

**Goal:** Take what you've learned about electricity, electric circuits and magnetism, and apply it to build a fun, educational device. This project is worth one lab grade.

**Partners:** You may do this alone or two people may cooperate.

**Cost:** Most will cost very little. With permission, look through the workshops of your parents and friends. Many people already have an array of batteries, wires, magnets, diodes, soldering iron & solder, and various other electronics. Since two people may collaborate, the cost per person for necessary items will be minimal.

**Safety:** When building circuits, and especially when using a soldering iron, always do so under an adult's instruction. Have fun, but safety is always paramount. Ultimately, what you build must be safe to demonstrate in school. Projects deemed unsafe will not be accepted. Contact your instructor should you have any doubts. Projects which require battery or (*exposed*) AC generated voltages in excess of 30V will not be allowed. Lead – acid batteries are not permitted.

**Choice of Project:** Plans are available on [www.scitoys.com](http://www.scitoys.com). See the sections on Magnetism, Electromagnetism, and Radios. A few other projects from this website may be accepted. You may want to follow plans for device that you found elsewhere.

**Your Deliverable – A Formal Presentation:** There is no formal paper to turn in. You may use note cards. Create easy to read graphics and diagrams that explain the physics behind your device. You have a wide variety of options:

- Color smartboard markers on the board
- Color overhead transparencies
- Handouts
- Posterboard display
- PowerPoint presentation
- Use your working model (*so people can see how something works*) – required!

**Due Date => May 30<sup>th</sup> 2008**

### **Websites**

American Science and Surplus [www.sciplus.com/index.cfm](http://www.sciplus.com/index.cfm)

Edmund Scientific [www.scientificsonline.com](http://www.scientificsonline.com)

Radio Shack [www.radioshack.com](http://www.radioshack.com)

SciToys [www.scitoys.com](http://www.scitoys.com)

Supermagnetman [www.supermagnetman.net](http://www.supermagnetman.net)

## **Local Stores**

- Radio Shack 389 Massachusetts Ave, Acton, MA
- The Home Depot 135 Commercial Rd, Leominster, MA (978) 840-0800
- Acton Model Railroad Center 8 Windsor Ave, Acton, MA (978) 264-4020
- Northeast Hobby Products Co. 200 Mount Laurel Cir, Shirley, MA (978) 425-2000
- Big-G-Trains 30 Main St, Ayer, MA (978) 772-9449
- Scale Model Products 63 Hudson Rd, Bolton, MA (978) 779-5056

## **Grading rubric**

In class, successful presentation and demonstration as follows:

- Your device must operate as planned (25%)
- You have between 3 – 5 minutes. (25%)
- Clearly explain the scientific principles behind how your device works. (50%)

You will need to engage in some research to understand how your device operates. Don't do a "cold" presentation. Always practice! Just because you understand something doesn't mean that other people will. Your goal is to explain your device to an audience that knows nothing about how it works.