

## Physics

### Current Electricity and Circuits

This unit will allow each student to:

- a. gain a better understanding of electric current and circuits
- b. continue making proper scientific measurements and calculations
- c. define and properly use all vocabulary
- d. properly apply all terms and concepts in describing/explaining real world examples
- e. continue making and interpreting scientific graphs
- f. teach someone else the concepts discussed
- g. practice proper laboratory safety

This will be accomplished by each student that is able to:

recognize and relate SI and USCS units of current, resistance, voltage, and power

recognize current, resistance, voltage, and power by the units only

relate the flow of electric charge to potential difference and electric resistance

identify the source of electric charge in a current carrying wire

1. describe the flow of electric charge and electrons through a circuit
2. explain the role of a voltage source in producing electric current
3. distinguish between dry and wet cells and briefly explain how each produces a potential difference
4. compare and contrast the flow of electric charge through a conducting wire to the flow of water through a pipe
5. describe how the potential energy of electric charge changes as it flows through a simple circuit
6. conceptually relate potential difference, resistance, and current using Ohm's law
7. perform calculations using proper problem solving techniques using Ohm's Law and electrical power
8. differentiate between series and parallel circuits and list their applications
9. identify characteristics of series and parallel circuits
10. construct simple electric circuits
11. sketch schematic (circuit) diagrams of electric circuits using proper circuit symbols
12. determine the equivalent resistance of several resistors wired in series and parallel
13. determine the voltage across resistors in series and parallel
14. determine the current at various locations in a series and in a parallel circuit
15. describe electrical power and energy usage
16. distinguish between AC and DC electricity

### **Textbook Reference – Physics: Principles and Problems**

### **Chapter 22: Current Electricity and Chapter 23: Series and Parallel Circuits**

**Key Terms** – *write the definitions of the boldface terms on your own paper, definitions are available at [theteterszone.net](http://theteterszone.net)*

**electrical resistance, electric current, voltage, Ohm's law, electrical power, resistor, cell (wet/dry), battery, circuit, parallel circuit, series circuit, alternating current, direct current, schematic (circuit) diagram, voltmeter, ammeter**

## Electric current and circuits review Answer on a separate sheet of paper

### Due prior to the 20Q on Day 5

- A. What are the units for electrical potential or potential difference? What are the units for electric current? What are the units for electrical resistance?
- B. Define electric current. What is the cause of an electric current?
- C. Compare the motion of the electrons to the motion of electric charge in a closed electric circuit.
- D. Give at least two examples of a voltage source.
- E. What 3 factors determine the electrical resistance of a material?
- F. True or false and explain: "the source of electrons in a circuit is the voltage source"
- G. If electrons flow very slowly through a circuit, why does it not take a noticeably long time for a lamp to glow when you turn on a distant switch?
- H. If the voltage impressed across a circuit is held constant while the resistance doubles, what change occurs in the current?(2) If the resistance of a circuit remains constant while the voltage across the circuit decreases to half its former value, what change occurs in the current?
- I. Will the current in a light bulb connected to a 220 V source be greater or less than when the same bulb is connected to a 110 V source?
- J. In a circuit of two lamps in series, if the current through one lamp is 1 A, what is the current through the other lamp? Defend your answer.
- K. If 6 V are impressed across the above circuit and the voltage across the first lamp is 2 V. what is the voltage across the second lamp? Defend your answer.
- L. In a circuit of two lamps in parallel, if there are 6 V across one lamp. What is the voltage across the other lamp?
- M. How does the sum of the currents through the branches of a simple parallel circuit compare to the current that flows through the voltage source?
- N. To connect a pair of resistors so their equivalent resistance will be more than the resistance of either one, should you connect them in series or in parallel? (2) To connect a pair of resistors so their equivalent resistance will be less than the resistance of either one, should you connect them in series or in parallel?