sessions through the *Lunch&Learn* scheme, so that you can incorporate this in your lessons!

Requirements:

- 1 computer per 2 students.

- Google Chrome with JAVA and Flash up-to-date

- Number of students, and anonymous breakdown by challenging background (SEN, EAL, FSM, PRU, etc.)

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IT WAS THE BEST TWO DAYS EVER
Year 7

OUR DESIGN
We improved by analysing 1512 student feedback forms, and 61 teacher responses in 54 schools, across 8 partner hubs.

CHALLENGES
We worked with 25% SEN, 30% EAL, 40% PP and PRU 5%.

CODING
Only 31% have coded before. After our workshop 85% are more confident in their coding skills!!

SUCCESS!!
96% of teachers approve our curriculum-level content

Year 7-8: the Conductive Music

We have been on the road for the past 6 years. We received great support from our partners, the schools, the students, the Arts Council. We decided to put all of our knowledge together to build our very own instrument. Exciting and satisfying arcade buttons control an instrument with three lovely effects - but it wasn't enough. This workshop is about how you take it apart, look under the bonnet, and rebuild it using custom made sensors, for your fantastic music instrument!!
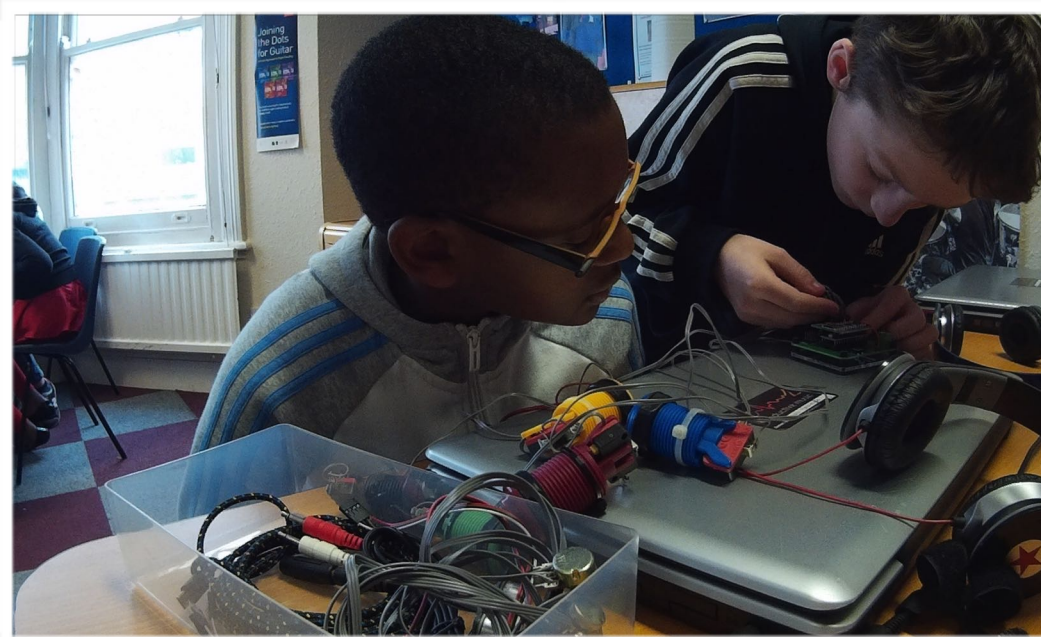
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Outcomes after the two sessions:

Basic understanding of linear circuits; Analog/Digital sensors; Melody/Scales and performance expressivity through homemade sensors; Original electronic instrument using custom technology; Sound Design and composition skills on a browser-based free software; Access to a network of DIY and open-source music technology communities for employment/work experience opportunities; Develop interpersonal skills and teamwork;

WHY?
You get to design your instrument, and it will talk to you exactly as you wanted, using everyday materials!

Photos? facebook.com/ConductiveMusic

2-day workshop for £800 or 1-day for £450

info@conductivemusic.uk

Some Opinions

A teacher's quote

This program is perfect for today's curious, inquisitive and technologically orientated students.

How do we stay on the edge?

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Student Response:

It's a great workshop where you learn to compose music even if you think you can't. *Year 8, The Albany School - Havering*

A little more about the session:

We designed this instrument from scratch, during two years of passionate R&D, through trial and error. We incorporated fantastic arcade buttons, those of PacMan, Space Invaders and Street Fighter. We wanted it more expressive and made effects, but, the kids? We could not stop there. We re-designed it so that you can take it completely apart, rethink it, and build your own sensors. Sponges, gaffer tape and felt? Yes, we used them to make sensors and give a professional-like quality of expressiveness to our instruments.

Your students will get to design their own instrument and follow the project end-to-end. It's not just about the STEM skills, but also about the endurance, the resilience and passion that it takes to see something all the way through. Fixing it, amending it, and having the bravery to give and receive feedback from peers. Music is a wonderful catalyst that makes all of these things happen. That beat sound likes that in my head, the note bends at that very moment, and the delay needs to come in then - that is why they will fix it.

Legacy:

Our workshops would not be any good if the students would not be able to continue after we left. Soundtrap.com is free to use, the materials we use are very basic and can be purchased via ebay or local shops, even the tiny devices are very cheap. The entire set is capped at £50. Finally, students receive ongoing support through our tutorials: conductivemusic.uk/experiment1 We offer CPD sessions through the *Lunch&Learn* scheme, so that you can incorporate this in your lessons!

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It is so interesting and you will not get an opportunity like this again   Year 7

RATINGS	STEAM APPROACH	TEACHER THOUGHT	ACROSS SUBJECTS
8.9/10 from 935 student submitted forms during 2017/18	It builds on STEM (Science, Technology, Engineering and the Arts), taught through the Arts, thus steAm	A perfect mix of listening, learning and practical. The children were absorbed for the whole session. Clear delivery and perfectly pitched. Teacher, Bristol	This is a very exciting opportunity for children. It encompasses Science, Music and ICT. A wonderful experience that is thought-provoking and inspiring!

www.conductivemusic.uk

info@conductivemusic.uk