Speak Up!

Amplify your grade with a hi-fi performance on this last project. In this project you will draw on what you have learned about electromagnetism to build a working speaker. You will need to do some research to determine how speakers work and develop a plan for how you will build one.

Part I: Research

The first part of this project involves doing research to determine how speakers work. Your research should include a discussion of how a speaker turns an electrical signal into sound. Your discussion should include a description and an illustration (your own) of the interaction between the magnetic field and the current carrying wires inside the speaker. Your discussion should also include the right hand rule and how it applies to this situation. You may also discuss the history of speakers and how they evolved over time to their present form. This portion of your project should be about two pages and include a full bibliography.

Part II: Plan

For the second part of your project you will draw up (your own) plans for constructing a speaker. The plans should be specific enough that someone else could follow them and get the same result that you intend to get. Your plans should include a detailed drawing, and a step-by-step procedure for constructing your speaker.

When making your design, keep in mind that you will be supplied with the following materials to make your speaker: 32 gauge magnet wire, magnets and card stock. You will also be able to use glue guns, tape, scissors other various tools we have on hand at school. You can make a working speaker from what is listed above but if you would like to bring other materials from home, you are welcome to do so. There is a limited supply of cardboard at school that can be used to make a box if needed. Try looking around home for **small** boxes. A shoebox would work well.

Suggested Sources:
BPL Databases: Science In Context, Credo Reference (use keyword: loudspeaker)
HyperPhysics http://hyperphysics.phy-astr.gsu.edu/hbase/audio/spk.html#c1
True Audio http://www.trueaudio.com/st_trade.htm
HowStuffWorks http://electronics.howstuffworks.com/speaker1.htm

The research and plan portion of your project are due Tuesday May 31. You will not be able to build your speaker until you have completed this portion of the project.

Part III: Build

The class will be split into groups to make the speakers. In your group you should discuss your designs to determine how to build your speaker. You may work with one design or you may choose to take parts from each group members designs to create a composite design that your group is satisfied with. You will have time in class to build and test your speaker

Your completed speaker is due June 8.

Rubric for Speaker Project

Questions to address in the research portion of your project:

How does a speaker turn an electrical signal into sound?
How do magnets and current carrying wires interact inside a speaker?
How does the right hand rule apply to this situation? What are the forces involved?
What is the history of speakers, and how have they evolved over time?

Due Dates:

Research and Plan due Tuesday May 31
Completed speaker due Wednesday June 8

Strand	Does not Approach Expectations <70	Approaches Expectations 70-80	Meets Expectations 80-90	Exceeds Expectations 90-100	Grade
Research 20 pts	-Research does not address several of the questions listed above. -Drawing is uninformative and does not demonstrate knowledge of electromagnetism concepts involved. -Bibliography is not included	-Research addresses most of the questions listed above. -Drawing does not clearly illustrate interaction between magnetic field and current carrying wires -Bibliography is incomplete or not formatted properly.	-Research addresses all the questions listed above. -Research includes an original drawing that illustrates the interaction between the magnetic field and current carrying wires inside a speaker. Drawing is explained in body of text. -Research includes full MLA bibliography.	-Research addresses all the questions listed above and includes additional detailed discussion. -Drawing is exceptional. Explanation demonstrates solid understanding of electromagnetism concepts involved. -Research includes full MLA bibliography and citations in text	
Modeling 20 pts	-Plan is missing important parts. Speaker could not be built from plans. -Drawing is incomplete. -Speaker is incomplete or does not work.	-Plan lacks detail, but key parts are laid out. -Drawing of speaker is incomplete, lacks important details. -Speaker construction is complete and functional.	-Plan is detailed enough that someone else could build your speaker and get the same result. -Plan includes labeled drawing of all components in speaker. -Speaker is constructed and functions well.	-Plan is very detailed and well organized. -Drawing is clear and informative. Drawing adds to plan and makes it easier to follow. -Speaker function is exceptional. Speaker produces high quality sound	
Work Habits 10 pts				All work is completed on time. (-1 pt each day late, up to 5 days for both due dates listed above.	