

Energy

Electricity: Units and Terms

NCF and/or NCERT Learning Outcomes:

• To understand the terms and units of measurement related to electricity.

Why should you learn this?

• You will learn scientific terms, their definitions, and the units related to measurement.

Think and Answer



When your mobile battery runs out, we say, "Charge it." But what does charging a battery mean?

2

If a bulb glows dimly or a fan rotates slowly, we say, "Voltage is low." What do you understand by 'voltage'?



Bulbs are labelled as 5-Watt, 7-Watt, 15-Watt, 60-Watt, etc. What does Watt mean?



Do you hear terms such as Charge, Voltage, Watt, and Resistance? What do they mean?

We use many such terms and units in our daily lives without fully understanding them.











Electricity: Units and Terms

Let us explore the meanings and importance of terms and units related to measurement.

Terms

S.N.	Electrical Term	Description			
1	Circuit	A path through which electricity flows, including a power source, conductors, and devices is called an electrical circuit. There are two types of circuits: Open circuit and Closed circuit.			
2	Load	All electrical devices that are connected to a circuit and consume power, such as a bulb, motor, or fan, are referred to as loads.			
3	Earthing and Grounding	A safety measure where electrical circuits are connected to the ground to prevent electric shocks.			
4	Terminals	Every cell or battery has a positive and a negative terminal, marked with the + and – signs. In household circuits and electrical plugs, there are three main terminals: Live (or Phase), Neutral, and Earth. The Live wire carries the current, the Neutral wire provides the return path, and the Earth wire is a safety feature that helps prevent fires or electric shocks.			
5	Conductors	Objects or materials that allow electric current to flow through them, such as Copper or Aluminium.			



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S.N.	Electrical Term	Description
6	Insulators	Objects or materials that do not allow electric current to flow through them, such as Wood or Plastic.
7	Short Circuit	A short circuit takes place in an electrical circuit when a current travels along an unintended path with no or very low resistance. With low resistance, the current flowing through the wire is very high, which can cause damage due to overheating, fire or explosion. This can happen if the plastic covering on a wire is damaged and two bare wires touch each other, electricity will flow directly between them instead of passing through the full circuit.
8	Power Source	A power source, like a hydroelectric power generator or an electric cell, supplies electrical energy for operating electrical and electronic appliances.
9	Alternating Current (AC)	Alternating current is a type of electrical current where the direction of current flow keeps changing periodically. This type of current is supplied in homes, offices, and industries.
10	Direct Current (DC)	Direct current is a type of electrical current where the current flows in only one direction. This type of current is generated by batteries.



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Units

S.N.	Units and their Symbols	Description	
1	Joule J or kilowatt- hour kWh	Joule and kilowatt-hours are units used to measure electrical energy. Just like we use kilograms to measure weight and litres to measure milk, we use Joule and Kilowatt-hour to measure how much electrical energy is used. Electrical energy is what makes things like fans, bulbs, and TVs work.	
2	Watt W	Watt is a unit used to measure electric power. It tells us how fast a device uses electrical energy in a given time. Just like a fast tap fills water quicker than a slow tap, a device with more watts uses electricity faster. For example, a 100-watt bulb uses more electricity every second than a 60-watt bulb.	
3	Coulomb C	Coulomb (C) is a unit used to measure electric charge. Tiny particles inside atoms — called protons and electrons — carry this charge. Protons have positive charge, and electrons have negative charge. Just like we measure weight in kilograms, we measure electric charge in coulombs.	
4	Ampere A	Ampere (A) is the unit used to measure electric current. The flow of electrons in a circuit is called electric current. Just like stronger water flow gives more water, more electrons flowing means more current — measured in amperes.	
5	Volt V	Volt (V) is the unit used to measure voltage. The force required to move electrons or the force that allows the flow of electric current in a circuit is called voltage (also known as potential difference). You may have seen 9V or 220 V written on appliances in your homes. E.g. On your mobile charger Input: 100- 240V, Output: 5V.	



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S.N.	Units and their Symbols		Description		
6	Ohm Ω	Ohm (Ω) is the unit used to measure resistance. Resistance means anything that slows down the flow of electric current in a circuit. It is just like a narrow bridge on a wide highway — it slows down the vehicles. In the same way, high resistance slows down the flow of electrons in a wire.			
7	Siemens S	Siemens (S) is the unit used to measure conductance. Some materials, like metal wires, let electric current flow easily — they have high conductance. This ability to let current pass through is called conductance. It is the opposite of resistance, which slows down the flow of current. If resistance is like a narrow path, then conductance is like a wide, smooth road where vehicles (electrons) can move freely.			
8	Farad F	Farad (F) is the unit used to measure capacitance. Capacitance means the ability to store electric charge. A device called a capacitor stores this charge and gives it out when needed. It's like a water tank that stores water and releases it when we open the tap. In the same way, a capacitor stores electricity and sends it out when required.			
Now some exercise for you					
1 Can you find the correct matches? 2 Can you find objects around					
Electrical Term (A) Electric Current (B) Voltage (C) Resistance		Unit Options (i) Ohm (Ω) (ii) Coulomb (C) (iii) Watt (W)	you that relate to these terms?		
(D) Electric Charge		(iv) Volt (V)			

(E) Power

(v) Ampere (A)