Student Handout:

Materials:

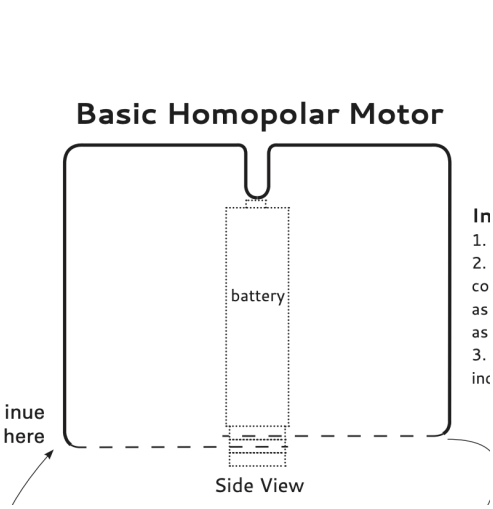
- 1.5V D or AA battery
- Neodymium magnets (3)
- 10” Copper wire (medium gauge)
- Wire cutters/pliers
- Pencil
- Crepe paper (optional)

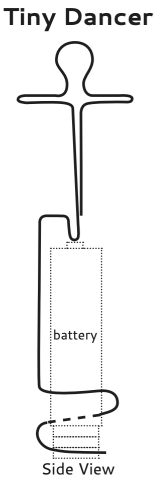
Safety Considerations: ⚠️ Important Safety Notes:

- Wear safety glasses
- Use gloves when handling metals
- Work under adult supervision
- Do not consume the experimental materials
- Neodymium magnets must be handled with adult supervision
- Do not touch batteries if they become warm
- Keep magnets away from electronic devices

Part 1: Basic Homopolar Motor Construction

1. Cut a 10-inch piece of copper wire
2. Bend the wire around the battery to create a balanced form either a homopolar motor or dancer
3. Create a circular base that can wrap around the battery and low enough to wrap around magnets
4. Place 3 neodymium magnets on the battery's negative terminal
5. Position the wire so it touches/balances on the battery's positive terminal
6. Observe the motor's rotation





Experimental Hypothesis:

Write a hypothesis about how changing the following variables might affect the motor's rotation:
- Wire symmetry

- Magnet placement

- Wire thickness

Background Understanding:

1. What is a homopolar motor?

2. Define the term "Lorentz Force" in your own words.

3. Who was Hendrik Lorentz, and why is he important in scientific history?

Observation Table:
Create a data table to record the following:

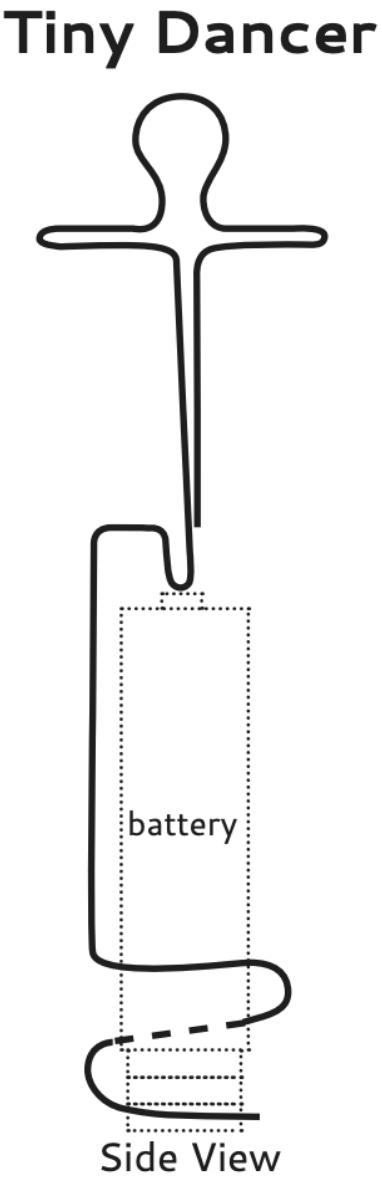
- Motor rotation speed
- Time of rotation
- Any unusual behaviors
- Temperature changes

Reflection:
Write a detailed paragraph explaining:

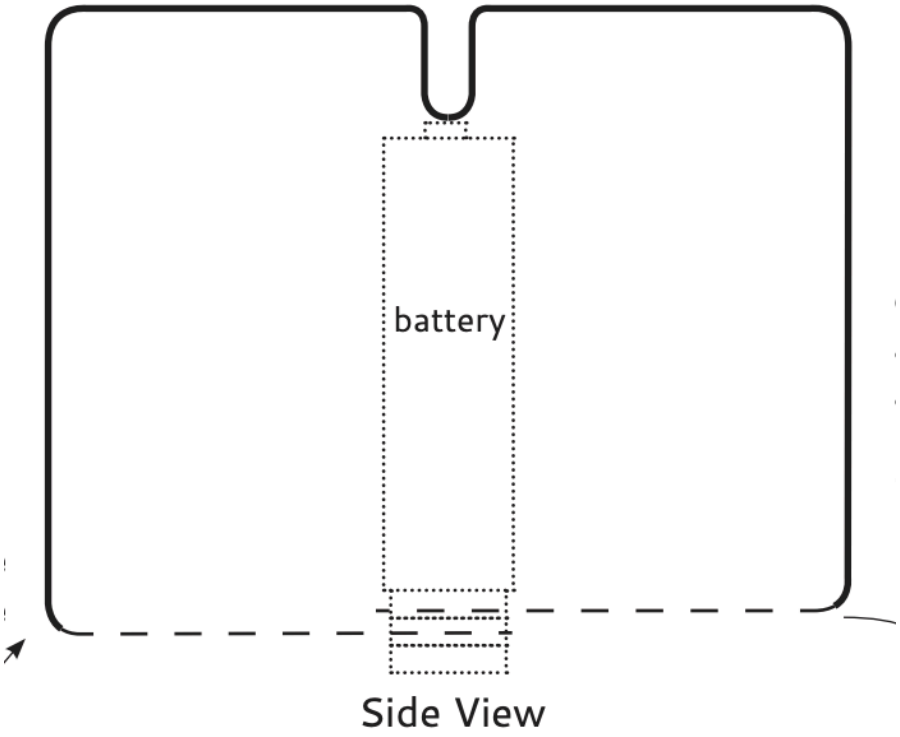
- What you learned about electromagnetism
- Challenges encountered during the experiment
- Potential real-world applications of this technology

Extension Activities:
1. Experiment with different wire gauges
2. Try creating a "dancing" wire sculpture
3. Research Hendrik Lorentz and his contributions to physics

Template:



Basic Homopolar Motor



Side View