Name: _____ Group: _____ Date: _____

CONCEPT REVIEW 61

Power supply, conduction, insulation and protection

EST

PAGES 462–468

Complete this concept review handout and keep it as a record of what you have learned.

Definitions

- An electrical function is *the role that a component plays in the control or transformation of electric current.*
- Power supply is *the electrical function performed by any component that can generate or provide an electric current in a circuit.*
- Conduction is *the electrical function performed by any component that can transmit electric current from one part of a circuit to another.*

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- A printed circuit is *an electrical circuit printed on a solid support called a circuit board.*
- Insulation is *the electrical function performed by any component that prevents an electric current from flowing.*
- Protection is *the electrical function performed by any component that can automatically cut current flow in the event of a power surge.*

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- A resistor is *a component designed to limit the flow of electrons through an electrical circuit.*

How two protective devices work

Fuse	Breaker
The electric current crosses the fuse through a conductive filament. If the current intensity exceeds a certain level, the filament melts and breaks, preventing the current from flowing through the fuse.	*In some breakers, the current passes through a bimetallic strip. When the current intensity exceeds a certain level, the strip becomes hot, it bends, and the connection is broken. A switch is thrown to restore circuit operation. Other breakers use an electromagnetic mechanism.*

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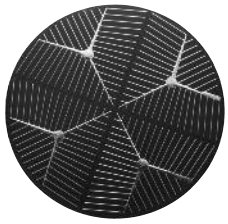
Advantages and disadvantages of various power supplies

Source	Advantages	Disadvantages
 Battery	• Appliances that run on batteries are portable.	• Batteries must be replaced after a certain time. • When people throw out used batteries, the cells can contaminate the environment by leaking heavy metals.
 Electrical outlet	• Electrical outlets are a stable and long-lasting power supply. • They generate very little greenhouse gas when supplied by hydroelectric dams, as in Québec.	• The construction of hydroelectric dams causes flooding of vast areas of land. • Appliances cannot be moved far from wall outlets. • Appliances stop working in the event of a power cut.
 Photovoltaic cell	• Photovoltaic cells can be used in isolated areas. • They can power portable or mobile devices. • They do not cause greenhouse gas emissions. • They have a life span of 20 to 30 years.	• Their operation depends on sunny conditions. • They are much more expensive to install than other sources of power.

EST Determining the value of an electrical resistor