

# Fundamentals of Electronics and Electrical

## Introduction to -

- Data Sheet Learning for Identification of Electrical Equipment
- Calculation of Load & Power
- Measurement of Voltage and Current



**What are the 5 types of electrical wiring systems?**

**What are the basics of house wiring?**

**How many amps should be coming into a house?**

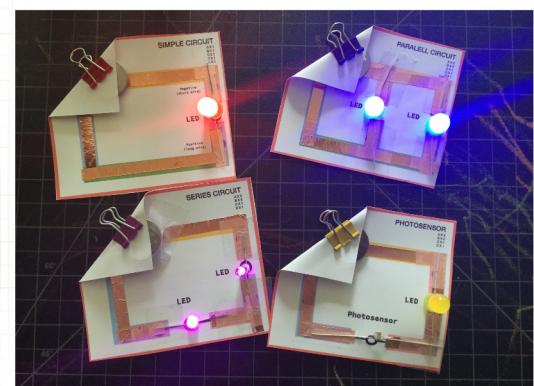
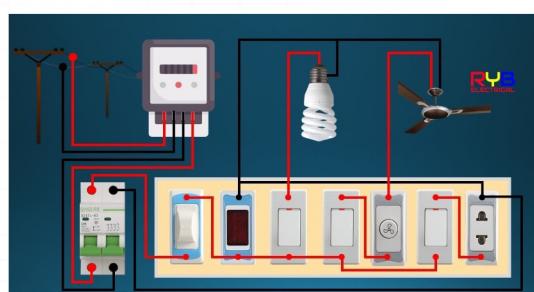
**What are the 3 basic types of electrical circuits?**

### 5 Different Types of Electrical House Wiring Systems

- Cleat Wiring.
- Casing and Capping Wiring.
- Batten Wiring.
- Lead Sheathed Wiring.
- Conduit Wiring.

### Lesson Aims:

1. Identify Prevent Electrical Issues
2. Troubleshooting of Electrical Circuits
3. Calculation of Electrical Load Analysis



**Watch the circuit animation at home. Make paper circuits, calculate house load, and showcase in class. Differentiate total load vs total consumption in the template given by the teacher.**



# Recap **Electrical Circuit and Safety**

Electricity can kill or severely injure people and cause property damage. However, you can take simple precautions when working with or near electricity and electrical equipment to significantly reduce the risk of injury to you, your workers, and others around you. This section provides a summary of those precautions.

What are the hazards?

What do I have to do?

## Brainstorming

Electrical safety basics;

- Don't work with exposed conductors carrying 50 volts or more.
- Ensure electrical equipment is connected correctly, grounded, and in good working order.
- Extension cords may not be used as permanent wiring and should be removed after temporary use for an activity or event.
- Surge suppressors with built-in circuit breakers may be used long-term and are available with three-, six- and 15-foot-long cords.
- High-amperage equipment such as space heaters, portable air conditioners, and other equipment must be plugged directly into permanent wall receptacles.
- Do not access, use, or alter any building's electrical service, including circuit breaker panels, unless you are specifically qualified and authorized to do so.
- Wet environments can increase the risk of an electrical shock.



# Calculation of Power Consumption

To calculate the consumption of an electrical appliance in kWh, you have to take into account three factors:

The capacity of your electrical appliance expressed in watts.

The number of hours that the appliance is in use in one day.

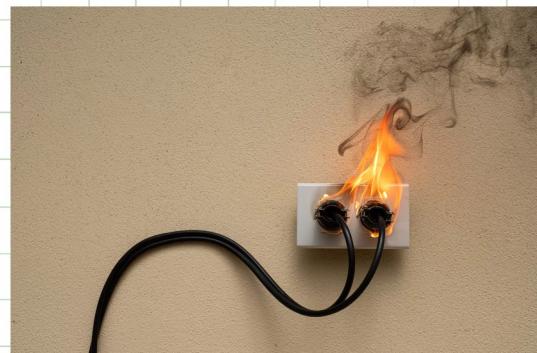
The number of days per year when the appliance is in use.

The calculation is as follows:

$$[\text{number of hours use}] \times [\text{number of days use}] \times ([\text{capacity of appliance expressed in watt}] / 1,000) = \text{number of kWh}$$

The capacity should be divided by 1,000 to convert the number of watts into the number of kilowatts. This finally gives us the number of kWh (kilowatt hours).

- 1) What is a short circuit?
- 2) What is the most energy-efficient lighting for my house?
- 3) Why would a dimmer/light switch plate be warm/hot to the touch?
- 4) Is your house 110v or 220V?





## Activity

### Using the energy inspection activity to calculate the load

- .....
- 1) Divides the class into pairs.
- 2) Each pair gives an area of the school
- 3) Calculate the load by using energy inspection
- 4) Merge all data and calculate the final I/P & O/P



## Reflection

- 1) How to install wire for an outbuilding
- 2) How do you calculate load in a circuit?
- 3) How is load calculation calculated?
- 4) What is load calculation electrical?
- 5) What is the formula for a total load?
- 6) What elements and compounds are found in your home?



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