

Help us Build Robots!

A teacher's resource

During the Manchester University workshops on 17 May YOU will be helping to design and build robots for the Robot Orchestra project!

This is a big project and we need lots of help, but we are hoping that you might build some robots at home or at school, as well as during and after the workshop. There are loads of ideas online, but here are a few things you can do and collect before the workshops.



What is a Robot?

The image that most people instantly have is of a humanoid 'metal person', but robots can come in many shapes and sizes, and it will help if our expectations are not that we will be building metal people! The best way to think about our robots may be something like: 'mechanical machines that use electronics and moving parts to do things that people usually do'. Why not watch some video of robots in car plants, or the robot orchestra from the Royal Institution Christmas lectures in 2014?

One of the workshops you might take part in is Noisy Toys Circuit Boxes. Here is a list of what is in the Circuit Boxes; if you can collect your own materials before the workshop, then you can take your creations away with you afterwards and carry on building them!

- small fans (up to 12volt)
- heatsinks (the metal things that keep electronics cool)
- small speakers (from tiny ones in computers to car audio/ small hi-fi size)
- 9 volt cells /batteries. Please use rechargeable batteries!
- Crocodile leads – you may have these in school already

Un-Making

Most of these resources can be found inside old computers. If your school has old any old computers, you could try 'Un-Making' as an activity. It's really fun and you learn a lot about how things work, as well as how to use tools. A lot of inventors started off by taking things apart when they were young.

Here's a few top tips for Un-making:

- Is it junk? Don't un-make the office computer! Make sure it's unwanted
- Stay safe! Junk can be dirty or have sharp edges. Work with an adult
- Screwdrivers only for level 1 un-makers. Later, you can use big hammers etc

What is an instrument?

Orchestras are made up of musical instruments, and ours will be too. But don't expect ours to sound like normal instruments - they might well be much stranger than that! The full orchestra will be able to play tunes, rhythms and harmonies, but many of the instruments that we make will be producing 'sound effect' type sounds. It will be helpful for us to think about sound, and encourage a broader conception of what can be included as music. Here are some ideas:

Close your eyes and listen to 'Marime' (or 'Marine') by Francis Dhomont
<http://www.last.fm/music/Francis+Dhomont>

If this was the soundtrack to a scene in a film, what would be happening?

Acoustic Ecology Exercises

Close your eyes and listen very, very carefully. How many sounds can you hear? Make a list- can you find some that no-one else has noticed. Try this in different places- at home, in the playground, on a bus. Are there some sounds that you like more than others?

Music involves much more than tunes and beats- every sound has an effect on us, and the more carefully we listen to the sounds around us, the more aware we become. We don't usually think about it much, because we focus on what we see more than what we hear.

If you have covered soundscapes or film soundtracks as a topic, you will already have a good idea of using sounds to create effects.

Timbre is a French word that means 'the colour, or quality of a sound'. Why does the same note sound different on a trumpet and a violin? How can you tell who is speaking on the phone from their voice? Because of the *Timbre* of the sound.

Acoustic Found Objects

We want our robots to be as sustainable as possible- that means re-using junk and using for new things. This is call **Upcycling**, and involves collecting 'found objects'. These are easy to find and very useful as they are what will make your instruments sound interesting. Anything can be a found object, and to find out if it is acoustic, just hold it gently (or better still, dangle it) and tap it with something, holding it close to your ear. It doesn't matter if it is quiet- we can use contact microphones to amplify it. Try to find objects with different *Timbres* and bring at least 3 each. Suggestions:

- Empty crisp packets
- Plastic tubs or disposable cups
- Thin metal things
- Tubes or boxes, especially with lids
- Metal grill trays or slinkys.
- As before make sure it is: 1) unwanted, 2) clean, 3) not sharp
- The hardness of whatever you ding it with makes a big difference to the sound

If you can get a contact mic and a guitar amplifier you will open a whole universe of found sounds. Noisy Toys make toughened workshop contact mics for £20.

Make an Ear tester

- Tie two pieces of string on to a metal grill/oven rack
- Tie a loop at the end of each string and put an index finger in each loop
- Press your fingers into your ears and lean forwards, so the rack dangles
- Get a friend to 'ding' your ear tester

Marvel at the incredibly loud 'gong' sounds (everyone else just hears a little 'ding')!

Here is a resource page just started where new ideas, links and how-to guides and videos will be posted. There will be information about how to develop your robots after the workshop here too:

www.noisytosys.org/robot-orchestra

Bring more tat!

Please also bring anything that would look good as part of a robot, for other Making workshops: electrical wires, circuit boards, metal things etc.

Also, bring an old toothbrush for the Bristlebot workshop.

Go collect useful junk, listen to new sounds, start drawing and designing robots!