

Electricity and Thermodynamics Review

Series Circuits

Parallel Circuits

$$V_{\text{Total}} = V_1 + V_2 + \dots$$

$$R_{\text{Total}} = R_1 + R_2 + \dots$$

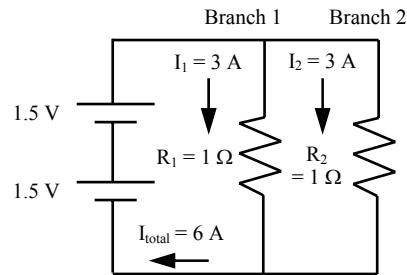
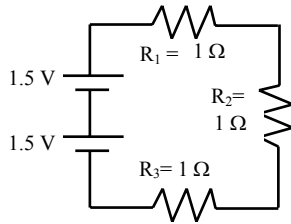
OR $R_T = V_T / I_T$

$$I_{\text{Total}} = V_T / R_T$$

$$I_{\text{Total}} = I_{R1} = I_{R2} \dots$$

$$V_{R_x} = I_T R_x$$

$$P_T = V_T I_T$$



$$V_{\text{Total}} = V_1 + V_2 + \dots$$

$$V_T = V_{B1} = V_{B2} \dots$$

$$I_1 = V_T / R_1$$

$$R_1 = V_T / I_1$$

$$I_{\text{Total}} = I_1 + I_2 + \dots$$

$$R_T = V_T / I_T$$

$$P_T = V_T I_T$$

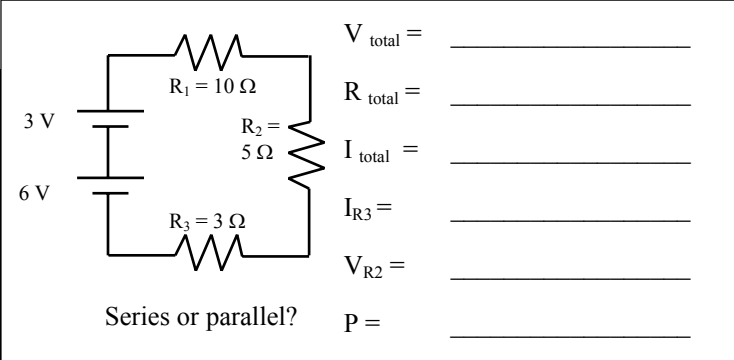
<p style="text-align: center;">What Kind of Thermal Transfer? 1. Conduction; 2. Convection; 3. Radiation</p> <p>___ From the sun. ___ From electromagnet radiation (light rays).</p> <p>___ Touching something. ___ In moving fluids.</p> <p>___ In a pot of water. ___ Putting your hand on a hot car.</p> <p>___ Liquids and gases become less dense when hot. ___ A fan cooling you down.</p>	<p>Use arrows to show the heat transfers</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;">20°C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">55°C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">25°C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">40°C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">20°C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">55°C</div> </div> <p>Does heat rise? What does rise?</p> <p>What is thermal equilibrium?</p> <p>What's the total charge of an object with 14 electrons and 6 protons?</p> <p>An atom that loses electrons becomes positive/negative.</p> <p>An atom that gains electrons becomes positive/negative</p>
<p>1. Electric charge A. A unit in measuring the amount of charge</p> <p>2. Electrical force B. The pushes and pulls that electric charges exert on each other</p> <p>3. Coulomb C. Property of matter responsible for electrical events; it has two forms, positive and negative.</p> <p>4. Static electricity D. An object that has equal amounts of positive and negative charges.</p> <p>5. Electrically neutral E. A buildup of charge on an object.</p>	<p>What are the charges of the second objects?</p> <div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="text-align: center;"> <p>attracting</p> </div> <div style="text-align: center;"> <p>repelling</p> </div> </div> <p>A _____ allows electricity or heat to pass through it.</p> <p>Electricity flows through paths called _____. A _____ circuit has no breaks in it, while an _____ circuit has a break and stops the flow of electricity.</p> <p>An _____ will not allow electricity to pass through it and can keep something from losing heat.</p> <p>Electricity is made up of flowing _____.</p> <p>Like electric charges attract/repel. Opposite charges attract/repel.</p> <p>A open circuit is on/off. A closed circuit is on/off.</p>
<p>1. Insulator A. The charge that attracts electrons.</p> <p>2. Positive B. An atom with a different number of electrons than protons.</p> <p>3. Ion C. A material that allows the flow of electricity.</p> <p>4. Negative D. The caused by the flow of electrons.</p> <p>5. Conductor E. The charge that attracts protons.</p> <p>6. Electricity F. A material that resists electricity.</p>	<p>1. Circuit diagram A. Slows down the flow of electricity.</p> <p>2. Open circuit B. A short-hand way of drawing electrical circuits.</p> <p>3. Closed circuit C. A circuit with a break in it; no electricity will flow.</p> <p>4. Current D. Pushes electricity through a circuit.</p> <p>5. Voltage E. Electricity can flow through this.</p> <p>6. Resistance F. The flow of electricity through a circuit.</p>

- | | |
|---------------|--|
| 1. Battery | A. Used to create radiant energy. |
| 2. Resistor | B. Pushes electricity through the circuit. |
| 3. Wires | C. Can turn the electricity on and off. |
| 4. Light bulb | D. Allows electricity to flow. |
| 5. Switch | E. Slows down the flow of electricity. |

Increases (I)
Or
Decreases (D)

Increasing resistance _____ current
Decreasing resistance _____ current
Increasing voltage _____ current
Decreasing voltage _____ current

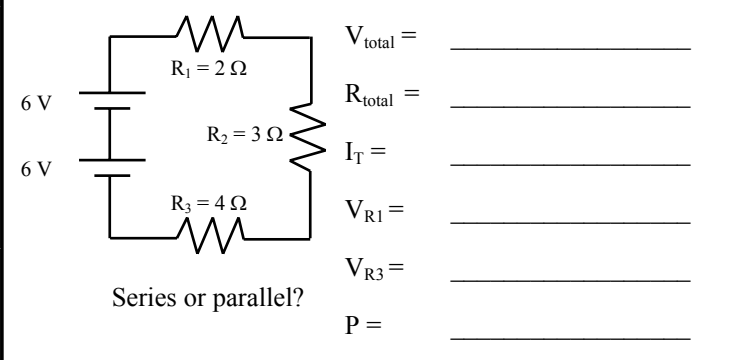
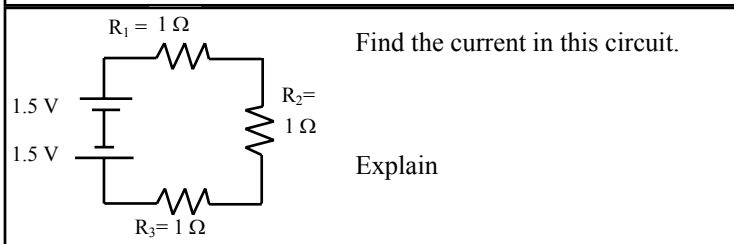
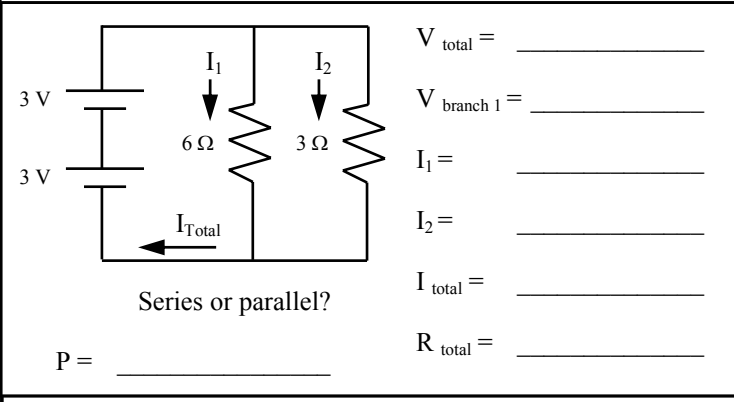
Draw the following diagram: 2 batteries; 2 light bulbs in parallel; switch; resistor.



How much voltage is needed to produce 2 amps through a 4 ohm light bulb?

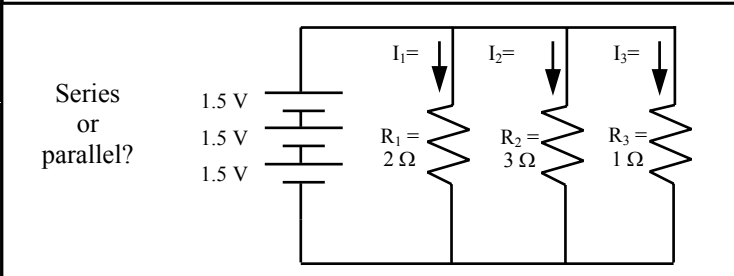
A 9 volt battery produces 4.5 amps across what resistor?

If a light bulb in your house (120 V) draws 0.5 amps, how much power does it use?



What happens when you short circuit one light bulb in a two light bulb circuit?

What happens if you short circuit a battery?



How much voltage difference is there across a wire?

Why don't birds get electrocuted when they perch on a power line?

$V_{total} =$ _____ $I_3 =$ _____
 $V_{branch\ 3} =$ _____ $I_{total} =$ _____
 $I_1 =$ _____ $R_{total} =$ _____
 $I_2 =$ _____ $P =$ _____

Is your house wired in parallel or series? How can you prove this?