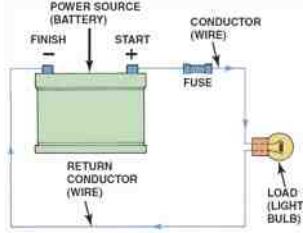


**FIGURE 4-1** All complete circuits must have a power source, a power path, protection (fuse), an electrical load (light bulb in this case), and a return path back to the power source.



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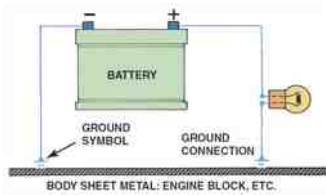
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**FIGURE 4-2** The return path back to the battery can be any electrical conductor, such as a copper wire or the metal frame or body of the vehicle.



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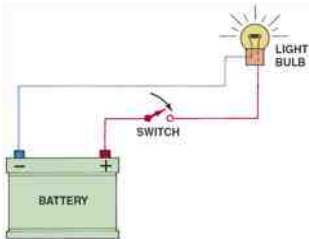
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**FIGURE 4-3** An electrical switch opens the circuit and no current flows. The switch could also be on the return (ground) path wire.



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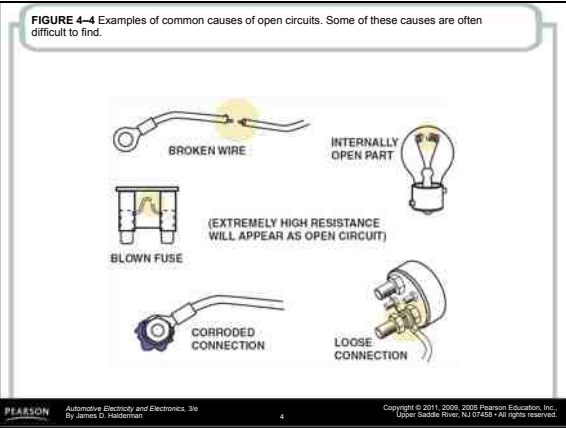
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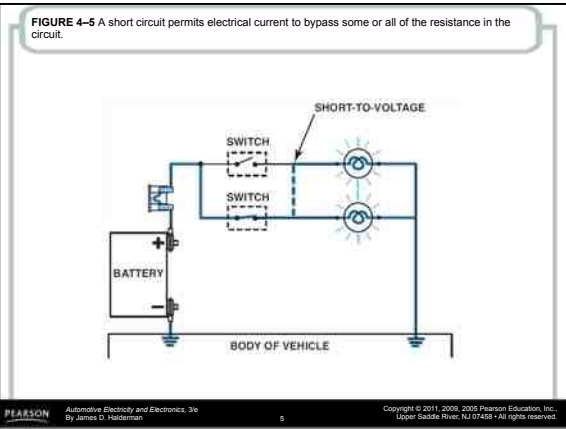
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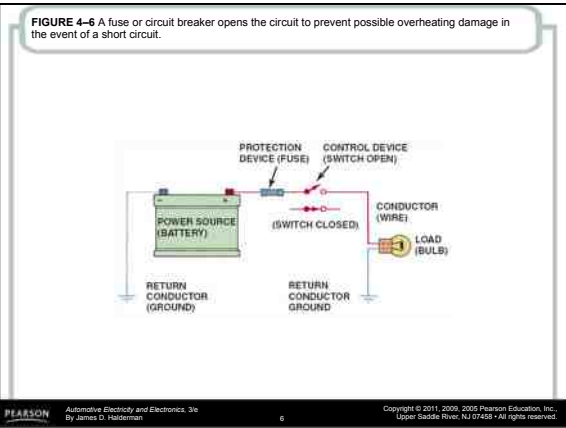
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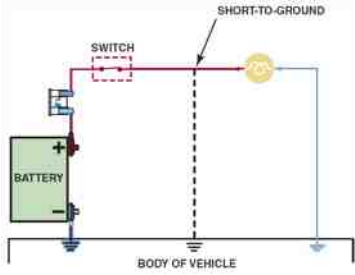
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**FIGURE 4-7** A short-to-ground affects the power side of the circuit. Current flows directly to the ground return, bypassing some or all of the electrical loads in the circuit. There is no current in the circuit past the short.




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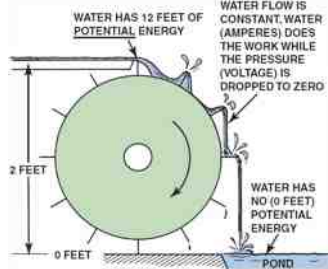
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**FIGURE 4-8** Electrical flow through a circuit is similar to water flowing over a waterwheel. The more the water (amperes in electricity), the greater the amount of work (waterwheel). The amount of water remains constant, yet the pressure (voltage in electricity) drops as the current flows through the circuit.




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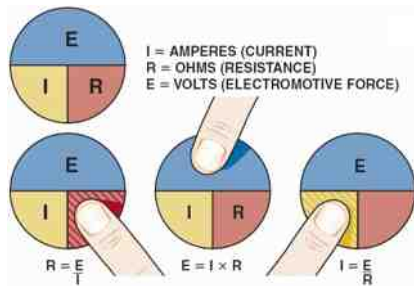
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**FIGURE 4-9** To calculate one unit of electricity when the other two are known, simply use your finger and cover the unit you do not know. For example, if both voltage (E) and resistance (R) are known, cover the letter I (amperes). Notice that the letter E is above the letter R, so divide the resistor's value into the voltage to determine the current in the circuit.




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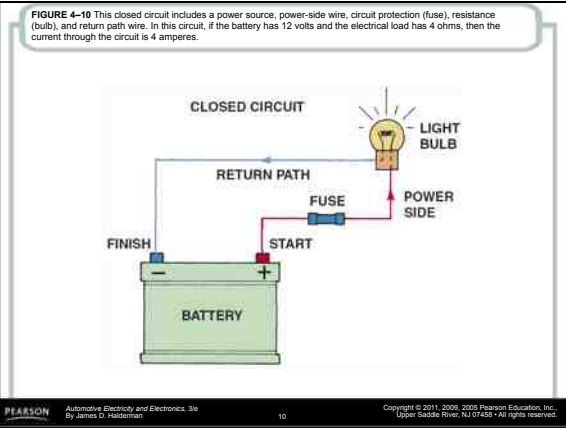
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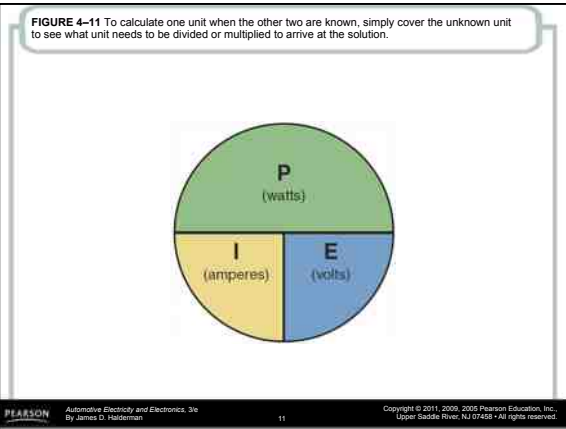
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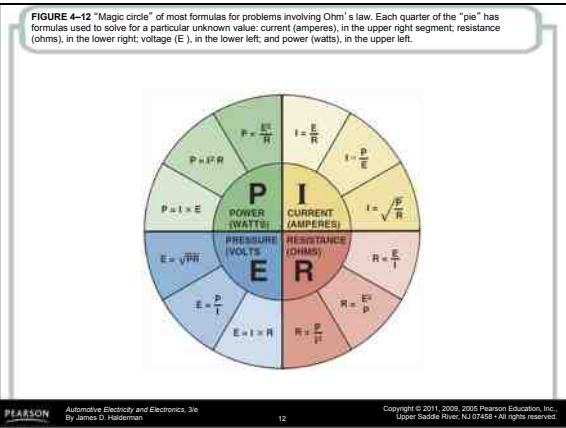
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