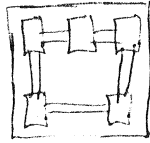


Spin off of resistance lab # 4 labs 4E1 and 4E2

These labs are still abstract to the visual learning skills of some students and need reinforcement for a sustained knowledge of OHMS laws and the rules for series and parallel circuits. At this point I would introduce elements of housewiring to students. To do this students would work in groups of two. Wiring #14 wire with insulation of red and white into a panel which looks like this.



Five single boxes mounted on a 12" by 12" by 3/4" piece of plywood and connected with 1/2" conduit. They will have 6 red and 3 white wires, 3 receptacles, 2 DPST switches, a flat blade screwdriver, and a pair of needle nose pliers.

The instructor should be the only one who hooks up the finished labs and lets the students install the bulbs for testing. use 3 15 watt bulbs in short sockets wired to plug ins for testing the power to the receptacles.

For the first part have the students run a red wire to the first receptacle and a white from there to the second receptacle and a red from the second to the third receptacle and a white from the third receptacle out of the board. plug one of the bulbs (15 watt) into a hot outlet and illustrate the normal brilliance of the bulb. Then plug all 3 bulbs into the receptacles. Students should note that the bulbs all glow about 1/3 the normal brightness. With the circuit hot disconnect one of the bulbs to show what happens when a circuit is opened at any point. (Bulbs all go out). Before disconnecting these bulbs have the students note the bulbs brilliance, and remove to ov the bulbs from the sockets. Replace them with a 60w and a 100w bulb.

Plug these two into a hot outlet and illustrate their normal brilliance. then install them in the circuit receptacles. Apply power. Which will be the brightest?

Disconnect the circuit and show them why the large watt bulb lights the brightest.

Show the students the labeling on the bulb, 120 volts 100 w etc.

Put this math on the overhead $P = E * I$ $E = P / I$ $I = P / E$ Watts = volts times amps

Current = watts / volts $100/120 = .83A$ $60/120 = .5A$ $15/120 = .125A$

So the 100 w bulb has the most current going through it and glows brightest in the normal outlet.

Then $R = E / I$ or bulb resistance = voltage / current.

SO: $120v / .83A = 144 \text{ ohms}$ $120v / .5A = 240 \text{ ohms}$ $120v / .125A = 960 \text{ ohms}$

This totals out to 1344 ohms for all three. Divide 120volts by 1344 ohms = .089A The apparent ampewrage of the three bulbs in a circuit.

Then $.089 * 960 = 85.44v$ $.089 * 240 = 21.36v$ $.089 * 144 = 12.88$ total = 119.68v

Since the 15w bulb draws the most voltage the bulb glows the brightest!!