

29.4: Procedures

You will make four electromagnets and investigate the properties of electromagnets.

1. Strip the ends of your wires, if the ends are not already stripped.
2. Draw a table in which to record magnetic strength data. **Do not fill in data until you have read the instructions for obtaining that data.**

Table 29.4.1: Magnetic Strength Data

Magnetic System	Windings	Paperclips
Nail, 12 Inch Wire		
Nail, 24 inch Wire		
Bolt, 12 Inch Wire		
Bolt, 24 Inch Wire		

Warnings

- Exposed ends of wires can burn you.
- Your battery may get hot.
- You may need to use a 2nd battery for your systems to work.

The Iron Nail

3. Leave about 2-3 inches of a 12-inch wire loose at one end of the nail, and wrap most of the rest of the wire around the nail (do not overlap wire loops), count the number of loops/coils. Record the number of windings on your nail. There should be about 2-3 inches of wire loose at each end of the nail.
4. While holding the insulated part of the wire, touch the exposed ends to one battery; be careful not to burn yourself. Attach the wire ends to the battery with electrical tape. Use your electromagnet to pick-up as many paperclips as it can attract. Record the number of paperclips your 12-inch wire electromagnet is able to hold. Detach this electromagnet from the battery.

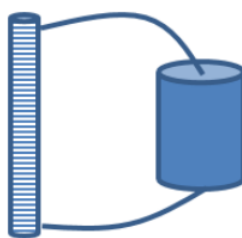


Figure 29.4.1

5. Repeat the process with your 2nd nail and the 24-inch wire. Record your data. If you receive a negative result for both the 12-inch wire and the 24-inch wire, use the 2nd battery and try again.

The Iron Bolt

6. Follow the same processes you used with the nail, but this time use an iron bolt for the core. Record your data.

Determining the Poles

7. Place the piece of paper over one of your electromagnets. Re-attach the battery to this electromagnet, and lightly sprinkle iron filings onto the paper. Describe or sketch the pattern; identify where the poles appear to be. Repeat this process for each of your electromagnets.

Clean-up

- Clean up all iron filings
- Throw away the piece of paper
- Wash your team table
- Unwrap and straighten all wire from nails and bolts

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