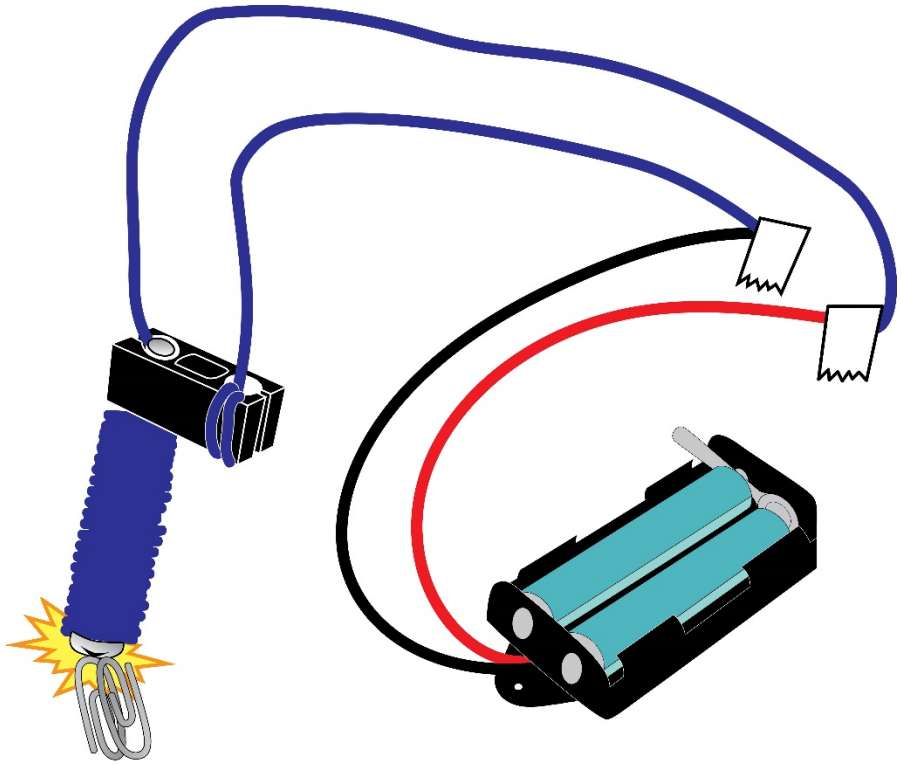
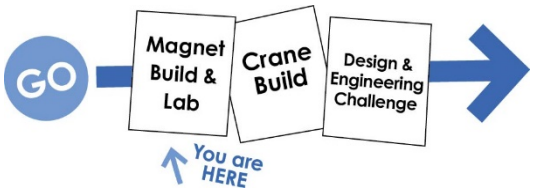
Electromagnet Build Guide with Lab

Name: _____ Set: _____ Date: _____



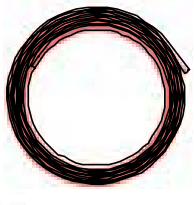


Other documents, including this activity without the lab, available at ***teachergeek.com/learn***

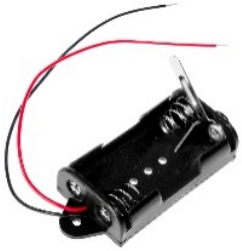
Get Supplies

You will need these TeacherGeek components:

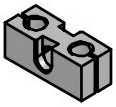
Available in the TeacherGeek Electromagnetic Crane Activity, TeacherGeek Maker Cart, or at **teachergeek.com** (activity packs include extra components for further tinkering and innovation).



1 - Wire Roll
colors vary
SKU: 1821-43



1 - Battery Holder
w/ Switch & Leads
SKU: 1821-63



1 - Block
SKU: 1821-34

1 – 50mm Screw
#10 (2in)
SKU: 1821-27

You will need these tools, they can be shared:

*Tools available at **teachergeek.com***

Wire Strippers
SKU 1823-95

Screwdriver
SKU 1823-90

Pliers (optional)
SKU 1823-86

You will need these non-TeacherGeek supplies:

Masking Tape

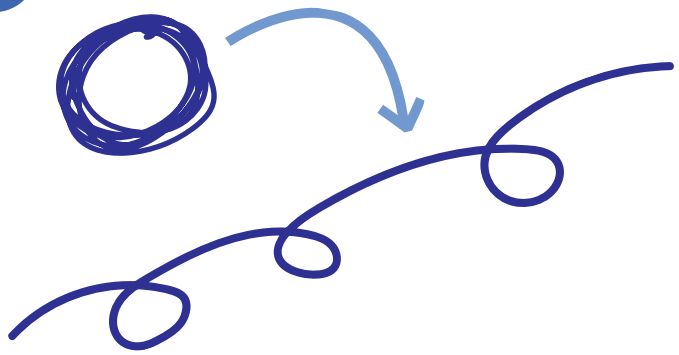
2 AA Batteries

Small Paper Clips and Other Materials
Erasers, Washers, Staples, Candy, Pennies, etc. for magnetic testing.

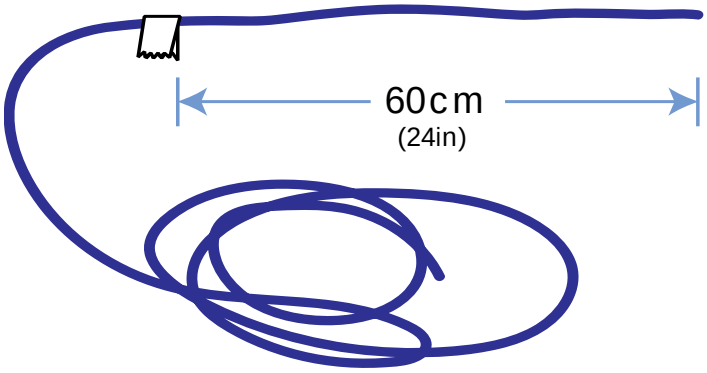
Make the Magnet

1. Turn a 5cm long **screw** into a **block**.

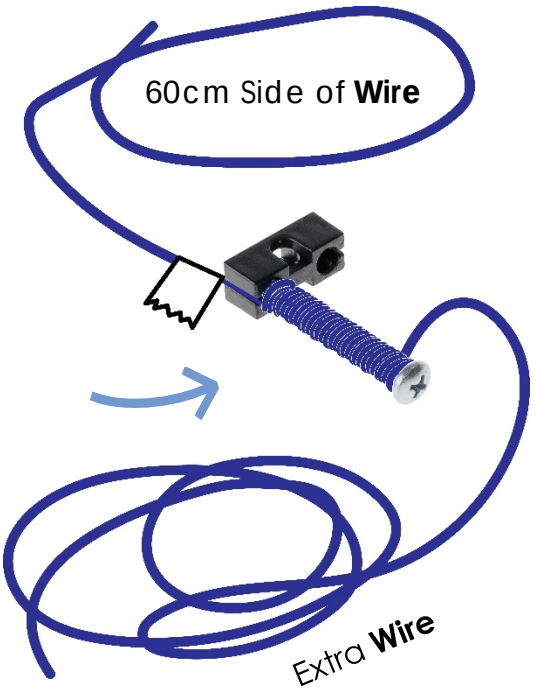
2. Uncoil a **wire roll**.

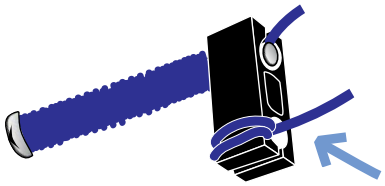


3. Measure 60cm from one end of the **wire.** Fold a piece of **tape** there, over the **wire**.



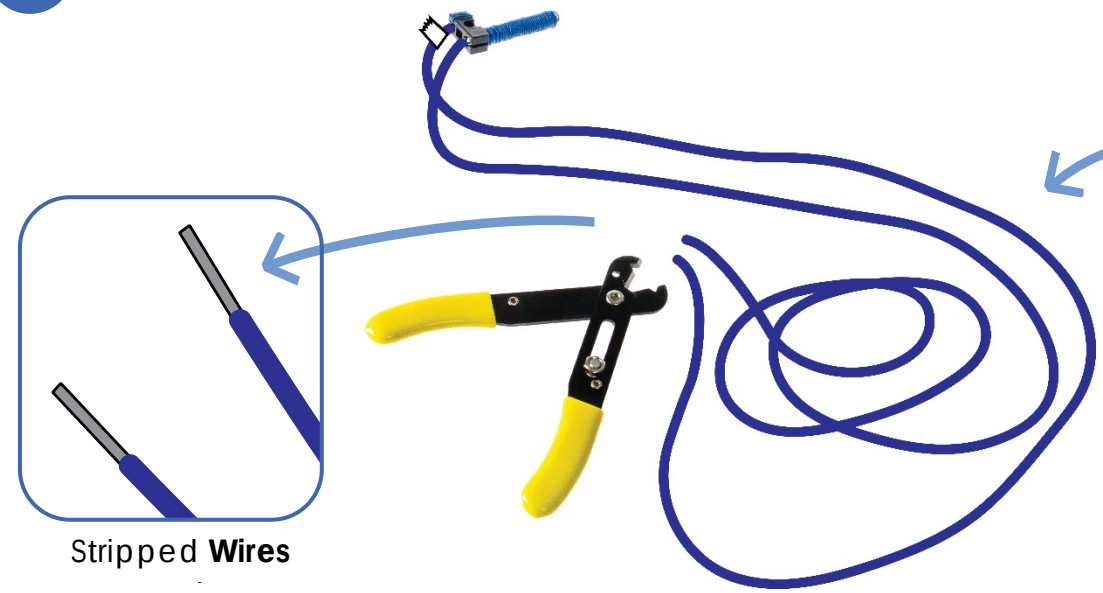
4. Wrap the **wire**, as shown below, <u>50 times</u> around the **screw**.





Quick Tip
To keep **wire** from unwinding, wrap a few times in the slots.

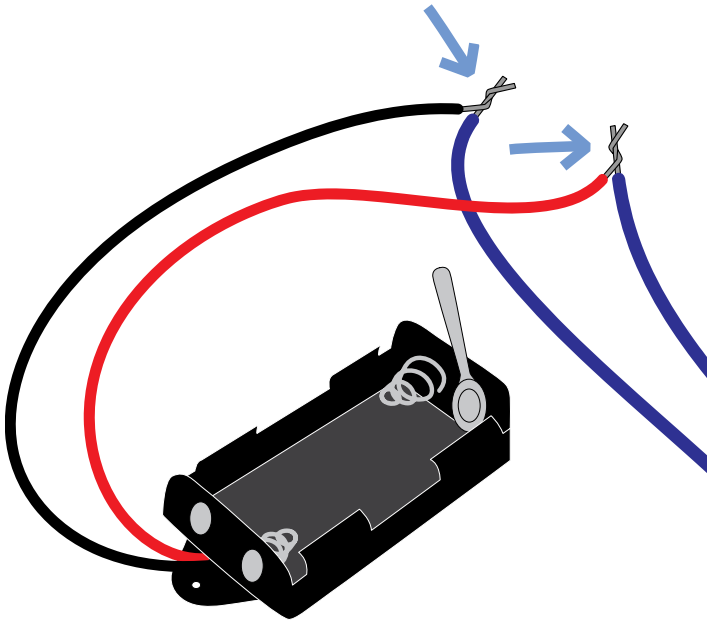
5 Strip (remove) 1cm of plastic **insulation** from the **wire** ends.



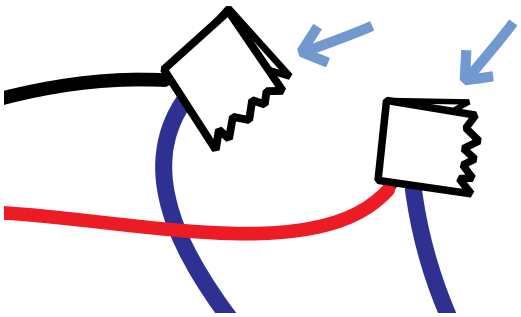
Yes... one wire should be longer than the other.

Stripped **Wires**

6 Twist the **stripped wire** from step 5 with the stripped **battery holder wires**.



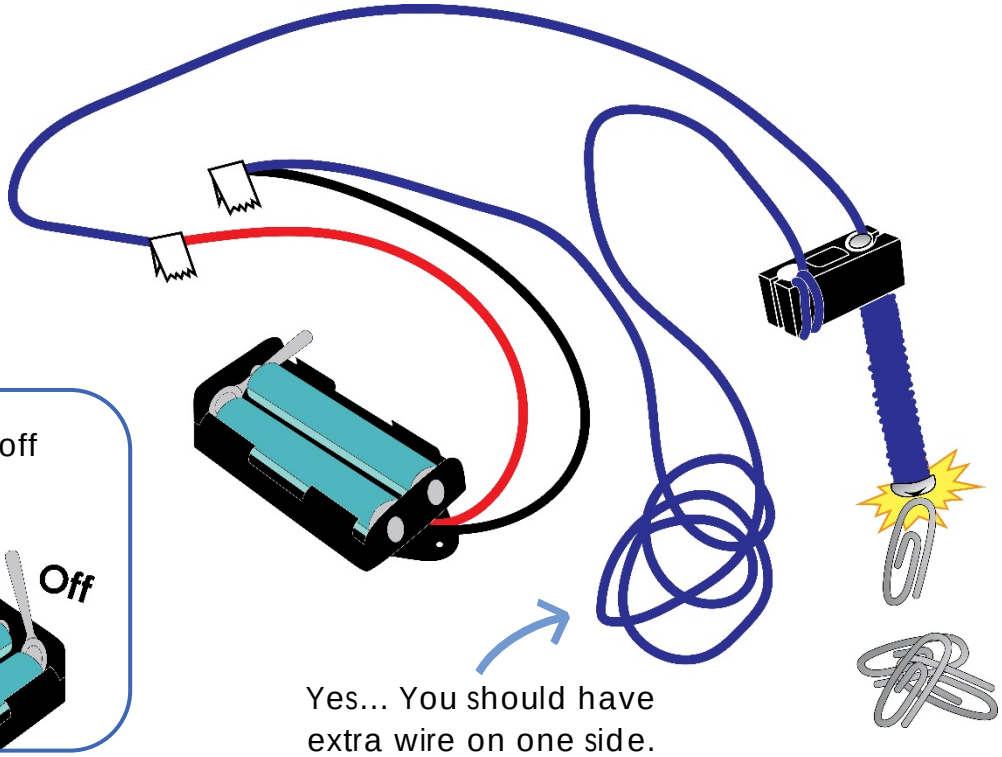
7 Wrap the twisted **wire** ends with **tape**. This will keep them together, and keep them from touching.



Don't Short Circuit

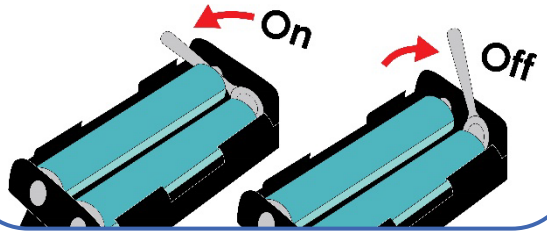
Keep the red and black wires from touching. The battery will heat up and die (nothing fun).

8 Put 2 **AA batteries** into the **battery holder**. Turn it on and try to pick up some paper clips.



Yes... You should have extra wire on one side.

Turn your magnet on and off with the metal lever.

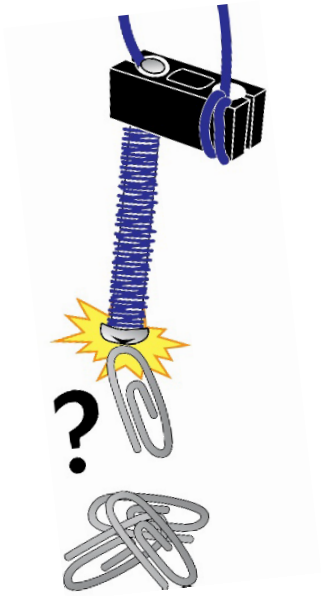


Do not keep your electromagnet turned on. It will get hot and drain your battery.

Let's see how much your magnet can pick up.

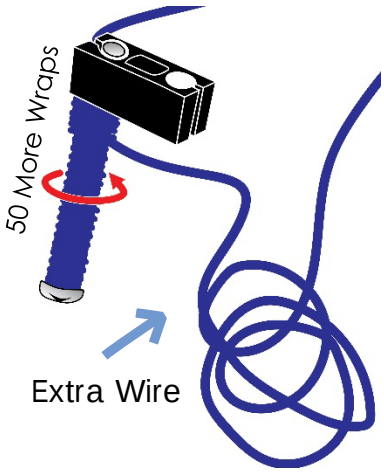
Name: _____ Set: _____ Date: _____

Test The Magnet



9 How many small paper clips can your electromagnet pick up?

_____



10 Add <u>50 more wire wraps</u> around the screw, using the extra wire.

How many wire wraps are now on the screw?

_____

11 How many paper clips can it pick up?

_____

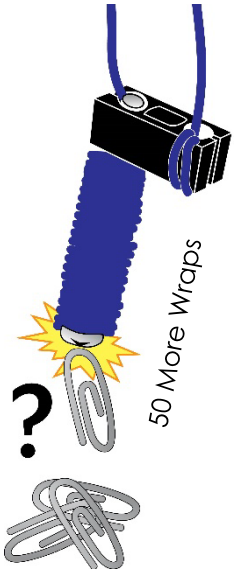
12 Add <u>another 50 wire wraps</u> around the electromagnet.

How many wire wraps are now on the screw?

_____

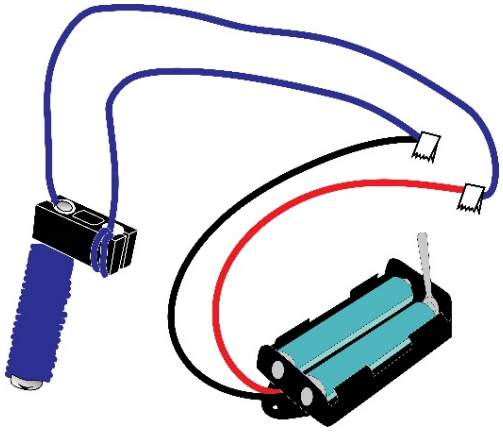
13 How many paper clips can it pick up?

_____



14 Make the wires the same length by wrapping the extra wire around the screw.

Your electromagnet is done. Put it to work.



Materials

15 Magnetic materials will attract to your electromagnet. Test different materials to see if they are magnetic. Record the results below.

Material	Predict: Will it be magnetic?	Test: Is it magnetic?	How many can it pick up?
Paper Clip			
Rubber Eraser			
Penny			
Dime			
Staple			

Some things may attract, but be too heavy to pick up.

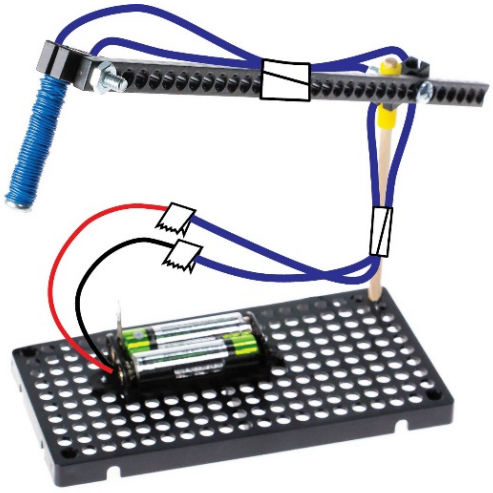
Find and test more materials

Conclusion

16 What was similar about the materials that were magnetic?

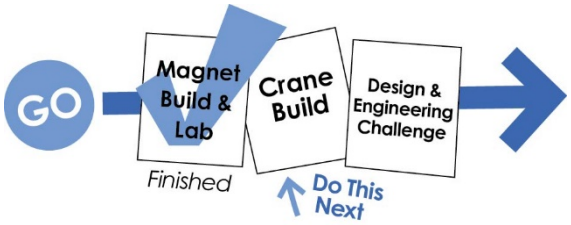
17 What was different about the materials that were magnetic?

18 How could you make the magnet more powerful?



Congratulations!

Your electromagnet is finished.
It's time to turn it into a crane.



Documents at ***teachergeek.com/learn***