

Building a Scrap Metal Collector (Electromagnet)

You have been contracted to build an electric device that can pick up scattered bits of metal from an auto shop floor, so the metal can be recycled.

Working in groups of no more than three (3) you will design and build a prototype metal collector. It will be tested to see if it can pick up paper-clips. The more paper clips it can pick up the better.

Features that your metal collector must have:

- It must use principles of **electro**magnetism.
- It must have a **light** to indicate when the electromagnet is **ON**.
- It must have a **switch** to turn it on or off. Indicate which end is ON/OFF. (The switch can be homemade of your own design.)
- You must indicate on the electromagnet, or next to it, which end becomes the north end and which end becomes the south end.
- Students are encouraged to use the school's power supplies. You may use your own power supply (max 12 V), but be aware that batteries drain quickly and are costly. (Do not use 12 V car, motorcycle, snowmobile etc batteries! The amperage is too high and you run the risk of burning yourself!)
- You must include a detailed circuit diagram of your prototype. Show all components with their proper symbols, include +/- end, N/S ends, direction of electron flow and direction of conventional current.

You are encouraged to find bulbs (eg. from old Christmas lights or LEDs from toys), insulated copper wire, metal bars, nails and anything else you may need for construction from your basement, garage, old toys, old appliances, old flashlights, Canadian Tire, Reno Depot, Dollarama etc. Basically find the stuff YOURSELF!!!

DO NOT SPEND A LOT OF MONEY ON MATERIALS!
You should be able to scrounge/recycle everything you need.

DO NOT test your collector by using your household power outlets....instead use low voltage batteries (eg. **12V Battery or less**) or bring your collector to school and test it here.

Your entire group will receive the same mark, so choose your groups carefully!

Date:	What needs to be accomplished:	What you need:
Wednesday October 26st	Make the electromagnet (coil wire onto core, secure and test it... Make plans on how to connect switch, lights & base.	Do research before class!!! Ex. Youtube Wire, core (nail, bolt etc.), lights, switch, batteries
Friday, October 28th	Connect light and switch. Check that the electromagnet still works and make modifications.	Switch and light. Small bulbs & LEDs work best! Bring extra, students tend to break several.
Tuesday, November 1st	Mount onto support. Ensure that the electromagnet is secured and is makes sense for this situation. (cardboard, wood, ...)	Some type of base that works for this situation. Feel free to be creative!
DUE date: Thursday, November 3rd, 2016		

We will test the collectors during class. Have fun☺