

1 E/M Assessment Due 12/13 Nov - Planning Guide

1.1 Question

How can you build a functioning fan or speaker to help explain electric currents and magnetic fields?

1.2 Prompt

They are hosting a party for Sundown Salute in Junction City. Your group has been tasked with creating speakers for the music OR fans to cool people off in the heat of the summer. You must decide which job you are going to take and build the fan or speaker using the materials provided. However, the city has given you a budget to design these projects and you only have \$10 to buy materials. You must work together as a group to design this project within the allotted budget.

1.3 Basic Requirements

Option 1 - Research and design a working fan that will spin.

Option 2 - Research and design a speaker that will play the music.

1.4 Materials List

With your \$10 you can purchase:

Item	Cost	Item	Cost
Plastic cup	\$1	Styrofoam plate	\$1
2 large paper clips	\$1	4 post-it notes	\$1
Rubber band	\$1	Water bottle	\$2
2 push pins	\$1	Nail	\$1
Donut magnet	\$1	24-gauge wire	\$1
Neodymium magnet	\$2	16-gauge wire	\$2
Small neodymium magnet	\$1	Sharpie	\$1
Ferrite magnet	\$1	Use of pliers	\$1
Advice from adult	\$1		

2 Proficiency Scale

Engineering Design - 4

- ☐ Describe 3 reasons why the fan/speaker passed/failed
- ☐ Describe 3 improvements
- ☐ Compare 3 points why a manufactured fan/speaker works better
- ☐ Describe WHY for each of the 3 points

Electricity and Magnetism - 4

- ☐ In writing - explain how their fan/speaker works in terms of electric current and magnetic fields with no errors
- ☐ Diagram - explain how their fan/speaker works; using arrows showing direction of forces

Engineering Design - 3

- ☐ Describe 2 reasons why the fan/speaker passed/failed
- ☐ Describe 2 improvements

Electricity and Magnetism - 3

One OR the other, with no errors

- ☐ In writing - explain how their fan/speaker works in terms of electric current and magnetic fields
- ☐ Diagram - explain how their fan/speaker works; using arrows showing direction of forces

Engineering Design - 2

- ☐ Describe 1 reasons why the fan/speaker passed/failed
- ☐ Describe 1 improvements

Electricity and Magnetism - 2

One OR the other, with minimal errors

- ☐ In writing - explain how their fan/speaker works in terms of electric current and magnetic fields
- ☐ Diagram - explain how their fan/speaker works; using arrows showing direction of forces

Engineering Design - 1

- ☐ Only identify if the fan/speaker was a success or failure but no reasons given why.

Electricity and Magnetism - 1

- ☐ Not explain how their fan/speaker works in terms of electric current and magnetic fields.
- ☐ Diagram with no labels or no description.

3 Pre-Planning

1. Research both how to make a speaker, and a fan. Summarize what you find below.

2. Which do you choose? _____

- ### 3. Why?

4. Make a drawing of your design

Grid of dots for drawing.

5. Label the currents, magnetic fields, and forces in your design.

6. Is there any way you can improve your design? (Think about the electro-magnet you made, and the magnets you played with. What made the forces stronger for either of them? Think back to what we did in mechanics too.)

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7. Write a description for how your design works.

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Grid of dots for planning or writing.

13. Grade yourself to make sure you included everything you need.