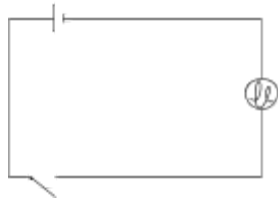


Science 30	Unit C: Physics
Lesson 4 - Electric Circuits	84 mins

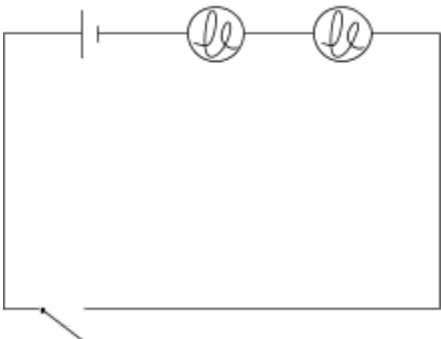
AC vs DC

<p>Direct Current (DC) Cells/Batteries/USB</p> <p>Alternating Current (AC) Plug-ins</p> <p>Pass Around My Plug</p> <p>Transformers Used to change the strength of voltage from a source Help with Transmission of electricity</p> <p>Generating Electricity Moving a magnet through a coil of wire generates an electrical current.</p> <p>Turning a motor manually creates a generator</p>	<p>“direct” because the electricity only flows one way Draw a Volts per time Graph</p> <p>“Alternating” because it flows back and forth 60 times per second</p> <p>Many Plug-in devices need DC current so they have converters to change the 120V AC to a DC current needed.</p> <p>Draw Pg. 329</p> <p>Long Distances high Voltage is better Transferred at 500, 000V Less Power lost as heat</p> <p>Homes only need 120V</p> <p>Mechanical to Electrical</p>
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Electric Circuits

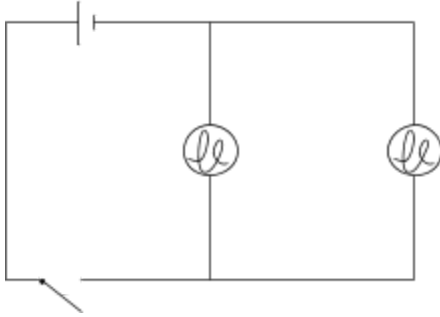
<p>Use electricity to do a job</p> <ul style="list-style-type: none"> - Need: <ul style="list-style-type: none"> - Load (something to do work) - Conductors (wire) - Switch (turn on/off control) - Power Source (Batteries/wall outlet) 	
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Building Simple Circuits

<p>https://www.physicsclassroom.com/Physics-Interactives/Electric-Circuits/Circuit-Builder/Circuit-Builder-Interactive</p> <p>Series</p> <ul style="list-style-type: none"> - Loads in series (list positives and drawbacks) 	<ul style="list-style-type: none"> - Sources (cells) in Series <ul style="list-style-type: none"> - (list positives and drawbacks)
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Parallel

- Loads in Parallel
 - (list positives and drawbacks)



- Sources (cells) in Parallel
 - (list positives and drawbacks)

Measuring Electricity

Voltage: The amount of energy in a single charged particle (Volt = V)

Current: The rate at which electrons flow (1) Amperes (Amp = A)

Resistance: the ability of a substance to allow electrons to pass through (Ohms (Ω))

Ohm's Law

Quantity	Symbol	Unit	Formula	Measured With
Voltage	V	Volts (V)	$V = IR$	Voltmeter
Current	I	Amperes (A)	$I = V/R$	Ammeter
Resistance	R	Ohms(Ω)	$R = V/I$	Ohmmeter

Ohm's Law

Using Ohm's Law

Electric Stove is connected to a 240-V outlet. The current is 20A, What is the resistance of the heating element?

Steps to solving the Problem	Information and Solution
1. Identify known	Current (I) = 20 A Voltage (V) = 240 V
2. Identify unknown	Resistance (R)
3. Use Correct formula	$R = V/I$
4. Solve	$R = V/I = 240 \text{ V}/20 \text{ A}$ $R = 12 \Omega$

Science 30 - Lesson 28 - Unit C - Electric Circuits

Name: _____

1. A headlight in an automobile draws a current of 5.0 A from the car's 12.0-V battery.
 - a. Is the current passing through the headlight AC or DC? _____
 - b. Determine the resistance of the headlight while it is operating.

2. A low-intensity light bulb illuminates the numbers on the outside of a house. The bulb is operated by one of the 120-V household circuits and draws 0.25 A.
 - a. Is the current passing through the bulb AC or DC? _____
 - b. Determine the resistance of the bulb while it is operating.

3. The four cells in a flashlight form a battery with a total voltage of 6.0 V. When the flashlight is switched on, the resistance of the bulb is 8.0Ω .
 - a. Is the current passing through the bulb AC or DC? _____
 - b. Determine the value of the current passing through the bulb.

4. Electric service to your home is transmitted through cables that contain three wires. Two of the wires each possess voltages of 120 V, while the third wire is the neutral return wire required to complete the circuit.
 - a. To operate appliances that demand 120 V, describe the circuit that is required.

 - b. To operate appliances, like the stove and dryer, that demand 240 V, describe the circuit that is required.

5. Laptop computers often need battery packs that have both high-energy output and long life. The solution is to combine groups of cells in combination series/parallel arrangements.

