

Experiment M-11 Magnetic Field



Objectives

- To learn about the basic properties of magnets.
- To compare the magnetic field strength between two poles of a magnet, between different distances from the poles, and between different magnets.

Modules and Sensors

- PANDA-1 Panda Multi-sensor 

Materials

- 2 types of bar magnets
- Ruler

Introduction

A bar magnet has two ends, known as magnetic poles. One pole is called the north pole of the magnet and the other pole is called the south pole of the magnet. 'Unlike magnet poles' attract each other and 'like magnet poles' repel each other. Magnets also attract other materials which are not normally magnetic (various sorts of metals). The magnetic field is stronger near the poles of a magnet.




In this experiment you will measure the magnetic field strength near the magnetic poles of two types of bar magnets. You will also measure the magnetic field strength in different distances from the poles.

Procedure

Experiment setup

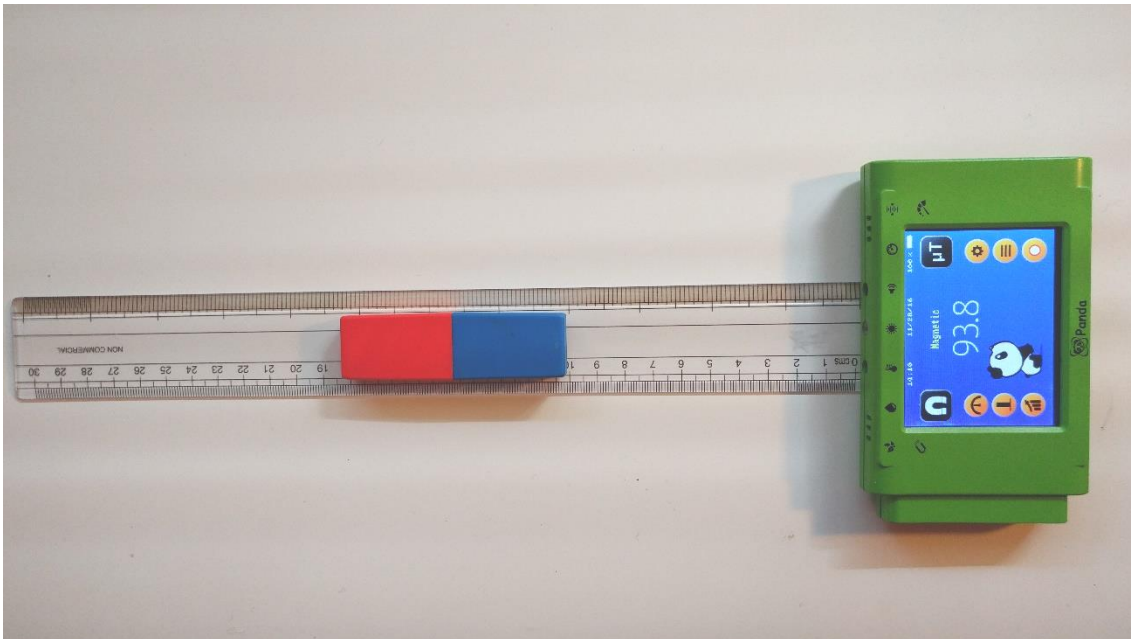
1. Make sure you have two types of bar magnets and a ruler.

Settings

2. Press on the **Sound sensor** icon  on the top left of the screen.
3. Use the arrows   to select the magnetic field (magnetic) sensor.
4. Press on the range button on the top right of the screen (will show " μT " or " 360° ").
5. Press on the **x axis** button.

Testing and measurements

6. Put the panda at the end of the ruler, next to the 0 value. The sensing side of the Panda (with the small icons) should be directed to the ruler.
7. Place one of the magnets on the ruler, so that the blue side will be directed towards the panda and its tip will be on the 10 cm or 4 inch mark of the ruler.



8. Fill on the value you see on the Panda in the table below:

	Magnetic field (μT) – Blue side (South pole)	Magnetic field (μT) – Red side (North pole)
First magnet: 10 cm/ 4 inch		
First magnet: 15 cm/ 6 inch		
Second magnet: 10 cm/ 4 inch		
Second magnet: 15 cm/ 6 inch		

9. Move the magnet next to the 15 cm/ 6 inch mark of the ruler.
10. Change the side of the magnet so the red side will face the Panda and place it next to the 10 cm /4 inch mark. Fill the value in the table above.
11. Place the magnet as it is but next to the 15 cm/ 6 inch mark of the ruler. Fill the value in the table above.
12. Repeat these steps with the second magnet and fill the table with the values you see.

Summary questions

1. Was the value higher or lower when the magnet was closer to the Panda? Explain these results.
2. What was the main difference in the values while measuring the two sides of the magnets?
3. According to your results, which magnet is stronger, the first or the second one? How can you demonstrate it without using the Panda?