

# Household Wiring



S1-3-18 Explain the parallel circuits, the components, and the safety aspects of household wiring. Include: switches, fuses, circuit breakers, outlets.

S1-3-19 Explain safety considerations of some common household electrical appliances.

*Examples: kettle, heater, toaster...*

# Electricity Production...

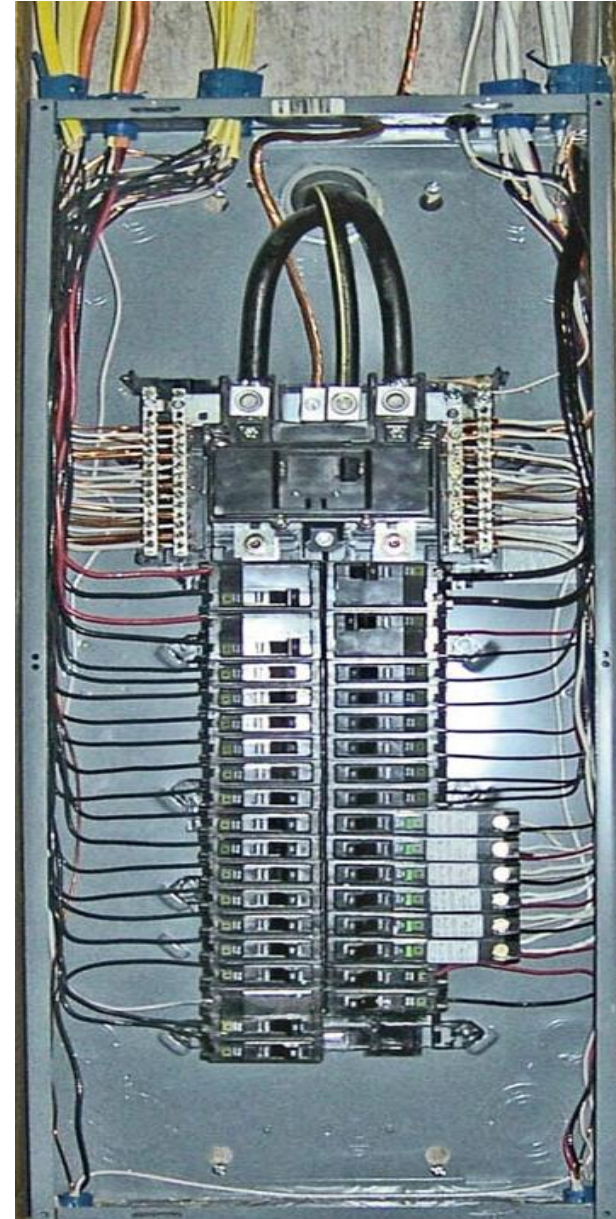
In household wiring, we wire our circuits in PARALLEL since the PERFORMANCE of our APPLIANCES depends on a CONSTANT VOLTAGE.

*What would happen if your house was wired in series?*

→ if you had a light on and then turned on an iron, the light would get DIMMER, unless the circuit was in PARALLEL.

# *Where does the electricity go after the meter?*

- Before electricity can get to any APPLIANCE/OUTLET in your home, it must go through a CIRCUIT BREAKER in your electrical panel
- When you turn on an appliance, the CURRENT INCREASES from the SOURCE, since the circuit is wired in PARALLEL.
- As MORE things are turned on, MORE CURRENT comes from the SOURCE.
- The INCREASE in CURRENT will cause the wires to HEAT up, and potentially cause a FIRE.
- A CIRCUIT BREAKER/FUSE is used to prevent a circuit from OVERLOADING → getting too much CURRENT.

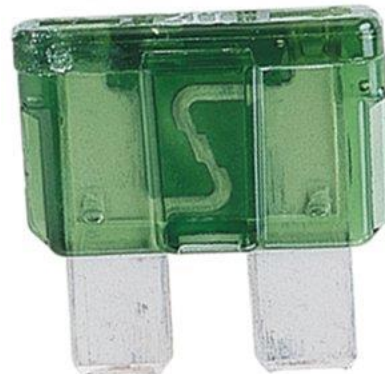


# Safety Devices...

There are different types of circuit “PROTECTORS” and safety aspects of household wiring:

## 1. FUSES:

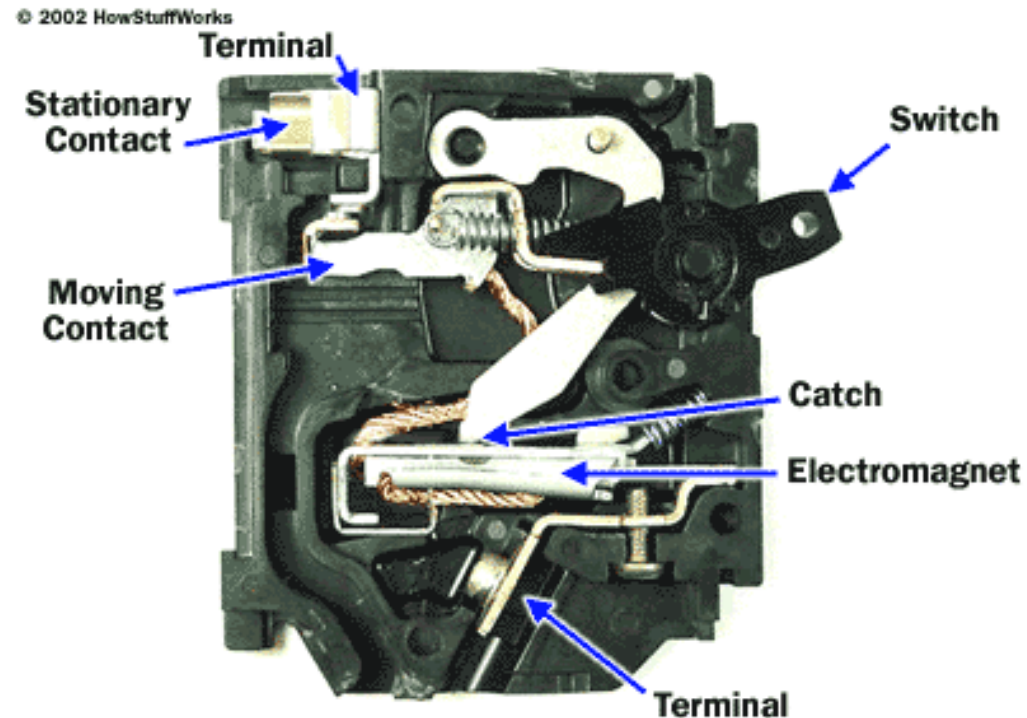
- Has a metal CONDUCTOR inside with a MELTING POINT LOWER than that of the WIRES.
- When the current reaches a certain level, the metal in the fuse will MELT, causing a BREAK in the circuit.
- Come in several SIZES (5A, 10A, 20A, etc)
- Used mainly in STOVES, APPLIANCES, and CARS.,
- NOT REUSABLE



# Safety Devices...

## 2. CIRCUIT BREAKERS:

- Does the same job as a FUSE, but in a different way.
- Nothing melts, but when the current gets too high, a SWITCH RELEASES, and OPENS the circuit.
- You can RESET the BREAKER (is REUSABLE)



# Safety Devices...

## 3. GROUND FAULT INTERRUPTERS (GFI):

- Is an electrical OUTLET that has RESET buttons on it.
- Are REQUIRED in BATHROOMS & OUTDOOR areas (wherever WATER may be present).
- If there is a SHORT CIRCUIT, the GFI will OPEN the circuit.



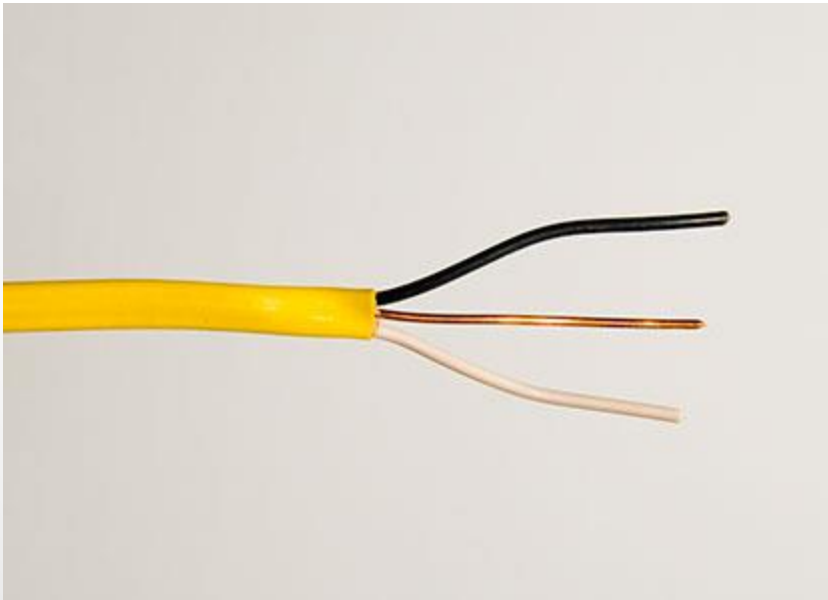
# More on Wiring...

After the circuit breaker, the electricity passes through the WIRES in your home to the appliances that you use.

There are other safety aspects that help to protect us and our homes:

## Household Wires:

- There are three different wires in our homes:



**Black** – HOT/ENERGIZED wire

**White** – COMPLETES the circuit

**Bare** – FRAME GROUND

# More on Wiring...

## House Ground:

- A house is GROUNDED by a large BARE WIRE connected to the WATER PIPES in the BASEMENT.





# More on Wiring...

## Polarized Outlets:

- All new electrical outlets are now **POLARIZED**. This is a safety aspect to ensure that a **PLUG** is put in the **CORRECT WAY**  
→ so that the current will go through the **SWITCH** first.

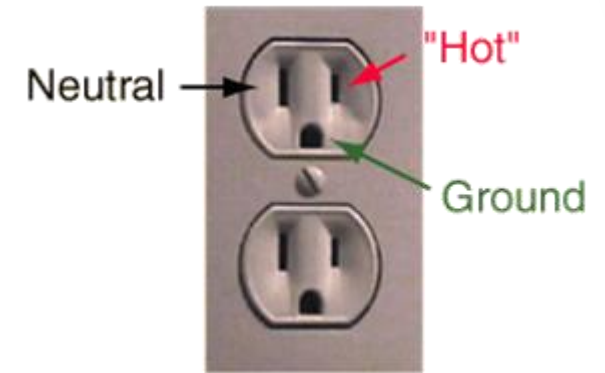


Notice that there are 3 slots:

**Long Slot** – **WHITE** wire → **COMPLETES** the circuit

**Short Slot** – **BLACK** wire → **HOT**, provides electricity

**Round Slot** – **BARE** wire → **FRAME** ground



# More on Wiring...

## Polarized Plugs:

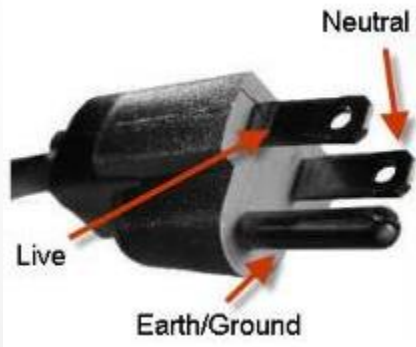
There are two types of polarized plugs

### A) 2-PRONG plugs:



→ has 2 prongs of DIFFERENT SIZES

### B) 3-PRONG plugs



→ has a 3<sup>rd</sup> ROUNDED PRONG at the bottom

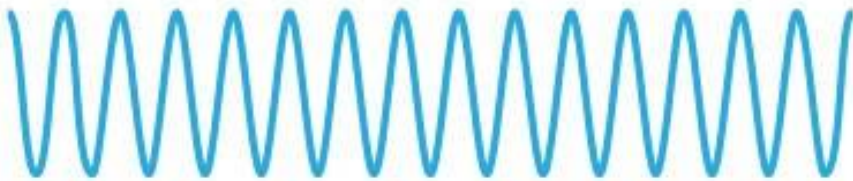
→ GROUNDS the FRAME in case of SHORT CIRCUITS to protect you from SHOCK.

If a plug has 2 prongs that are the SAME SIZE, then it is UNPOLARIZED.

# Types of Electricity...

## 1. A.C. = ALTERNATING CURRENT

- Found in HOMES
- Electrons do not MOVE, they just TRANSFER ENERGY. (like dominos or a Neuton's cradle)

ALTERNATING 

## 2. D.C. = DIRECT CURRENT

- From DRY CELLS
- Electrons are FORCED to FLOW.

DIRECT 

