

To teachers We have prepared worksheets to accompany the experiments in the instructions, which you can copy and use in your teaching.



How Electric Current Works

Soccer Robo 2 Worksheet

Name	Year	Class
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Experiment 1 Properties of Electromagnets

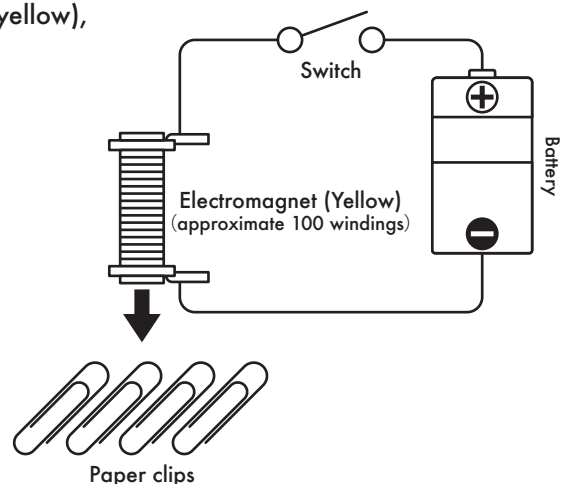
A Find out how to attract iron

A To apply or stop the current to the electromagnet (yellow), bring it closer to the paper clip.

☆ What happened to the paper clip?

Apply current and bring it closer

Stop current and bring it closer



B Find out if there is a pole

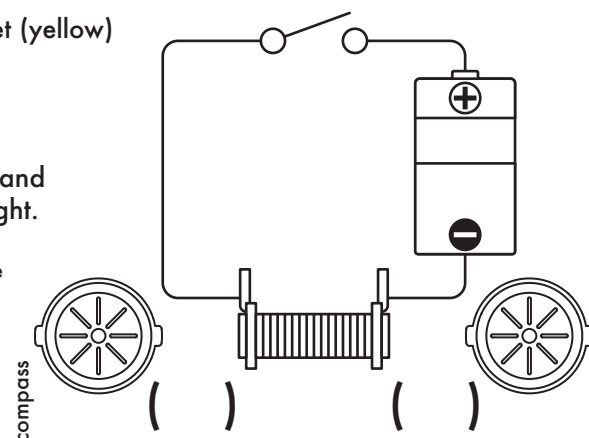
B An electric current is applied to the electromagnet (yellow) and bring the compass closer to it.

C Change the direction of the battery and examine them in the same way.

☆ Write down the direction of the compass's needle and write N or S in brackets () in the figure on the right.

☆ Let's summarize the relationship between the orientation of the battery and the pole of the electromagnet.

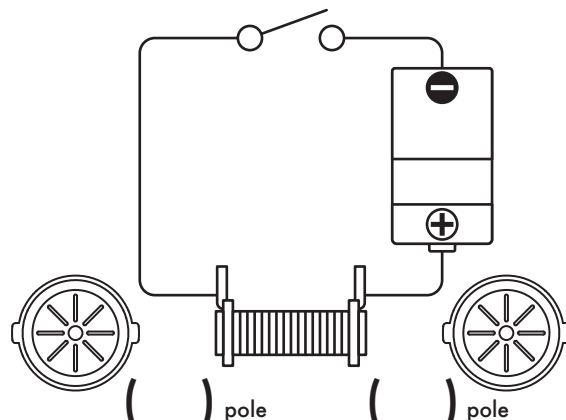
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☆ Let's compare magnet and electromagnet.

Similarities

Differences



☆ Before proceed to Experiment 2, let's all think about how to make a strong magnet.

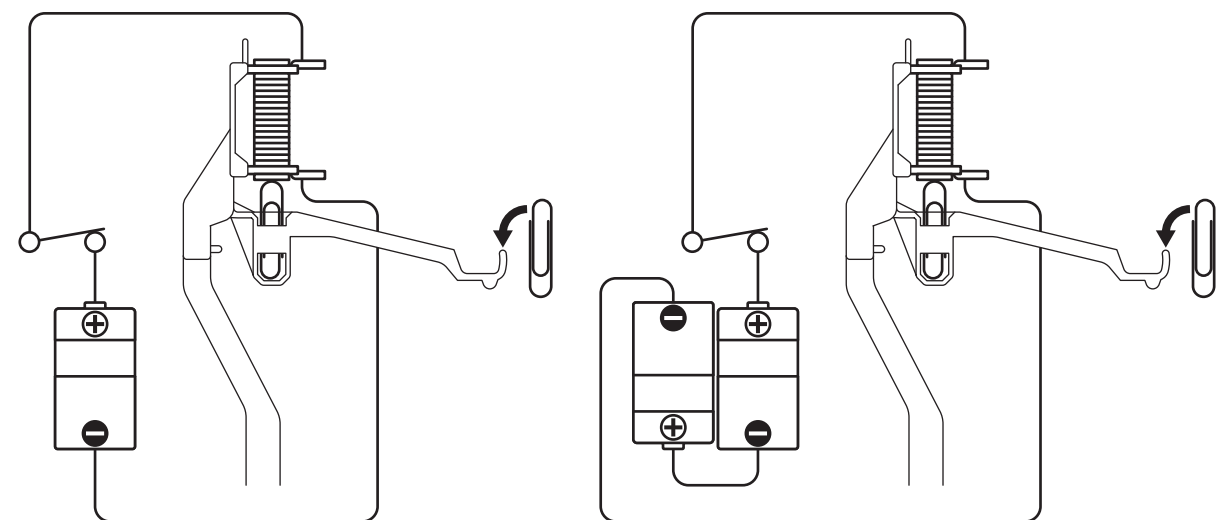
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Experiment 2 Strength of electromagnets

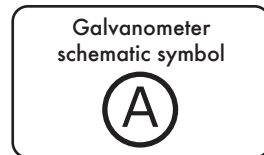
C Examine by changing the magnitude of the current

D Find out how many suspended paper clips you have using 1 battery.

E Find out how many suspended paper clips you have using 2 batteries connected in series.



☆ When using a galvanometer in Experiment 2-C, try drawing the schematic symbols in the figure above.



Changeable conditions	The magnitude of the current	1 battery	2 batteries
	When measured with a galvanometer	ampere	ampere
Unchangeable condition	Number of coil windings	100 windings	
Experiment 2-C results (number of paper clips)	1st time		
	2nd time		
	3rd time		

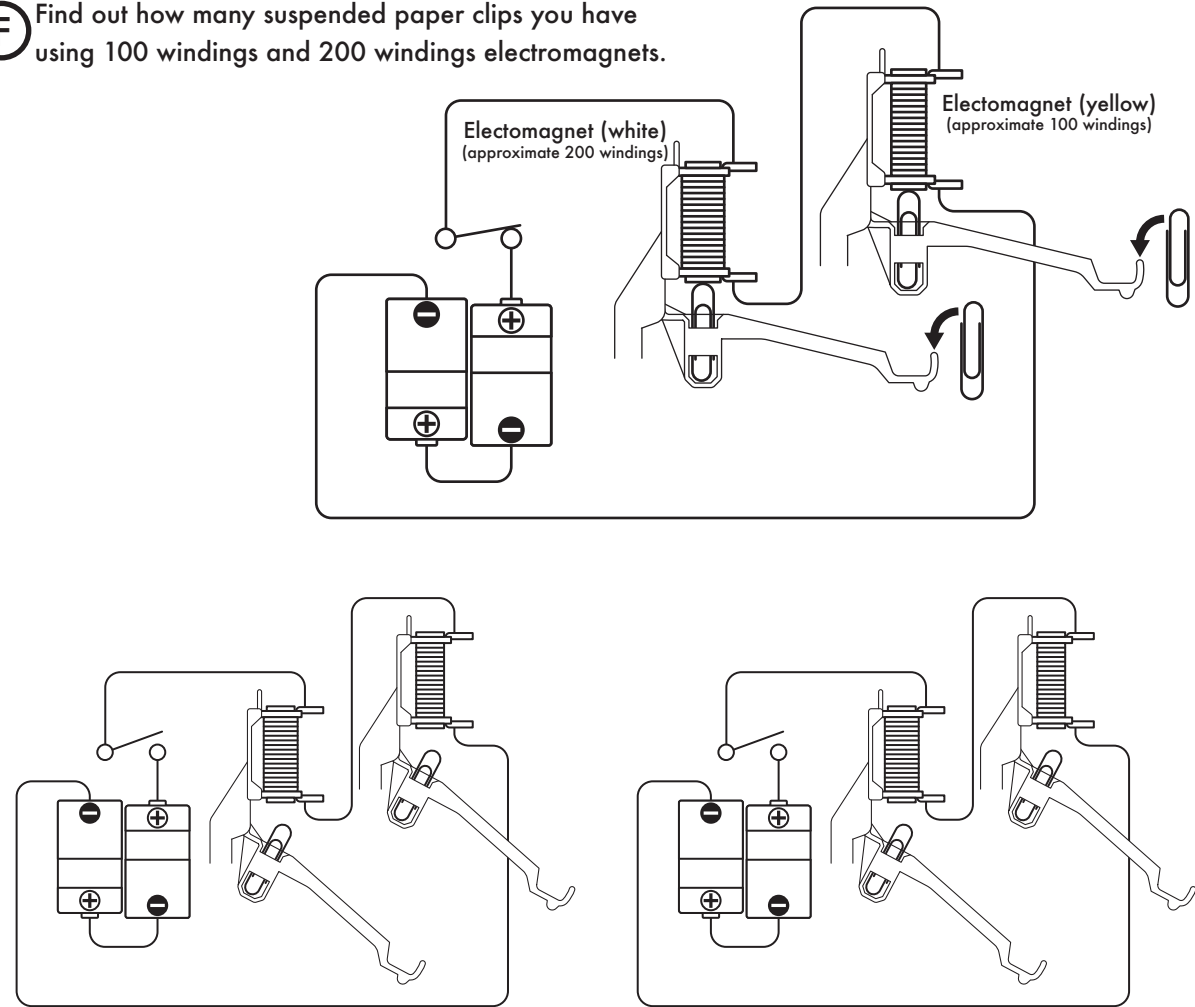
Experiment

2 Strength of electromagnets (continuation)

D

Investigate different numbers of coil windings

F Find out how many suspended paper clips you have using 100 windings and 200 windings electromagnets.



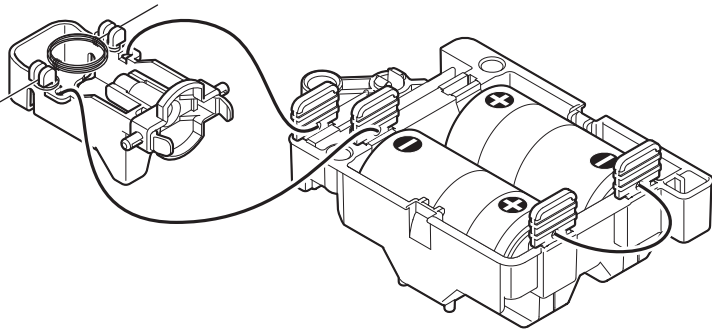
☆ When using a galvanometer in Experiment 2-D, try drawing the schematic symbols in the figure above.

Unchangeable condition	The magnitude of the current	2 batteries	
	When measured with a galvanometer	ampere	
Changeable conditions	Number of coil windings	200 windings	100 windings
Experiment 2-D results (number of paper clips)	1st time		
	2nd time		
	3rd time		

☆ From the results of Experiment 2, let's summarize the strength of the electromagnet.

Let's try

1 Let's turn the coil motor!

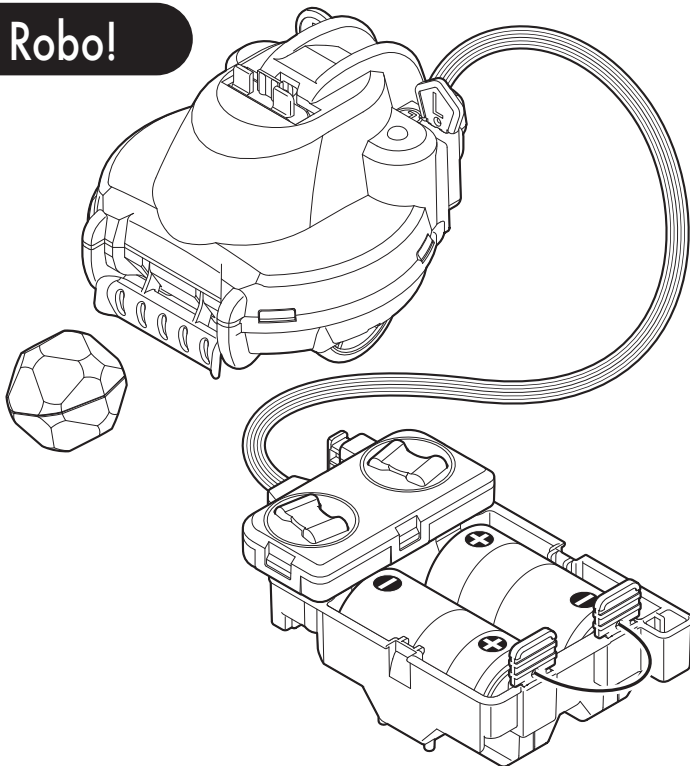


☆ Write down what areas/things that you need to pay attention to before the coil motor runs well.

Let's try

2 Let's make a Soccer Robo!

☆ Let's write down your thoughts when the soccer robo move.



☆ Let's think about what kind of machines and tools that use the function of electromagnets.