UNIT 8: ELECTRICITY AND MAGNETISM
A Current Theory

Upon completion of this unit, the student should be able to:

1. Define static electricity and describe how it is produced.

2. State the basic law of electrostatics and contrast the two types of charges.

3. Explain the concept of an electric field and sketch the electric field lines around one or more charges.

4. Contrast a conductor and an insulator.

5. Describe and explain the processes of charging by conduction and induction.

6. Describe how a capacitor is built and the factors which affect capacitance.

7. Explain Coulomb's Law and apply it to calculating the force between two electric charges.

8. Explain magnetism in terms of the domain theory.

9. Explain the difference among diamagnetism, paramagnetism, and ferromagnetism.

10. Explain the concept of a magnetic field, define magnetic flux, and sketch the lines of magnetic flux around a set of magnetic poles.

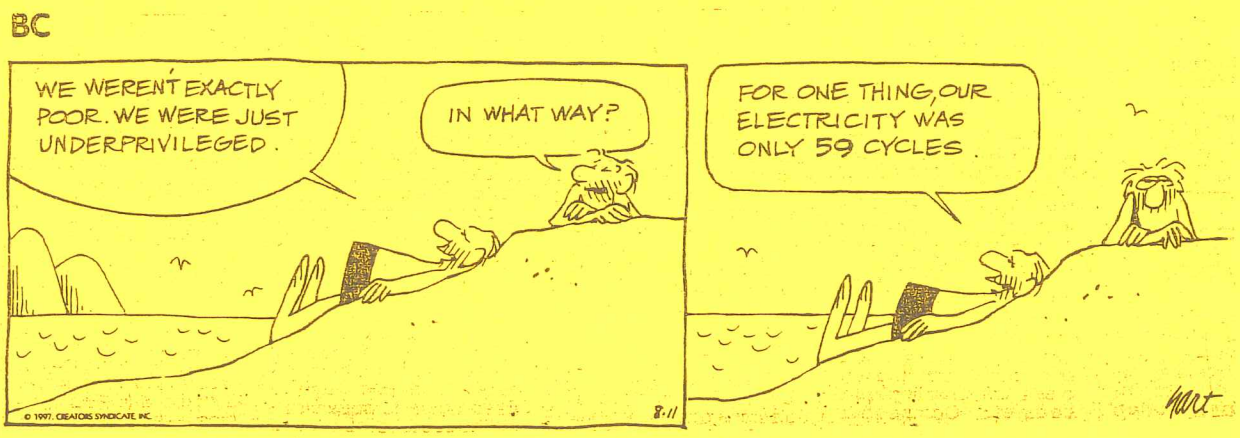
11. Explain the relationship between electricity and magnetism and describe applications which use this relationship, including motors and generators.

12. Explain superconductivity and the theory behind it.

Reference: Holt Physics, chapters 16 and 17 (electricity); chapter 19 (magnetism); chapter 20 (EM induction)

Homework: Electricity and Magnetism handouts

Labs: It Can't Work, Get a Charge



SPARKS AND SHOCKS

1. Electrical experiments were first conducted in earnest in the _____ Century.

2. _____, an Englishman, was the first scientist to investigate electricity and magnetism.

3. The word electron comes from the Greek word for _____.

4. 3 important experimenters of electricity and their contributions from the 18th Century:

5. The 2 types of electricity were initially referred to as _____ (for amber) and _____ (for glass).

6. Today we refer to the 2 types of charges as _____ and _____, a system of nomenclature first proposed by _____.

7. Unlike charges _____ each other, and like charges _____ each other.

8. A pinwheel rotates because the metal points are _____ by the charged air molecules.

9. The first plate machine was first invented around _____.

10. A spark-generating machine built in 1784 by John Cuthbertson was used to test lightning rods, with the result that ship lightning rods were changed from _____ to _____.

11. With his famous kite experiment, _____ demonstrated that lightning was indeed electricity.

12. The _____ is a device that stores electricity and produces huge sparks; this device is named for the famous city in _____.

13. Early devices used to measure electrical charge were called _____.

14. List some early practical applications of static electricity shown in the video: