

PhyzJob: Slide On With Your Circuit Self



The Standard Slide

The slide has an elevation, run-length, and incline. Draw and label a diagram above.

The Analogy

1. How do the parameters of a circuit relate to the parameters of the slide in our analogy?

The voltage of a circuit (brought by the _____) is like the _____ of a slide.

The resistance of a circuit (brought by the _____) is like the _____ of a slide.

The current of a circuit (the quotient: voltage/resistance) is like the _____ of a slide.

Slide Relationships

2S. What happens to the incline of a slide if the elevation is increased but the run-length stays the same?

3S. What happens to the incline if the run-length increases but the elevation remains the same?

4S. What happens to the incline if the elevation and run-length are increased by equal amounts?

The Standard Light Bulb Circuit

The circuit has a voltage, resistance, and current. Draw and label a diagram above.

Circuit Relationships

2C. What happens to the current in a circuit if the voltage is increased but the resistance stays the same?

3C. What happens to the current if the resistance is increased but the voltage stays the same?

4C. What happens to the current if the voltage and resistance are increased by equal amounts?

Slide Construction Kit

You have access to a variety of slide ladders and run-lengths. And plenty of material to complete the actual slide.

5S. How could you build a slide that would be a rip-roaring bun-burner?

6S. Suppose you had a slide ladder that was fairly average. How much run-length would be needed to make a slide so that the incline had a slope of zero? Explain your answer.

Circuit Construction Kit

You have access to a variety of batteries and bulbs of various resistances.

5C. How could you build a circuit that would have a big power output?

6C. Suppose you had a battery whose voltage was fairly average. How much resistance would be needed to make a circuit so that the current was zero? Explain your answer.

Potential Test Questions

Draw Appropriate Slide Diagrams Below

1. Circuits A and B are connected to equal voltages, but B has more resistance.
 - a. Which circuit carries more current?

 - b. Which circuit uses more power?

2. Circuits C and D have equal resistance, but D is connected to more voltage.
 - a. Which circuit carries more current?

 - b. Which circuit uses more power?

3. Circuits E and F are connected to equal voltages, but F carries more current.
 - a. Which circuit has more resistance?

 - b. Which circuit uses more power?

4. Circuits G and H carry equal currents, but H has more resistance.
 - a. Which circuit is connected to more voltage?

 - b. Which circuit uses more power?

5. Circuits J and K use the same amount of power, but K carries more current.
 - a. Which circuit is connected to more voltage?

 - b. Which circuit has more resistance?

6. Circuits L and M use the same power, but M is connected to more voltage.
 - a. Which circuit carries more current?

 - b. Which circuit has more resistance?

Observation and Deduction

1. Bulbs A ("6.3V") and B ("2.5V") are connected to the same voltage (3 V), but B lights up brighter.
 - a. Which bulb uses more power?

 - b. Which bulb carries more current?

 - c. Which bulb has more resistance?

2. Connect bulbs A and B in parallel.
 - a. Which bulb is brighter now?

 - b. Given the difference in the bulbs' resistances and multiple path nature of parallel circuits, which is the better explanation of this result?
 - ___i. Both bulbs get the same voltage, but the brighter bulb carries more current.
 - ___ii. Both bulbs carry the same current, but the brighter bulb gets more voltage.

3. Connect bulbs A and B in series.
 - a. Which bulb is brighter now?

 - b. Given the difference in the bulbs' resistances and the single path nature of series circuits, which is the better explanation of this result?
 - ___i. Both bulbs get the same voltage, but the brighter bulb carries more current.
 - ___ii. Both bulbs carry the same current, but the brighter bulb gets more voltage.