



Drexel-SDP GK-12 ACTIVITY

Activity

Subject Area(s): Electricity, Computation, Energy, Comparison

Associated Unit: *Nanotechnology and Electricity*

Associated Lesson: *Powered by Fruit, Battery Charge, Nanoreisen, Binary, Moore's*

• **Activity Title** : *Ohm's Law*

Grade Level: (6-8)

Time Required: 60

Group Size: Classroom

Summary: *Students develop an understanding of electricity and its components through such silly analogies as water flow in a toilet or a water tower in comparison to the potential observed in electrical wiring.*

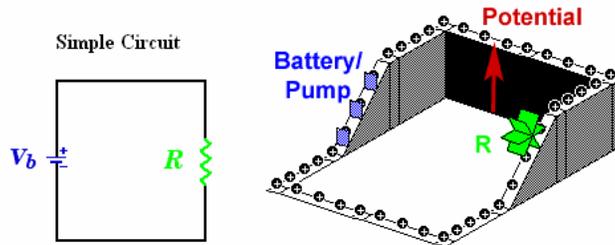
Engineering Context: Controlling the great power of electricity is one of the modern eras greatest scientific accomplishments. Everyone understands how to flip open a light switch, but when you do...what is actually happening?

Keywords: Electricity, Computation, Energy, Comparison

Educational Standards: [PA] 2.1.8ADG, 2.2.8AB, 2.4.8BF, 3.1.7ABE, 3.4.7B

Materials List: Calculator, Ohm's Worksheet

Motivation/Introduction: *Electricity and water are two things that greatly affect our daily lives. Water can help explain how electricity works as a general concept. Take the illustration below, which could more or less represent a toilet. If the toilet is flushed, the water goes down that spinwheel, whereas after the toilet completes flushing, the water is pumped back into the chamber at a higher potential. This potential has its own mass (m) multiplied by the height of the chamber (h) and the acceleration of gravity (g). Conservation of energy and kinetics may be touched on, but a separate lesson will follow. Ohm's Law may be spoken as how engineers view electricity. Most kids will know voltage, and current can be explained just as a river. One end of the river is always higher than the other, giving it a potential energy.*



Methods and Procedure:

1. Explain the analogy below in class for a solid 10-15 minutes. Engaging the kids with questions really helps. I asked my class if I filled a tube with water and set it flat, would the water go anywhere? When they answer correctly, asking them what needs to happen for the water to move really helps them understand the need for a potential. Its a great segue into explain electric potential.

2. Once number 1 is sufficient, the kids may use the front page guide to answer the problems. All problems give two variables with the third explained by the "thumb key" to perform the necessary operation to get the unknown quantity.

Assessment: The questions on the 2nd page serve as the assessment.

Attachments: Ohm's Worksheet

References: <http://www.ac.wvu.edu/~vawter/PhysicsNet/Topics/DC-Current/WaterFlowAnalog.html>

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Contributors:

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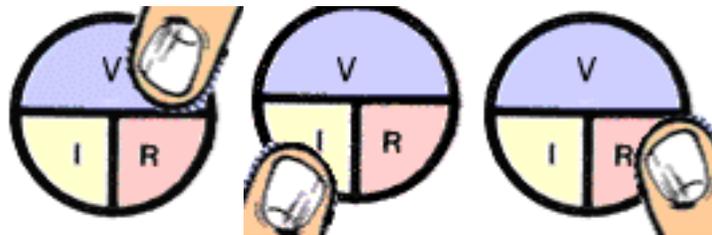
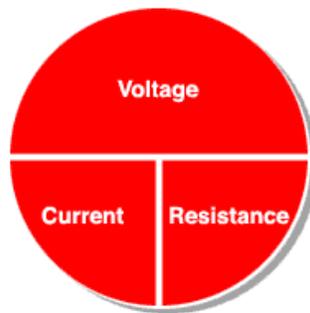
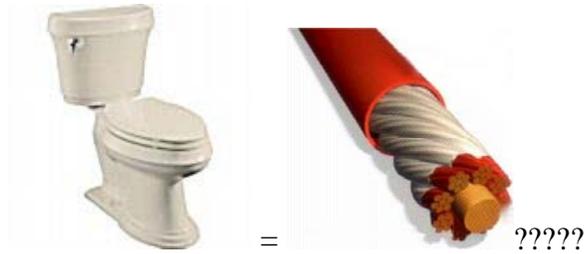
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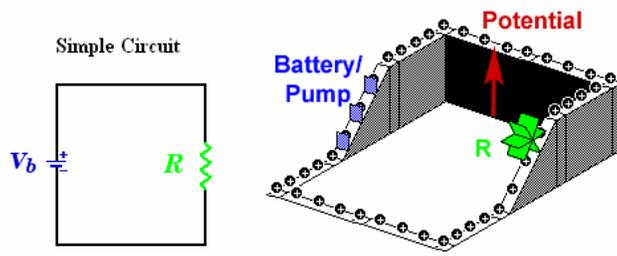
Version: Mar 2007

betternano

“Ohm’s Law”

name :





Questions:

1. There is a transistor wire with a resistance of 1 kilo-ohm (1000 ohms) that carries 7 amps. How much voltage is there in this wire?

2. A 110 volt wall outlet supplies power to a strobe light with a resistance of 2200 ohms. How much current is flowing through the strobe light?

3. Mr. N is trying to find the right type of wire to put between the transistors he makes in his lab. He has three choices, shown in the following table:

Wire	Voltage	Current
Copper	7	.006
Nickel	14	.012
Silver	3	.0025

Which metal will allow Mr. N to have a wire with a resistance of at least 1200 Ohms?