

Electrical Principles & Technologies Concept Map

STATIC Electricity

Charge Separation
Electrical Discharge

Laws of Electric Charges

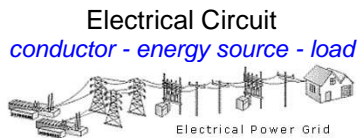
Opposite charges attract.

Like charges repel.

VanDeGraff Generator

CURRENT Electricity

Continuous flow of electrons through conductors.



Electrical SAFETY

- Short Circuits
 - Insulators
 - Plugs (Ground)
 - Fuses
 - Breakers
-

Safety Regulations

Safety Rules

VOLTS

Potential Difference
Voltage Drop

Voltmeter

AMPERES

Current flow rate

Galvanometers

OHMS Ω

Resisting the flow
Multimeter

Ohm's Law $R = V / I$

WET Cell
(Electrolyte is a liquid)

DRY Cell
(Electrolyte chemicals in a paste)

CELLS

Electrodes in an Electrolyte

2 different electrodes
2 cells make a BATTERY

Battery Types
Primary – Secondary

Conductors – Insulators
Superconductors

Types of Resistors

Wire-bound

Carbon composite

Variable Resistors
Rheostat (varies resistance)
Varistor (temperature change)
Thermistor (surge protector)

$Power = Voltage \times Current$

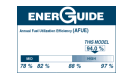
$Current = \frac{Power}{Voltage}$

$Voltage = \frac{Power}{Current}$

Energy $E = P \times t$

Law of Conservation of Energy
Energy can neither be created nor destroyed, it can only be transformed from one form to another

EFFICIENCY
 $\frac{Energy (output)}{Energy (input)} \times 100$



Energy TRANSFORMATIONS

- Chemical
- Electrical
- Mechanical
- Thermal
- Light
- Sound

Generators
Motors (DC – AC)



St. Louis Motor

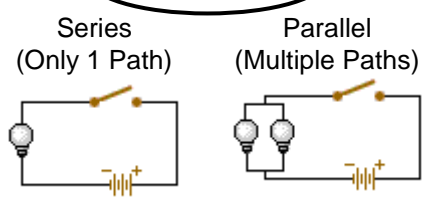
Transformers

Energy SOURCES
Fossil Fuels – Light (Solar)
Geothermal – Gravity – Tides
Wind – Biomass – Fuel Cells

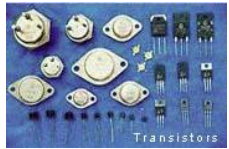
Source – Load – Conductor - Switch

Electrical Circuit Symbols

CIRCUITS



Microcircuits
Transistors – act as switches



IMPACTS
Renewable vs Non-renewable
Air Pollution
Conservation of Energy
Sustainability