

Chapter 17

Introduction

to Electricity

17-4

Electric Circuits

Essential Questions

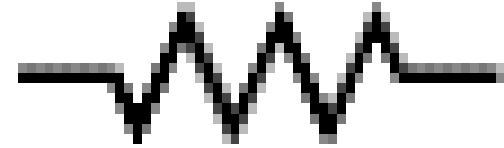
- What are the three essential parts of a circuit?
- What is the difference between series and parallel circuits?
- How do fuses and circuit breakers protect your home against short circuits and circuit overloads?

Vocabulary

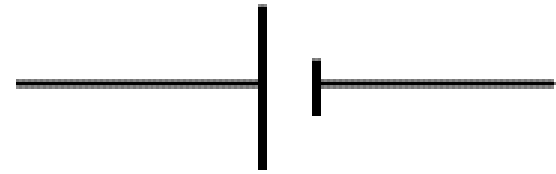
- Series circuit – a circuit that is a single loop (one way for electrons to flow)
- Parallel circuit – a circuit in which there are two or more loops
- Load or resistor – ANYTHING that uses electricity
- Line – wire carrying electricity
- Loop – ways to start & end at same point without crossing over

Symbols

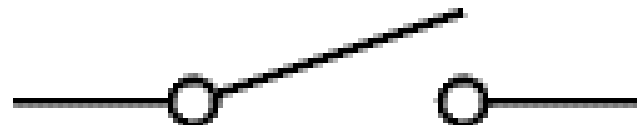
- Load or resistor –



- Power Source -
AC/DC




- Switch



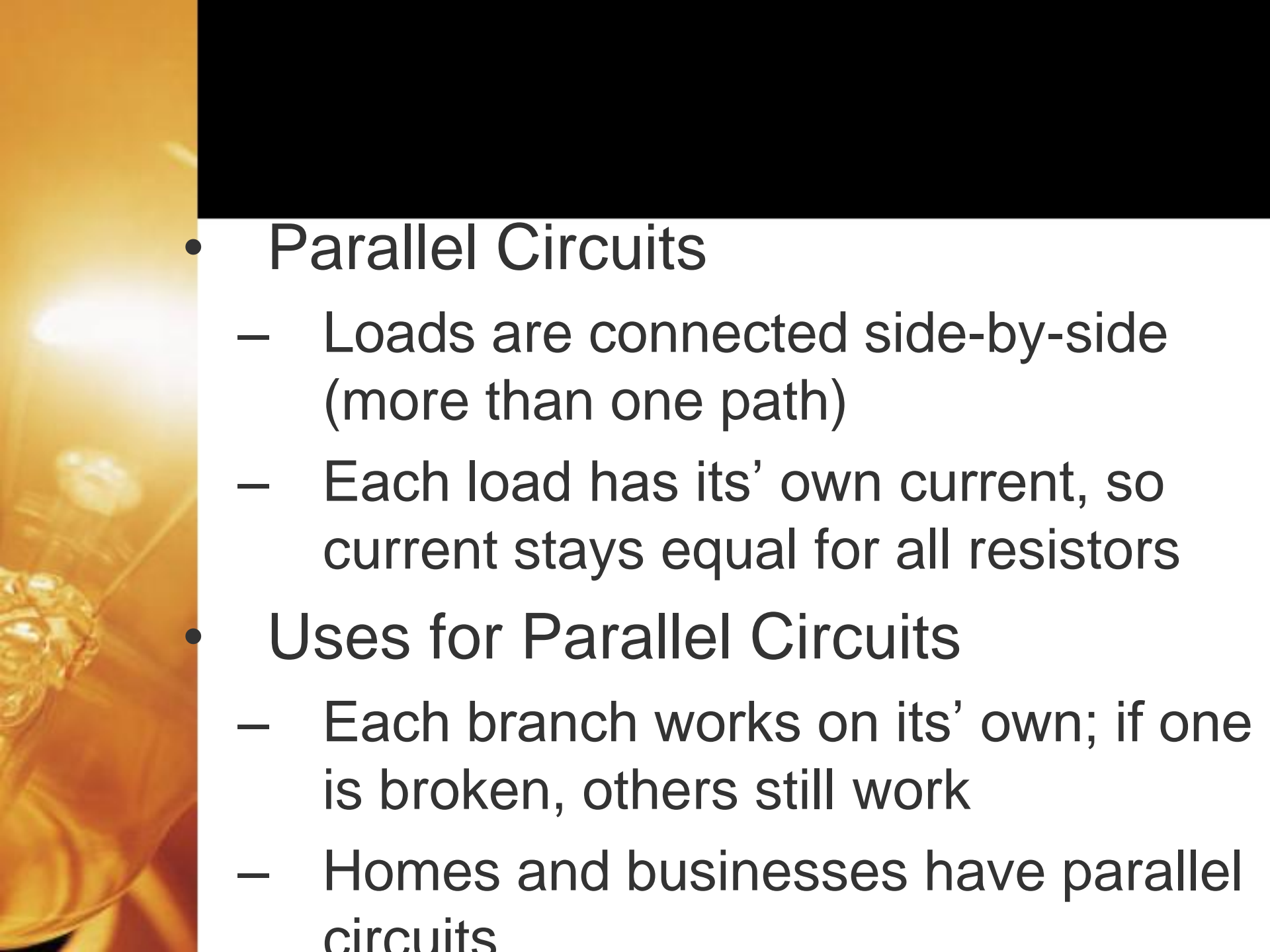
Parts of an Electric Circuit

- Switch to Control a Circuit
 - Electric circuit is a complete, closed path for electrons
 - All circuits have an energy source, wires, and a load
 - Loads change electrical energy into other types of energy
 - Forms might be thermal, light, or mechanical
 - Loads offer resistance

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- A Switch to Control a Circuit
 - Switches are used to open and close a circuit
 - For charges to flow, a switch must be “closed” or “turned on”
 - A switch that is “open” or “off” does not allow electricity to flow

Types of Circuits

- Series Circuit
 - All parts are connected in a single loop (only ONE path)
 - All loads share the same current:
loses current as it progresses
- Uses for a series circuit
 - Any break in the circuit causes charges to stop flowing
 - Limited uses (Ex: burglar alarms)

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- **Parallel Circuits**
 - Loads are connected side-by-side (more than one path)
 - Each load has its' own current, so current stays equal for all resistors
 - **Uses for Parallel Circuits**
 - Each branch works on its' own; if one is broken, others still work
 - Homes and businesses have parallel circuits


Household Circuit Safety


- Circuit Failure
 - Broken wires or water can cause a short circuit
 - Circuits may fail if they are overloaded
 - Could cause a fire
 - Fuses and circuit breakers help prevent electrical fires



- Fuses

- Fuse – thin strip of metal the current flows through
- If current is too high, the strip melts, breaking the circuit

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- **Circuit Breakers**
 - A switch that opens if current is too high
 - Can be closed by flipping a switch
 - Ground fault circuit interrupter (GFCI) – small circuit breaker in an outlet
 - Can be closed by resetting

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- **Electrical Safety Tips**
 - Make sure insulation on cords is not worn
 - Do not overload circuits
 - Do not use electrical devices near water
 - Never put anything (except a plug) into an outlet