

Name _____
Period _____



Electrical Unit (100 Points)

The purpose of this assignment is to give students an opportunity to gain some hands-on experience related to the electrical occupations and also some background information relating to electricity and its concepts. The assignment will include some vocabulary related to electricity, and introduction to Ohm's Law, and wiring of circuits using basic tools related to the electrical trades. Students will also be given a basic house floor plan and will have the opportunity to do a layout of electrical circuits for the house.

Class time given to complete: Students will be given 4 class periods to complete this unit. Students will use their class notes and books provided by the instructor. The book that will be used as a reference is "Basic Wiring" by Sunset Books.

This assignment will require a team effort as students will be working with two other students. Each student will be responsible for the completion of each portion of the assignment and must turn in his own copy.

There are three parts to this unit and each must be completed in order to get credit for the unit.

Part 1- Ohm's Law and Book worksheet (20 points)

Using Ohm's Law and the "Basic Wiring" book answer the questions on the attached worksheet.

Part 2- Circuit layout of a house (30 points)

Use the information provided in class along with the "Basic Wiring" book to draw the necessary circuits for the house design provided. Students must draw the correct symbols for items such as switches, outlets, and lights and how they are related in the plan of the house.

Part 3- Hands-on wiring (50 Points)

Students will be required to wire up a circuit breaker in a service panel and begin a circuit with a receptacle attached. Students will also be required to wire up two receptacles, two three way switches, and a light on a "mock-up" board to simulate a complete home circuit.

Electrical Vocabulary

Conductor-

Voltage-

Current-

Resistance-

Alternating Current (AC)-

Direct Current (DC)-

Series Circuit-

Parallel Circuit-

Fuse-

Circuit Breaker-

Single Pole Switch-

3 Way Switch-

Receptacle-

G.F.C.I.-

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OHM'S LAW

Electrical Worksheet

Using your notes and the book called "Basic Wiring" answer the following questions.

Ohm's Law- use the Ohm's Law circle above to answer questions 1-5. Remember to label your answers. <Hint---- Voltage (V) is volts, Current (I) is amps, Resistance (R) is ohms >

1. What is the voltage if the current is 10 amps and the resistance is 30 ohms?

2. How many ohms of resistance are there with a circuit voltage of 100 and a current of 20 amps? _____
3. What is the current if there are 12 volts running through the circuit and the resistance is 8 ohms? _____
4. What is voltage if there is 25 amps and 1000 ohms in the circuit? _____
5. Find R if $I=8$ and $V= 120$. _____

Use the book "Basic Wiring" to answer questions 6-10.

6. What does NM stand for when talking about conductors? _____
7. How many amps can a #14 copper conductor carry? _____
8. How many terminals are on a 3 way switch? _____
9. In a standard 14-2 NM cable what color is the hot (power) wire? _____
10. What 3 colors of insulation are used when using a 14-3 NM cable to hook up 3 way switches? _____

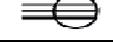
Part 3- Planning the Electrical

Using the symbols below and the example on page 27 of the “Basic Wiring” book to help you, design the electrical layout for the floor plan provided. Remember to label the drawing carefully and neatly so that it can be read by the teacher for grading.

Required circuits include:

- GFCI Outlet in the kitchen with no more than 3 outlets sharing the circuit
- A 110v singleplex receptacle for the refrigerator in the kitchen
- A 240v receptacle for the stove in the kitchen
- A 240v receptacle for the dryer in the laundry room
- A 110v receptacle for the washer in the laundry room
- A 240v receptacle for the water heater in the laundry room
- Minimum of 4 duplex receptacles in each of the bedrooms
- Minimum of 4 duplex receptacles in the living room and family room
- Light switches and ceiling lights in each room
- 3 way switches for the ceiling light in the living room
- A telephone jack in each bedroom, living room, family room, sunroom, and kitchen
- Door bell pushbutton by the front door

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	ELECTRICAL SWITCHBOX	S	SINGLE POLE SWITCH
	THREE-WAY SWITCH		SINGLEPLEX RECEPTACLE
	DUPLEX RECEPTACLE		DUPLEX RECEPTACLE WP = WATERPROOF
	GFCI DUPLEX RECEPTACLE		ISOLATED GROUND RECEPTACLE
	SWITCHED RECEPTACLE		FOURPLEX FOUR GANG RECEPTACLE
	240 VOLT RECEPTACLE		CEILING MOUNTED LIGHT FIXTURE PC = FULL CHAIN
	WALL MOUNTED LIGHT FIXTURE		RECESSED LIGHT FIXTURE
	WEATHERPROOF LIGHT FIXTURE		FLUORESCENT LIGHT FIXTURE
	CEILING FAN		COMBINATION LIGHT & FAN
	POWER VENT FAN		ELECTRIC MOTOR NUMBER = HP
	SMOKE DETECTOR		CIRCUIT BREAKER
	TELEPHONE JACK		DOORBELL TRANSFORMER
	DOORBELL PUSHBUTTON		GROUND

