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| **Tool Holder Testing (Instructions)** |
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| Your task is to build an electromagnetic gripper arm. The arm is very simple and will be provided for you. However, you will have to build the electromagnet yourself.   |
| Once you have built your gripper arm it will be tested by seeing how many paper clips you and your arm can move from one pile to another in 30 seconds. The piles will be carefully marked out and any paper clips falling outside the marked areas will not be counted.To perform well in this activity your arm will need:* To have as strong an electromagnet as possible
* The ability to switch the magnet on and off
* The controls to be easily accessible so that the arm can be operated as efficiently as possible
* A well trained operator.
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**Construction tips**

* If you coil your wire around a core, use a little piece of electrical tape to hold the end in place as you coil it
* If you are using particularly thin wire you may not be able to use electrical tape as thin wire is liable to heat up and melt the tape. Check with your teacher
* Use the leads and crocodile clips provided to connect your switch and cells to the electromagnet
* Use electrical tape to fix your magnet to the end of your arm unless you are using particularly thin wire. If your wire is thin it may heat up and melt the electrical tape. Check with your teacher
* Add a second boss below the one holding your pivot and then slightly release the screw on the boss holding the pivot. Your arm should now be able to rotate as well as move up and down like a see saw

**Safety**

Do not touch your electromagnet unless you are sure it is cool. Wires will heat up when an electrical current passes through them and thin wires are likely to get particularly hot.