

OHM'S LAW (1)



Electricity ()

Current...

is the **flow** of electric charge through a circuit. It is measured in **amperes** (A or amps).

Voltage...

is the **force** supplied by a dry cell that causes electric current. It is measured in **volts** (V).

Resistance...

is the **friction** in a wire or bulb that opposes electric current. It is measured in **ohms** (Ω).

1. Squeeze an air-filled bag connected to a straw, and direct the wind against your face.

- What models the *current*?
- What models the *voltage* that causes this current?
- What provides *resistance* to the "voltage" you create?
- Squeeze the bag with greater force and less force. How does changing the "voltage" affect the current?
- While squeezing the bag with a strong steady "voltage", open and close the straw by pinching it between you fingers. How does changing the resistance affect the current?



2. The German physicist, Georg Ohm (1787-1854), expressed current as a fraction.

$$\text{CURRENT} = \frac{\text{VOLTAGE}}{\text{RESISTANCE}}$$

Explain how this fraction restates what you observed in steps 2d and 2e.

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OHM'S LAW (2)



Electricity ()

1. Ohm's law states that *current* (I) is directly proportional to *voltage* (V) but inversely proportional to *resistance* (R)...

$$I = \frac{V}{R}$$

... Explain these ideas in terms of blowing air through your lips.



2. Current, voltage and resistance are measured in amperes (A or amps), volts (V) and ohms (Ω). Apply Ohm's law to each problem below. (Though air is not actually measured in electrical units, it behaves in a similar way.)

$$1 \text{ ampere} = \frac{1 \text{ volt}}{1 \text{ ohm}}$$

- How many "amperes" of air are supplied by blowing with a force of 12 "volts" through your lips held at a resistance of 6 "ohms"? If you double your voltage while holding your resistance constant, how does this change your current?
- How many volts are required to force 4 amperes of air through your lips held at a resistance of 5 ohms? If you double your resistance while holding your voltage constant, how does this change your current?
- A certain light bulb draws .2 amperes of current when it is connected to a source of 2 volts. What is the resistance of this bulb?

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