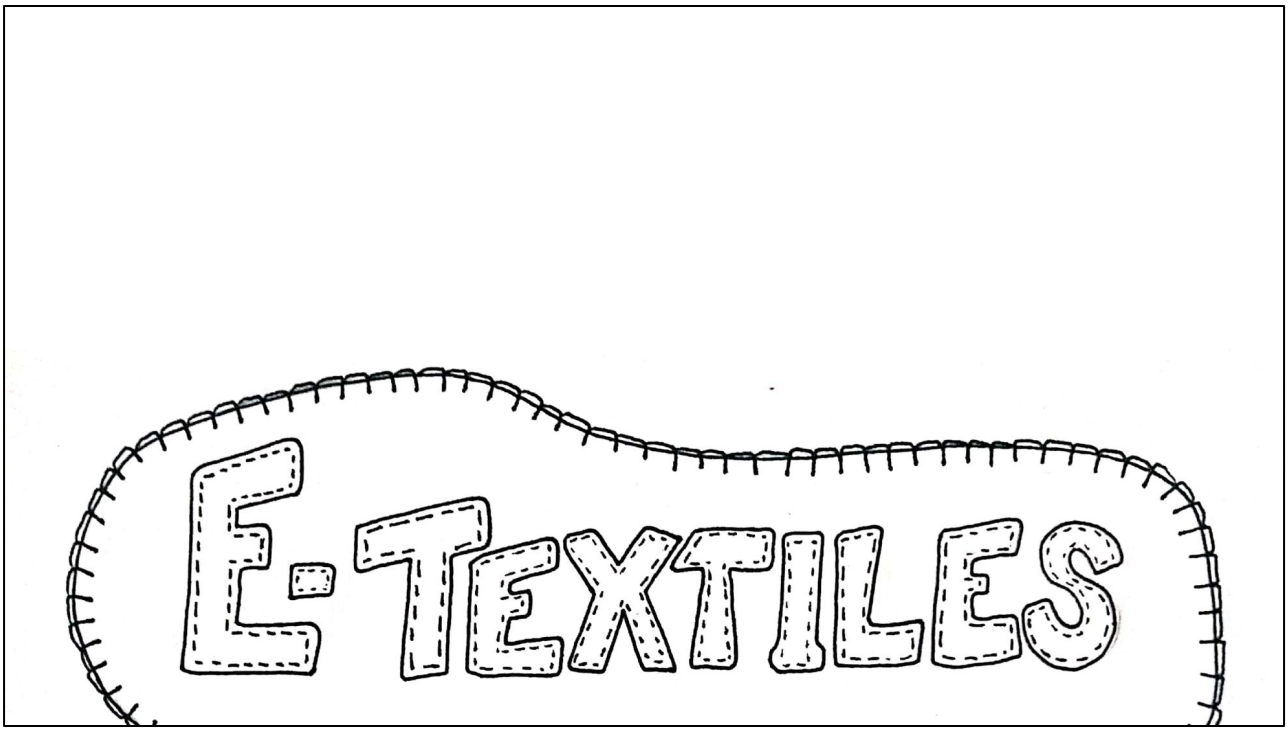
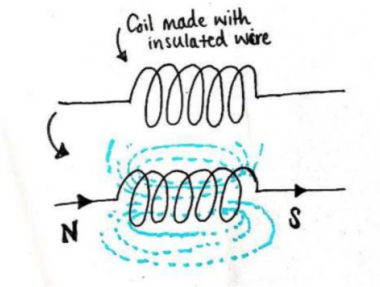
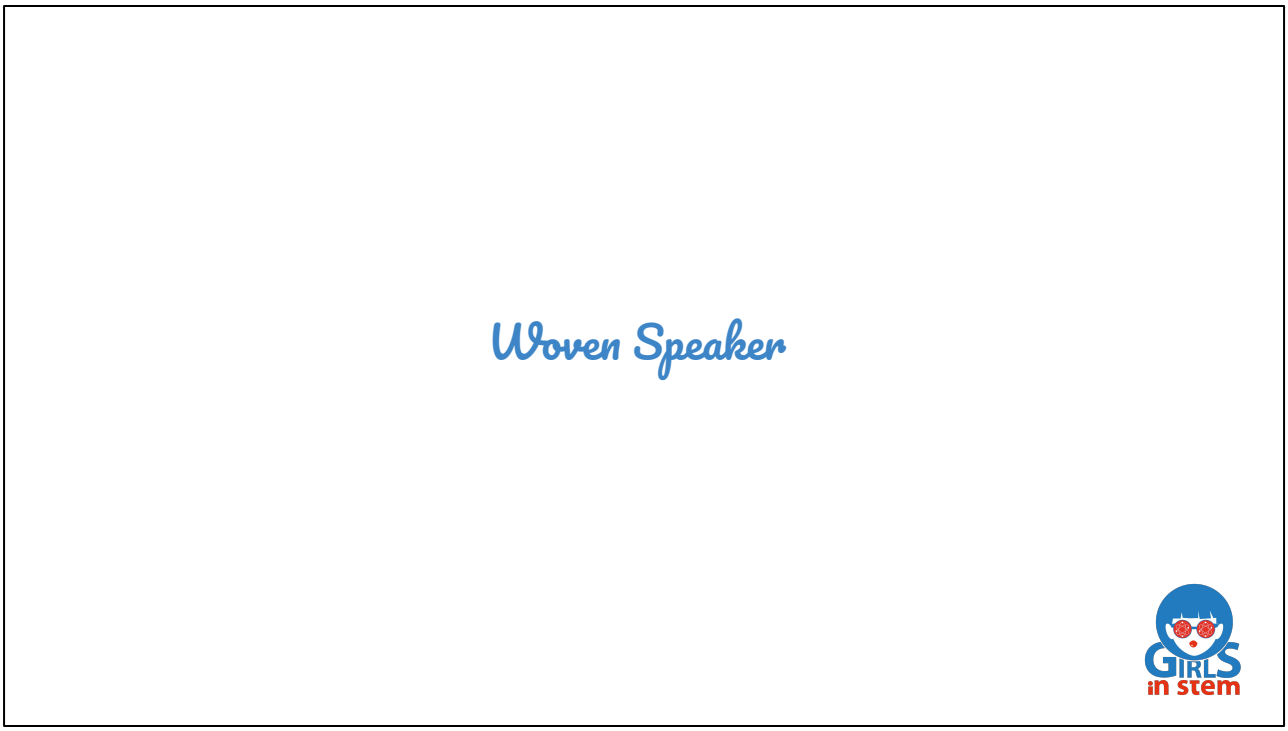

E-TEXTILES



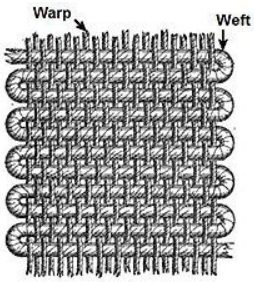
Overview of day 4: What is an electromagnet and components which use electromagnetism.



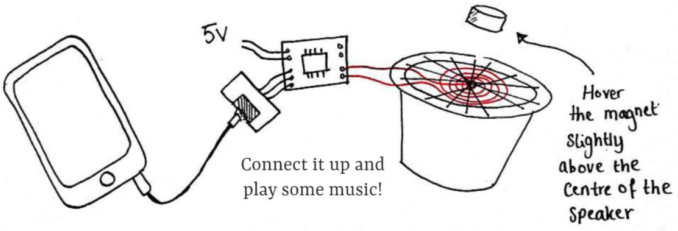
Day 5: Introduction to the activity of the Woven speaker

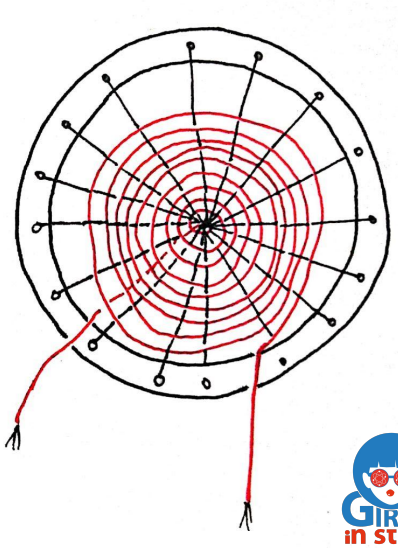
What is weaving?

Weaving is a traditional technique that is used to create pieces of fabric.
At least two different threads are interlaced to create a new fabric.



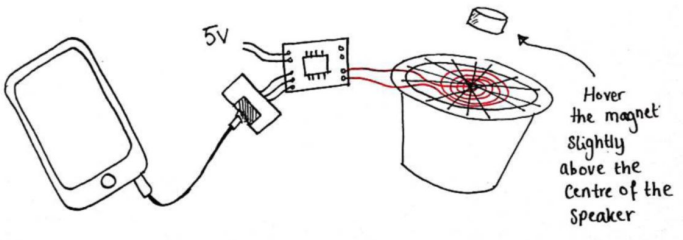
Introduction to weaving as a textiles techniques. Within the woven speaker design, we weave the electromagnet, so that the coils are held in position.



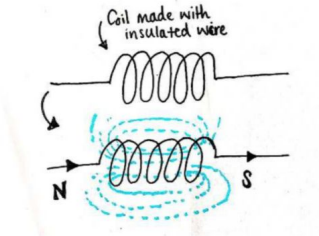


This illustration shows how the coils for the electromagnet are formed using a spider web of the thread in a yoghurt pot.
The woven speaker will be able to play music when connected through your phone when using an aux cable.

How does it work?



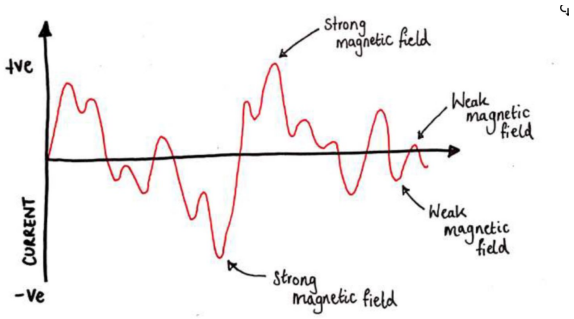
The weaved wire creates a coil.
With a current running through it, this creates an electromagnet.

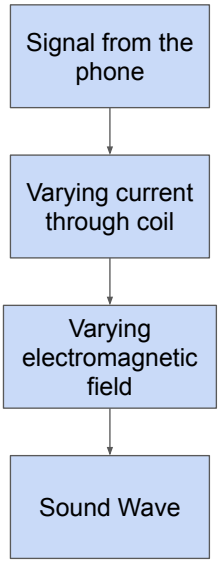


How does the woven speaker work?

- An electromagnet is created through a coil of wire. The coil has many turns - as the more turns an electromagnet has, the stronger it is
- When a current runs through this coiled wire, an electromagnetic field is created around it. Here the poles of the electromagnet are above and below the coiled face of the speaker.

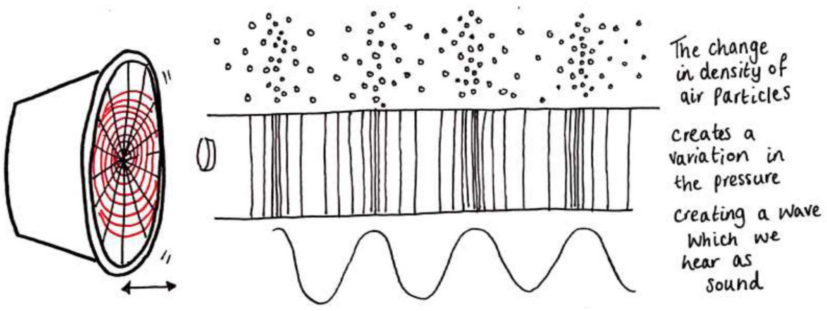
How does it work?





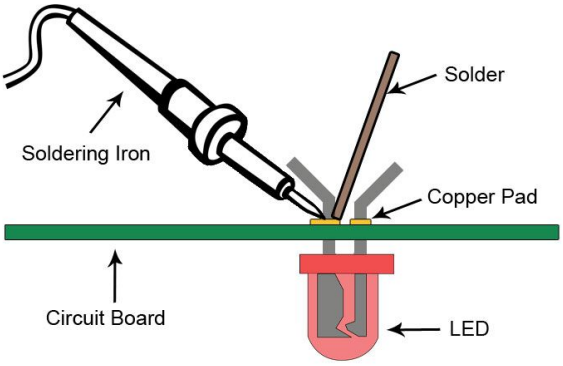
- The signal from the phone is providing this current
- The signal from the phone travels to the amplify chip (connected via the aux cable)
- The amplifier chip amplifies the signal - makes it bigger, so that there is create differences between the strong and weak signals
- These signals are actually a varying electrical current running through the wire
- This varying current travels through the coil of the electromagnet and creates a varying electromagnetic field around it
- This varying electromagnetic field attracts and repels the magnet hovering above the speaker at different rates
- This causes the coiled face of the speaker to repeatedly move up and down, creating sound waves

How does it work?



The sound waves are created, due to the up and down movement of the speakers face.
It pushes air particles to be together and then to spread out. This would be seen as varying density of air particles in the air in front of the speaker
This travels as a variation in pressure - which to our ears is what we hear as sound.

Soldering



For the woven speaker, the additional technique you will need is soldering when connecting the wires to the amplifier chip.
Soldering creates a permanent connection between two metallic objects. This connection is conductive - allows electricity to run through from one element to the other.

The process for soldering is as follows:

- hold the solder onto the copper pad of the amplifier ship and the component you are wishing to solder in place
- Hold in position for 15 to 20 seconds to ensure that they are heated adequately
- When both are hot enough, introduce the solder. Add the solder to the component and copper pad. NOT onto the soldering iron
- If they have been heated up enough, they should be hot enough to melt the solder without it touching the soldering iron itself
- This will cause the solder to run like a liquid and form a connection
- A small pointed mountain of solder should be created (not circles or bubbles of solder)