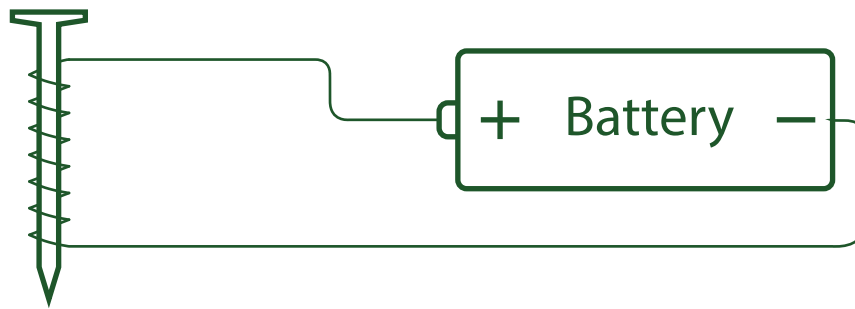




# EXPERIMENTING WITH ELECTROMAGNETS

You can create your own electromagnet with two batteries, a piece of wire about 2 feet long and a nail. Remove the insulation off both ends of the wire, coil it around the nail and attach both ends to one battery. To test your electromagnet, use a bunch of paper clips.



## Object of the experiment:

To find out whether the strength of the electromagnet is affected by the number of coils and/or the voltage provided.

## Hypotheses

Increasing the number of coils will \_\_\_\_\_ the strength of the electromagnet.

Increasing the voltage will \_\_\_\_\_ the strength of the electromagnet.

## Directions

Coil the wire around the nail 20 times and connect the ends of the wire to the battery. See how many paper clips you can pick up. Repeat the experiment two more times, adding 10 coils in each trial.

## Data:

Number of coils	Number of paper clips picked up

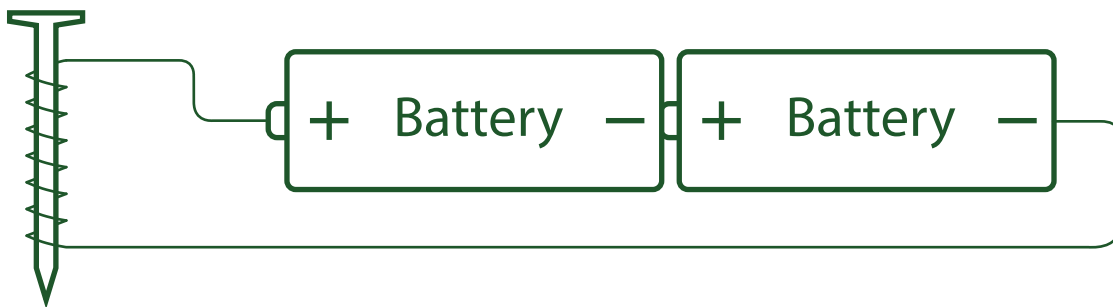


What factor is kept constant here? \_\_\_\_\_

What is the variable? \_\_\_\_\_

### Directions

Keeping the number of coils the same, increase the voltage provided by connecting both batteries in a series, as shown below. Use tape if necessary.



### **Data:**

Number of batteries connected	Number of paper clips picked up

What factor is kept constant here? \_\_\_\_\_

What is the variable? \_\_\_\_\_

### Conclusion

Increasing the number of coils \_\_\_\_\_ the strength of an electromagnet.

Increasing the voltage provided \_\_\_\_\_ the strength of an electromagnet.



## Answers

### Experiment 1

Data: *The number of paper clips picked up must increase with the number of coils*

Number of coils	Number of paper clips picked up

What factor is kept constant here? *Voltage*

What is the variable? *Number of coils*

### Experiment 2

Data: *The number of paper clips picked up must increase with the number of batteries connected*

Number of batteries connected	Number of paper clips picked up

What factor is kept constant here? *Number of coils*

What is the variable? *Voltage*

## Conclusion

Increasing the number of coils *increases* the strength of an electromagnet.

Increasing the voltage provided *increases* the strength of an electromagnet.