SCIENCE TEACHING MATERIALS

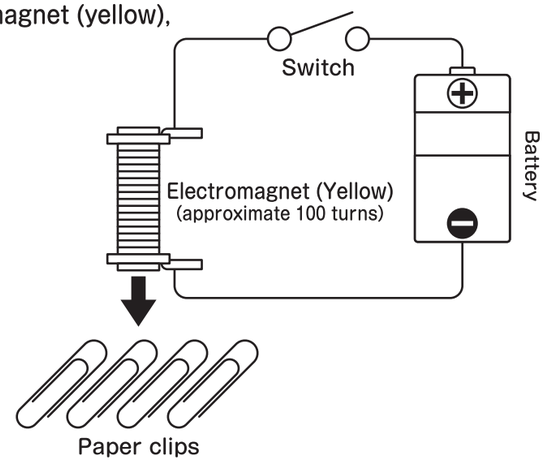
How Electric Current Works
[Soccer Robo 2] Worksheet

Name

Experiment 1 Properties of Electromagnets

A Find out how to attract iron

Ⓐ Apply or stop an electric current to the electromagnet (yellow), and 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

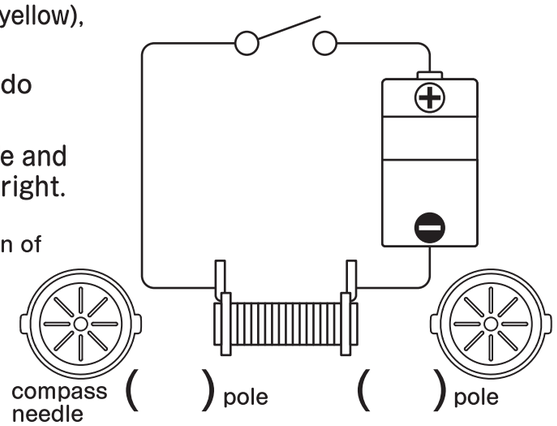
B Find out if there is a magnetic pole

Ⓑ Apply an electric current to the electromagnet (yellow), and bring the compass closer to it.

Ⓒ Switch the direction of the batteries and redo the previous step.

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

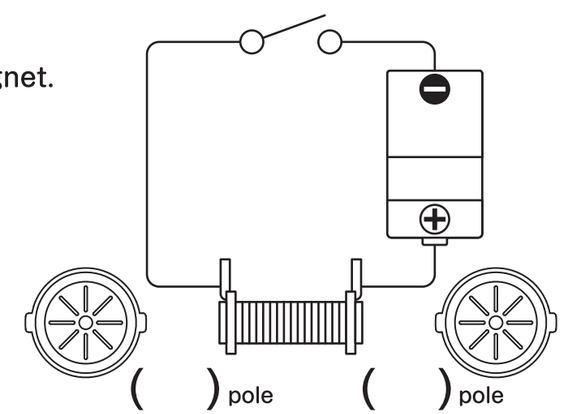
☆ Let's summarize the relationship between the direction of the battery and the pole of the electromagnet.



☆ Let's compare the magnet and electromagnet.

Similarities

Differences



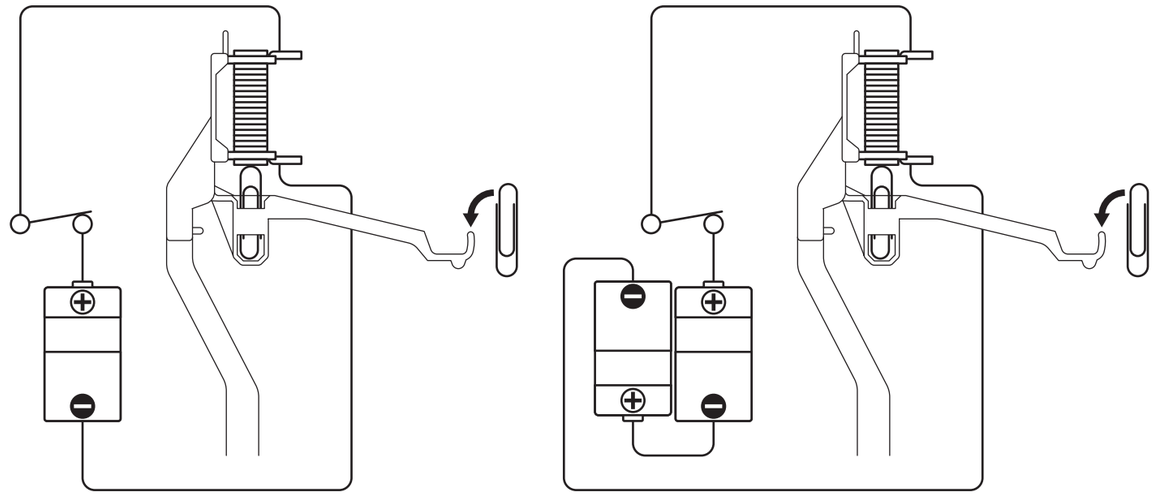
☆Before proceeding to Experiment 2, let's think about how to make a strong electromagnet.

Experiment 2 Electromagnetic strength

C Change magnitude of the current

Ⓓ Find out how many paper clips you can hang when using one battery.

Ⓔ Find out how many paper clips you can hang when using two batteries connected in series.



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

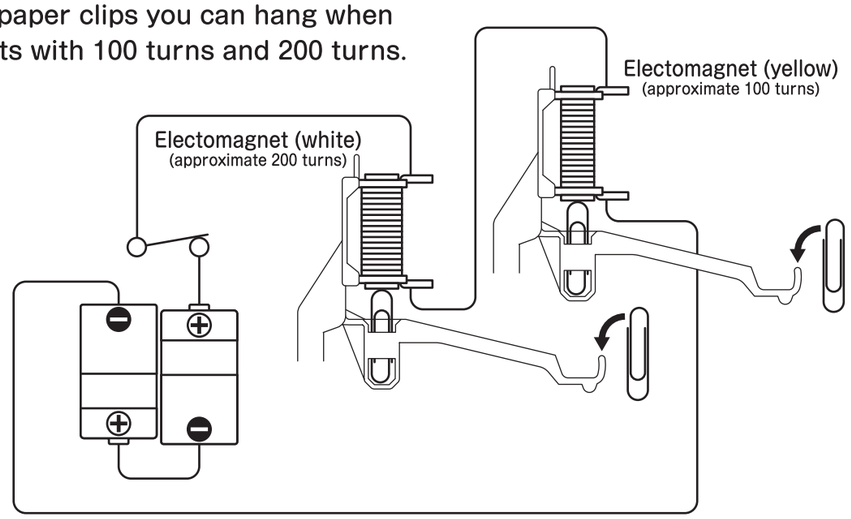
Galvanometer schematic symbol
Ⓐ

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

Experiment 2 Electromagnetic strength (cont'd)

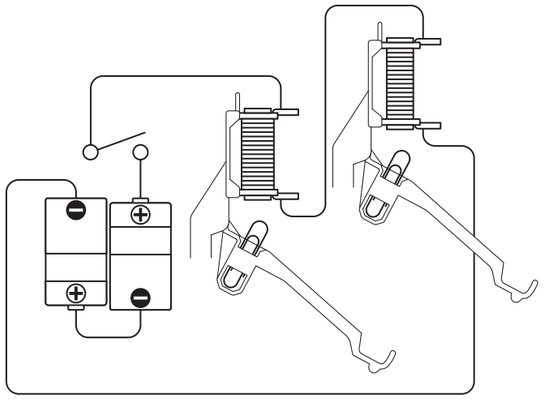
D Change number of turns on the coil

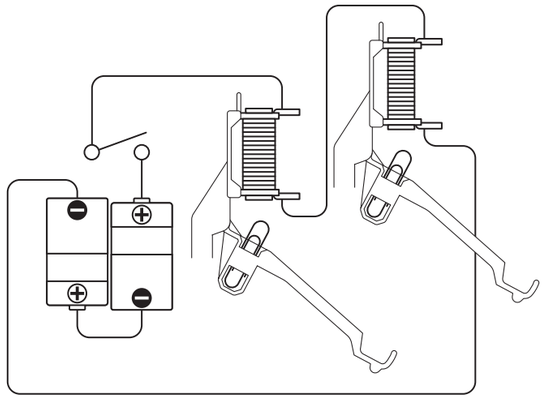
Ⓕ Find out how many paper clips you can hang when using electromagnets with 100 turns and 200 turns.



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

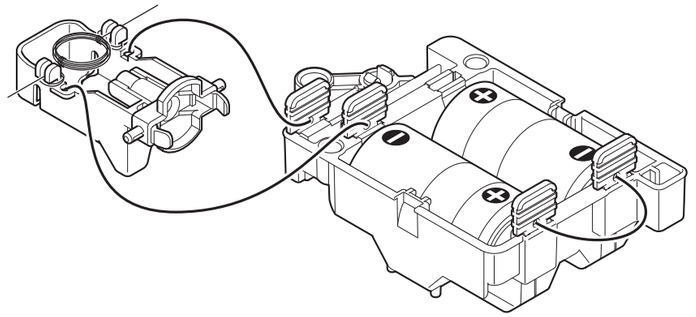
☆ When using a galvanometer in Experiment 2-D, try drawing the schematic symbols in the figure above.





☆Based on the results of Experiment 2, let's summarise what you have found out about electromagnetic strength.

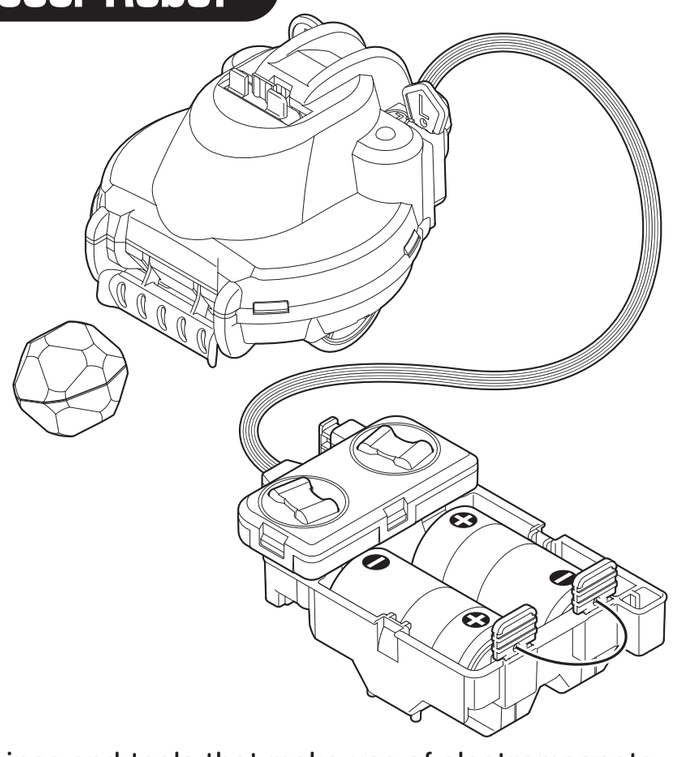
Let's try 1 Let's turn the coil motor!



☆Write down the areas to pay attention to ensure that the coil motor operates well.

Let's try 2 Let's make a Soccer Robo!

☆Let's write down your thoughts when moving Soccer Robo.



☆Let's think about the types of machines and tools that make use of electromagnets.