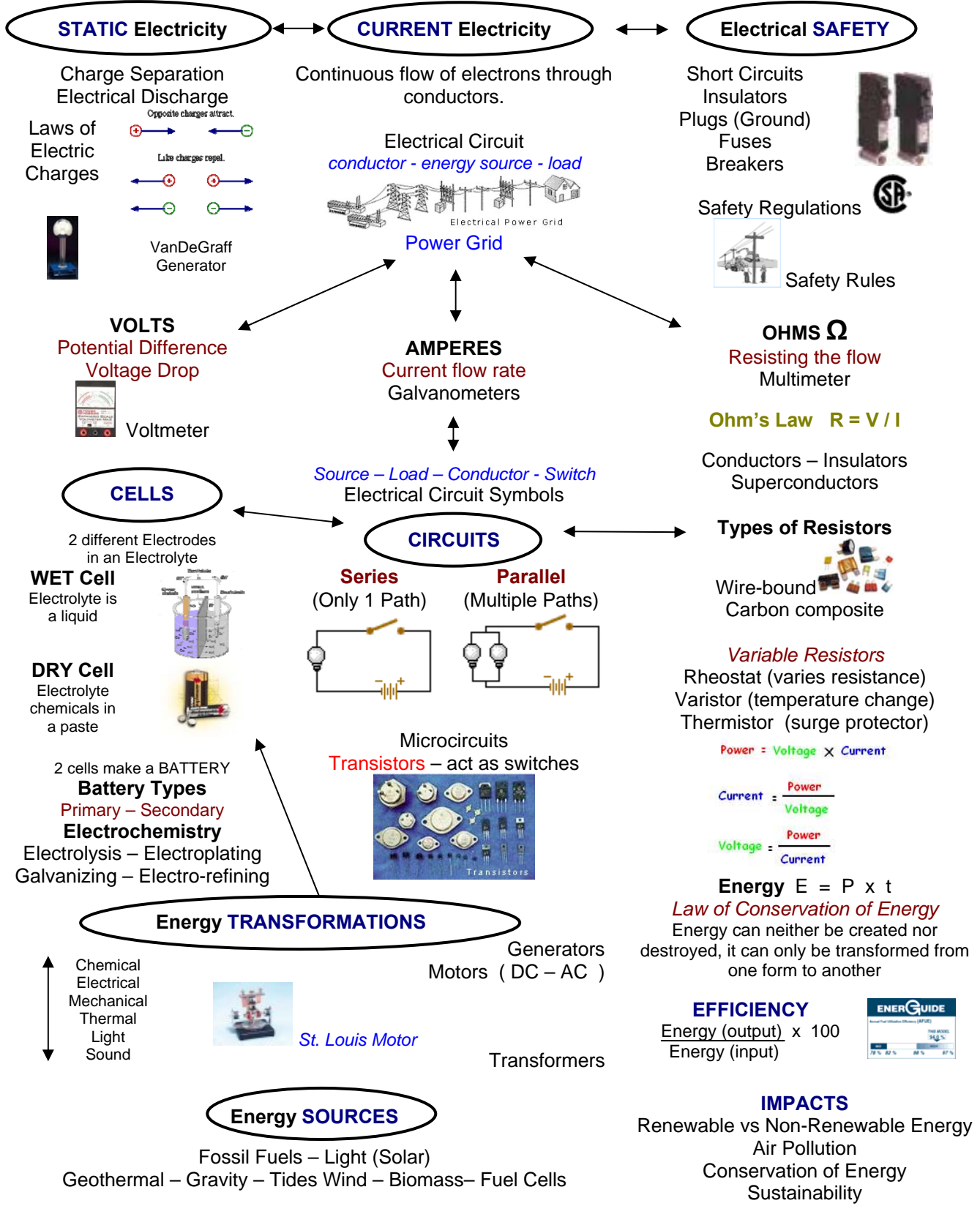


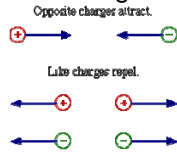
Grade 9 - Unit 4 –Electrical Principles & Technologies Concepts



STATIC Electricity

Charge Separation
Electrical Discharge

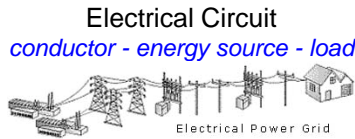
Laws of Electric Charges



VanDeGraff Generator

CURRENT Electricity

Continuous flow of electrons through conductors.



Power Grid

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 $R = V / I$

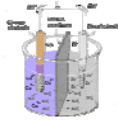
Conductors – Insulators
Superconductors

CELLS

2 different Electrodes in an Electrolyte

WET Cell

Electrolyte is a liquid



DRY Cell

Electrolyte chemicals in a paste



2 cells make a BATTERY

Battery Types

Primary – Secondary

Electrochemistry

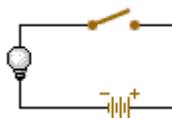
Electrolysis – Electroplating
Galvanizing – Electro-refining

CIRCUITS

Source – Load – Conductor – Switch
Electrical Circuit Symbols

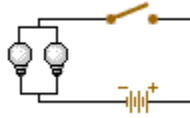
Series

(Only 1 Path)



Parallel

(Multiple Paths)



Types of Resistors

Wire-bound
Carbon composite



Variable Resistors

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

$$\text{Power} = \text{Voltage} \times \text{Current}$$

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

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

$$\text{Energy } E = P \times t$$

Law of Conservation of Energy

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

Energy TRANSFORMATIONS

Chemical
Electrical
Mechanical
Thermal
Light
Sound



St. Louis Motor

Generators
Motors (DC – AC)

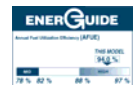
Transformers

Energy SOURCES

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

EFFICIENCY

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



IMPACTS

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