Electromagnets

- Relationship between electricity and magnetism: [observational experiment]

1. Test a coil of copper wire with compass. Is it a magnet? (no)
2. Connect coil to 1.5-volt cell and then test with compass (it is now a magnet).

Note: This is a "short circuit" and should only be connected momentarily. (Explanation: No boulders in the moat so current runs rapidly, battery runs out of power faster).

Conclusion: When electrons flow through a wire, it makes a magnet.

- How does amount of current affect magnetic field? [observational experiment]

1. Wrap 6 turns of hook-up wire (18-gauge) around a compass, connect for about 5 seconds to battery, record amount of deflection (mark with crayon).
2. Place bulb in circuit, see if deflection is as much (Note: This is the principle involved in electrical meters - show a meter if you have one - less current, less magnetic force).

- Make and test an electromagnet: [observational experiment]

nail 1.5 volt battery
18-gauge wire (20 turns) paper clip

1. Test nail with paper clip. Is it a magnet?
2. Wrap wire around the nail.
3. Connect to battery (short time). Is it now a magnet? (test with paper clip)
4. When disconnected, is there any residual magnetism left in the nail? (if so, how could we get rid of it?)

Use of electricity and conservation

- Appreciation/conservation: [lesson/activity]

Students should develop an appreciation for electricity - be aware that it costs money and should be conserved.

1. Discuss where we get our household electricity (fossil fuels, water power, nuclear power plants, etc.)
2. List appliances that use electricity and how they make life easier for us.

Safety

1. Discuss dangers of high voltage - even household current can kill.
2. Use only batteries for experiments. Respect high voltage.

- Develop process skills by involving students as much as possible in these activities.