

## Electricity

Electricity is described as the flow of electrons. And like flowing water, this current is affected by pressure, intensity, and resistance.



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### Charge

#### Charging the city

Electrical charge is characterized by the relative imbalance of positively and negatively charged particles in matter. For example, an object with more negatively charged particles (electrons) is said to have a negative charge.

### Flow of Electrons

#### Electrons flowing across atoms

Objects powered by electricity harness the flow of electrons to operate. These electrons generate a charge as they accumulate, which is a form of potential energy

### Voltage

#### Vault

Voltage is defined as the quantity of a charge. Voltage is the amount of pent-up electrical energy in a given circuit. In a static electric field, it represents the amount of work required per unit charge to move a positive test charge from one point to another. Voltage can be calculated by multiplying Amperes by Ohms.  $V=IR$ .

### Pressure

#### Pressure-gauge

Voltage is analogous to pressure. Visualizing water pressure building up behind a dam. The potential energy of water pushing against the wall of the dam is analogous to voltage. Similarly in a battery circuit the voltage of the battery creates an electric potential difference. When the circuit is closed (similar to opening the dam gates), electrons flow from the negative terminal (high potential energy) to the positive terminal (low potential energy), powering any connected devices.

### Current

#### Flowing Current

Electrical current is defined as the amount of energy flowing through a circuit per unit time. It is measured in amperes and is analogous to water flowing through a pipe. As the amount of water that can flow through a pipe is dependent on the pressure of the water and the diameter of the pipe, so too is electrical current dependent on voltage and resistance. Current equals volts divided by Ohms.

## Amperes

### Emperor

Amperes is the unit of measurement associated with current. An ampere is a unit used to measure the rate at which electric current flows through a conductor, in other words, ampere measures how fast electrons flow in an electrical conductor. It can be calculated by dividing the volts in a circuit by the Ohms.

## Resistance

### Resisting Flow

Resistance is the third component of electrical flow and is the basis of Ohm's law. Electrical resistance is defined by how easily electricity can flow through a circuit. Good conductors of electricity, such as copper and gold, have low resistance, whereas poor conductors, such as wood or distilled water, have high resistance. In our dam analogy, think of resistance as the diameter of the pipe through which water must flow.

## Ohms

### Om-monks

Resistance is measured in Ohms. Calculate Ohms by dividing the Volts by the Amperes in a given circuit.