

Magnets to Megahertz©  
Pavek Museum  
DC

Week 1: Pass out nametags and do roundtable introductions. Do a presentation on the history of electronic communication. Introduce concept of resistor vs. conductors vs. insulators vs. semiconductors. Introduce concepts of circuits, polarity, static electricity, and current electricity. Measure voltage stored in Leyden jar with electrostatic voltmeter. Perform a Radio Show. Participate in a Television Quiz Show. After the Quiz Show take a snack break, pass out notebooks, and work on Word List. Have the students and their parents fill out the treat sheet. We always have some kind of treat in the middle of class, usually during the lecture. The Museum provides treats the first Saturday. After that the kids and their parents take over.

Week 2: Talk about molecular structure, what distinguishes conductors, resistors, insulators, and semiconductors from one another. Introduce Ohm's Law & concepts of voltage, current, and resistance; water analogy works if we think of resistance as a sponge. Use ohmmeters to test different materials and different lengths of materials. Discuss tool safety. **Build the switch.** Apply it to circuits with light bulbs. Do demonstration with different materials as filaments.

Week 3: Collect first semester fees from all parents (first two Saturdays are on free trial basis). Introduce the **Pavek Electromagnetism Workshop Demonstrators**. Introduce concepts of electric fields and magnetic fields. One does not exist without the other. Distribute meters, batteries, and calculators. Have them label their personal property (boxes, meters, batteries, etc). Make sure that bolts for magnets are steel, NOT STAINLESS STEEL. **Start building electromagnet.** Discuss magnetism and current. Do demo with magnets, and monster voice coil.

Week 4: **Convert electro-magnets into buzzers.** Talk about relays. Introduce concept of **diodes** and **Back-EMF**. Set the stage for other uses of electromagnetism. Connect switches to buzzers, send and receive Morse code messages. Introduce series and parallel circuits

Week 5: Continue with concepts of electromagnetism and various applications. Start building the **motor**. This is a more involved construction project. Talk about the relationship between printed plans/schematic diagrams to actual physical devices/projects.

Week 6: Finish building the motor. Finish Ohm's Law problems. Finish the Word List. Talk about upcoming second semester. Bring out examples of second semester projects.

Week 7: make-up