

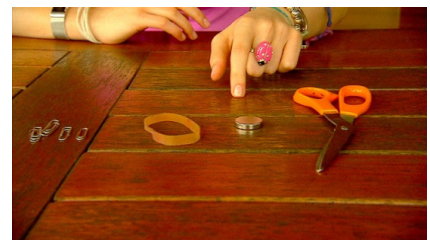
## Electric Engine

On SCOPE's Engines episode, Julia made an electric engine!  
Here's how you can do it at home:



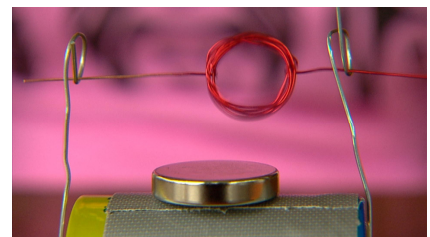
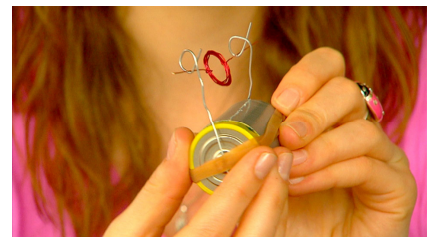
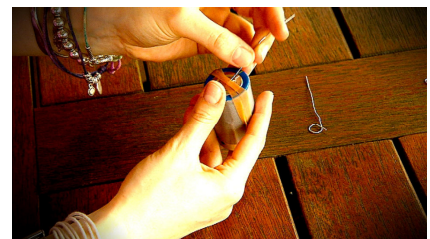
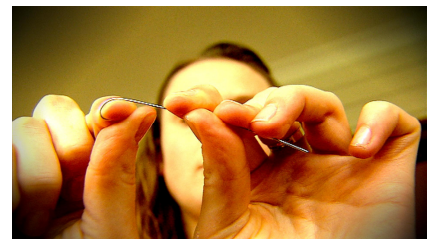
### What you need:

- 2 paper clips
- Elastic band
- Small magnet
- Coil wire
- Permanent marker
- Large battery



### What to do:

1. Bend and straighten out each paper clip.
2. Bend a small loop in one end of each paper clip.
3. Wrap the elastic band tightly around the battery so it is touching the positive and negative ends.
4. Place the straight end of one paper clip between the elastic band and the positive end of the battery.
5. Place the straight end of the other paper clip between the elastic band and the negative end of the battery.
6. Make sure the loops in the paper clips are directly opposite each other.  
*You have now made your battery terminal.*
7. Make a coil in the wire by winding it around the permanent marker a few times.
8. Cut the wire so there is about 5-6cm of wire on each side of the coil.
9. Straighten out the ends of the wire.
10. Strip all the insulation off one end of the wire.
11. Strip only one side of the insulation off the other end of the wire.  
*You have now made the armature.*
12. Place the armature in the loops of the battery terminal.
13. Place a magnet directly below the coil in the armature.  
*The magnet will now interact with the surrounding electromagnetic field, setting the armature spinning!*



### **What's happening?**

Unlike engines that run on fuel, electric engines use electrical energy to create mechanical movement. Most electric engines have an armature; this is the part of the engine that spins. When you place your armature in the loops of your battery terminal, a basic electrical circuit has been created and a current begins to flow from the positive terminal of the battery to negative terminal (which is why this motor is called a direct current electrical motor). As the current passes through the armature a magnetic field is created. So, when you position the magnet, it disturbs the electromagnetic field and sets the armature spinning!

