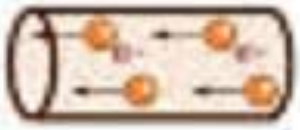
Electricity 101

Basics of Electricity



Current

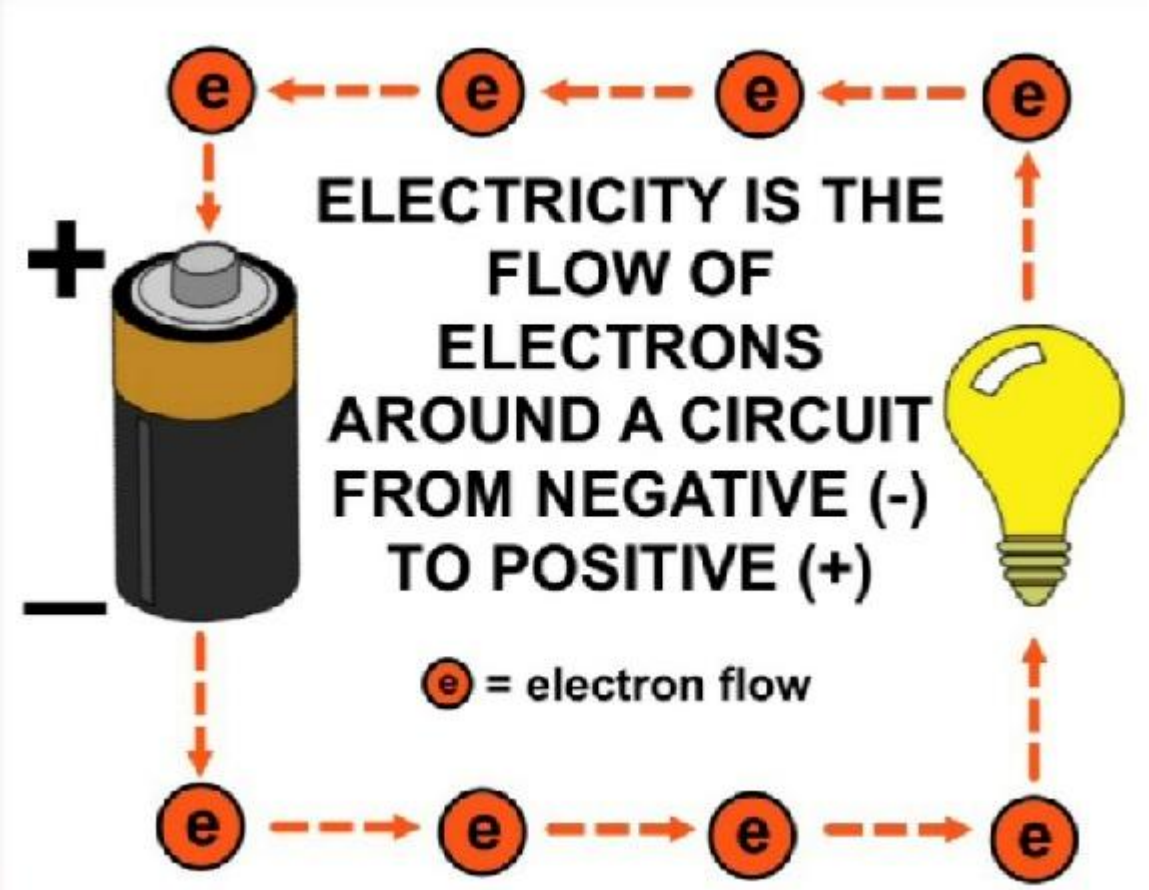
$V = IR$

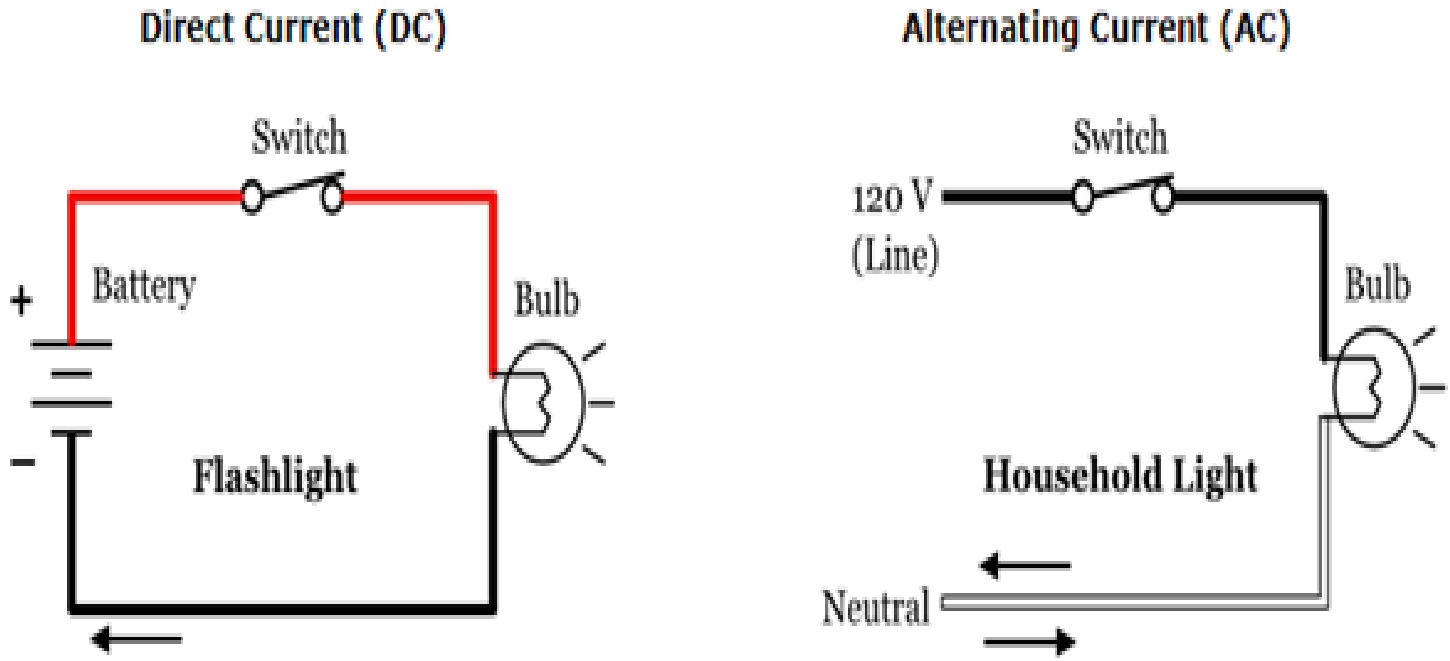
Energy

Power

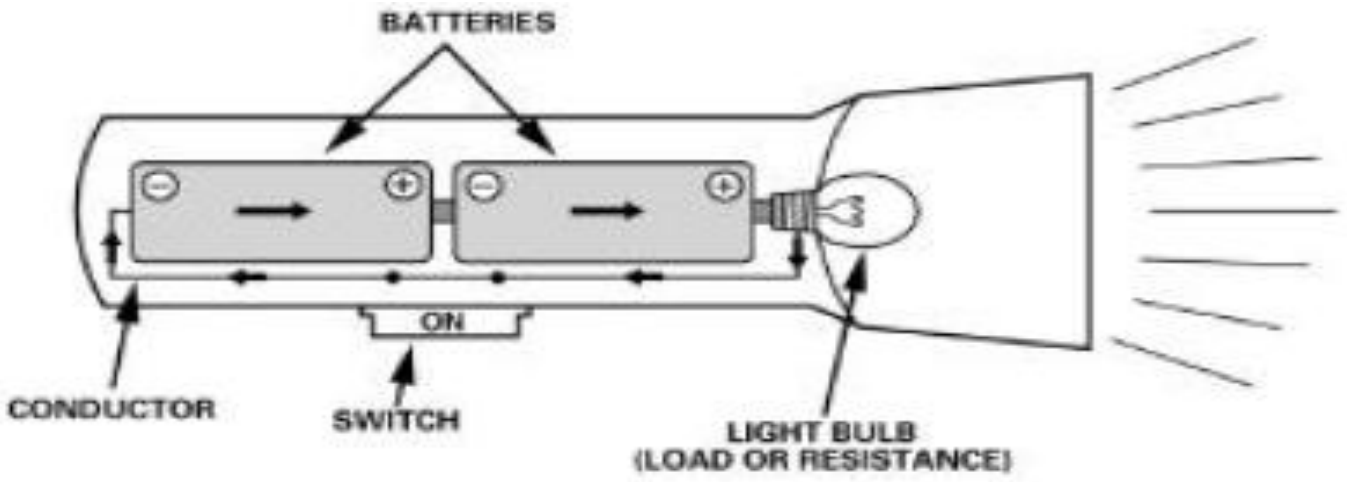
Charge

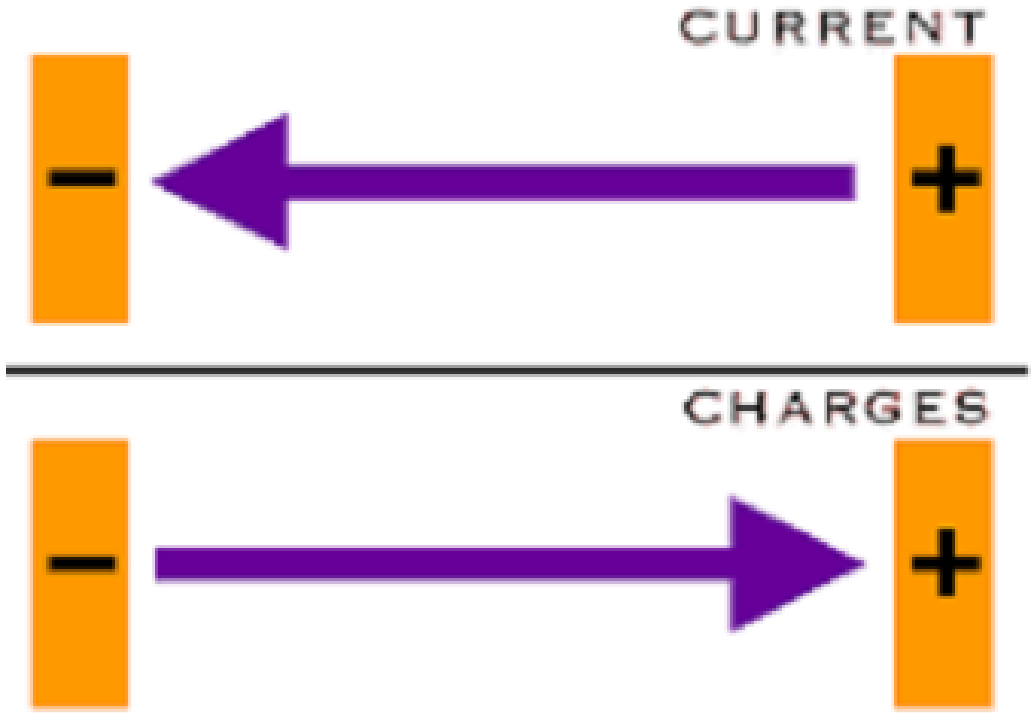
What is Electricity?




Direct Current (DC)
Switch
+
Battery
Bulb
−
Flashlight
Alternating Current (AC)
Switch
120 V
(Line)
Bulb
Household Light
Neutral

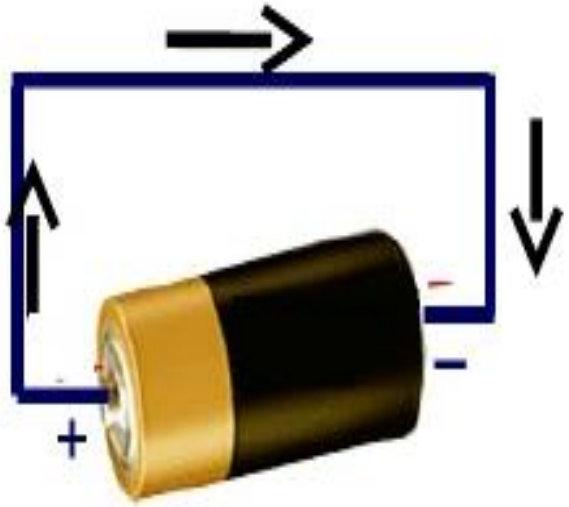
A simple DC device



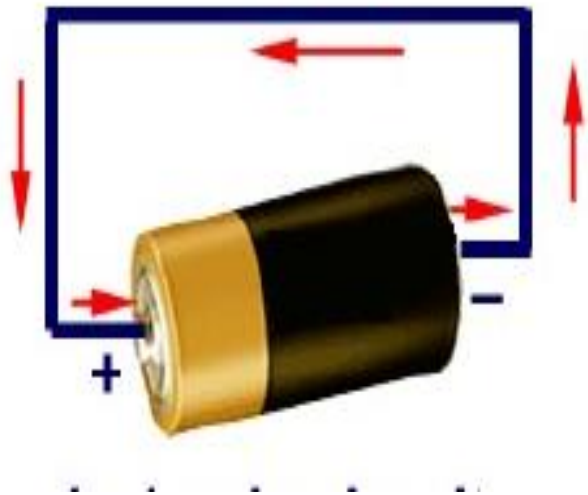


CONVENTIONAL CURRENT MOVES IN THE OPPOSITE DIRECTION OF THE CHARGED PARTICLES.

Current

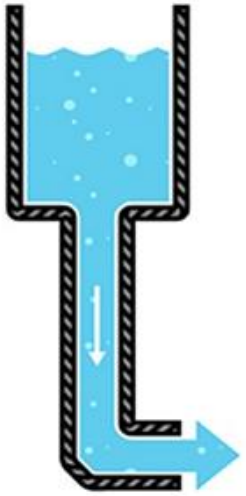


Electrons



3 Important Principles

- Voltage (Volts)
- Current (Amps)
- Resistance (Ohms)

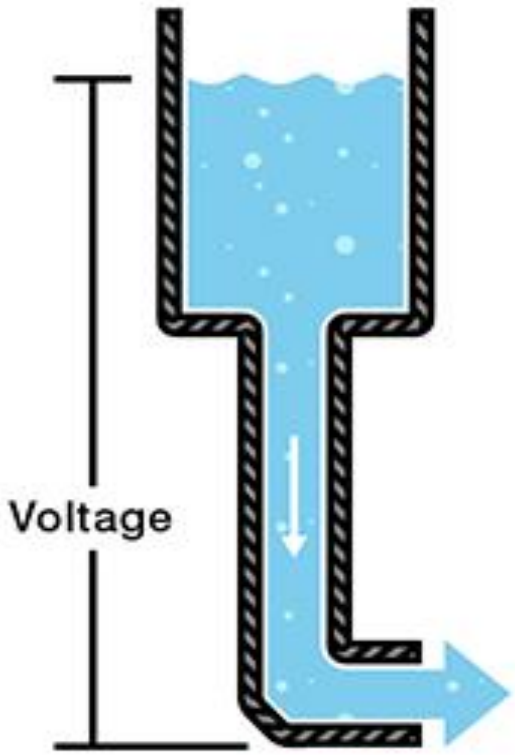


Water = Charge

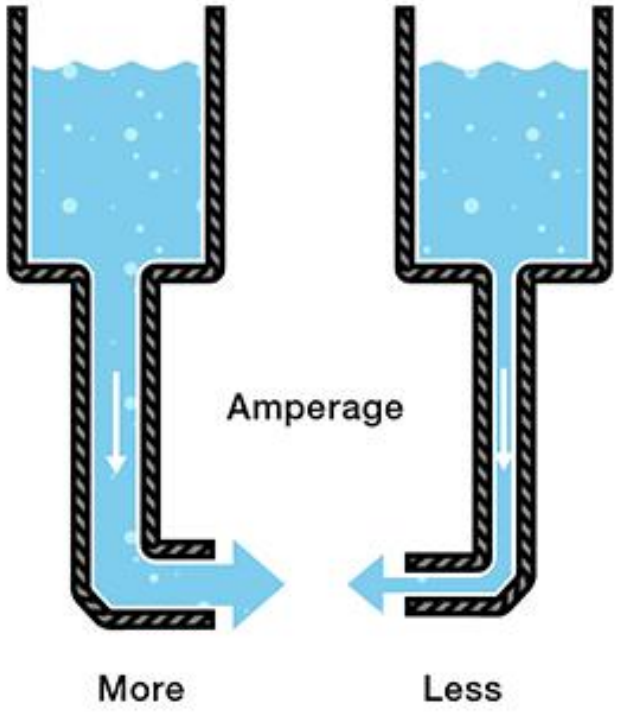
Pressure = Voltage

Flow = Current

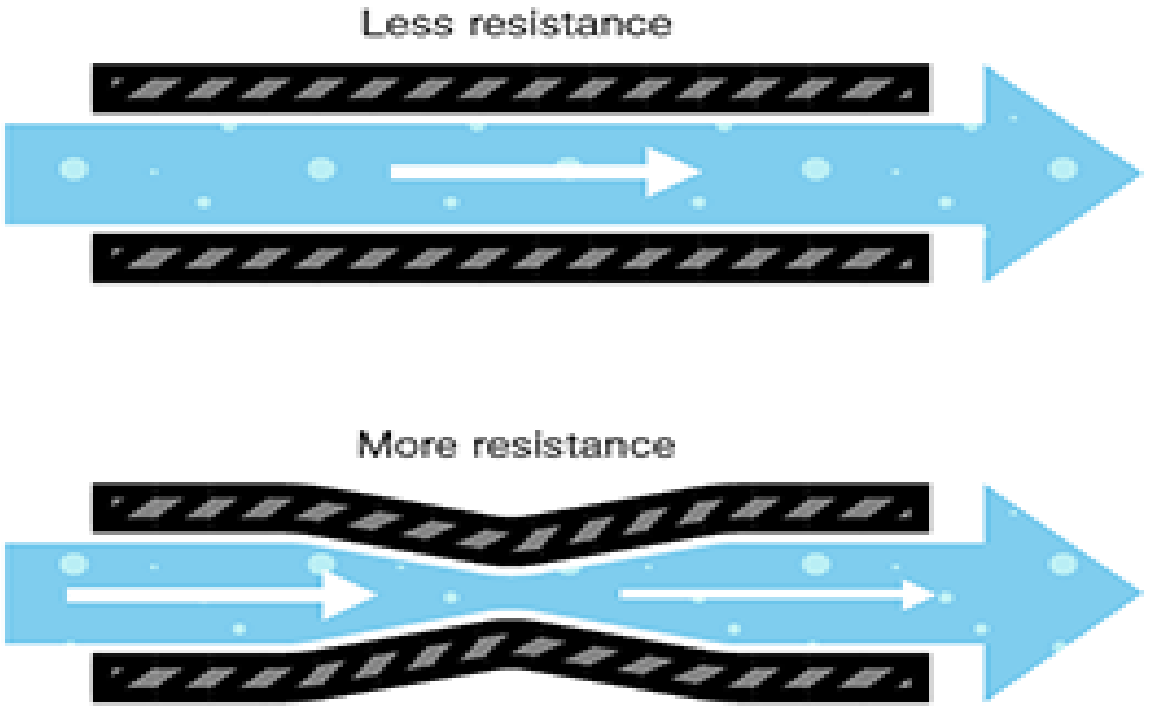
Friction = Resistance


Voltage

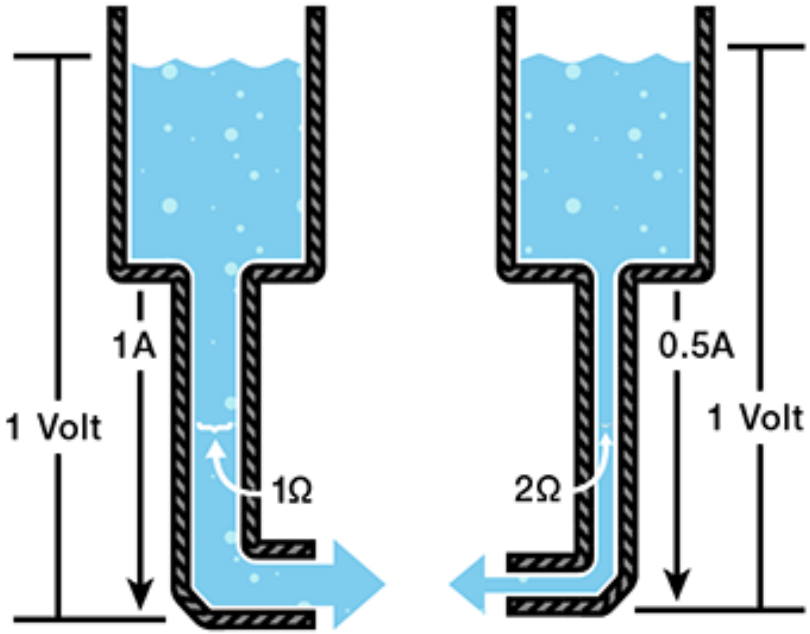
Current



Resistance

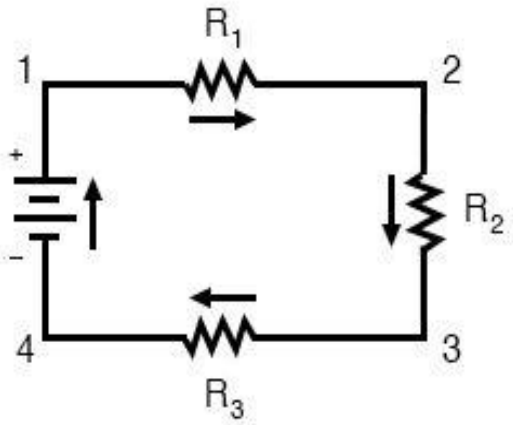


V=IR

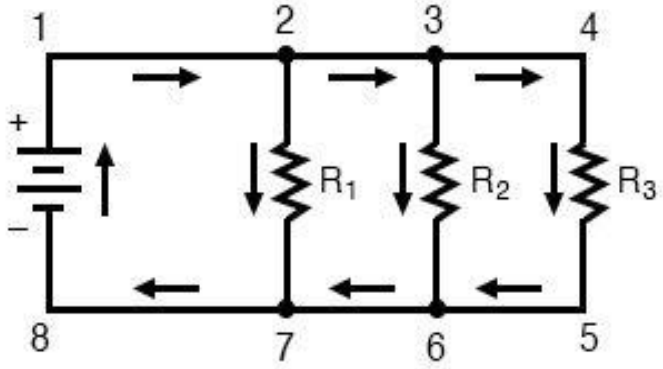


Circuits

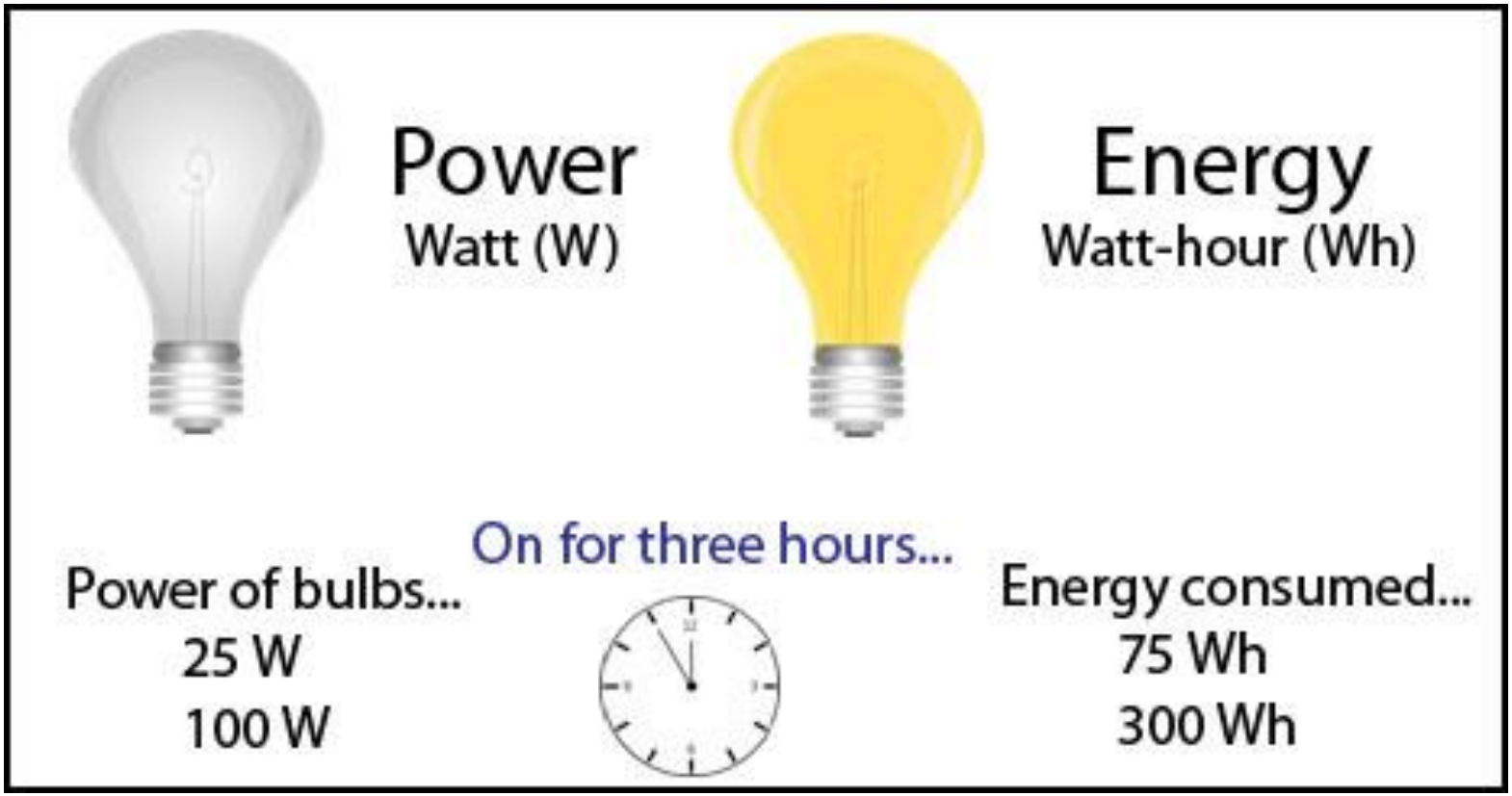
Series



Parallel

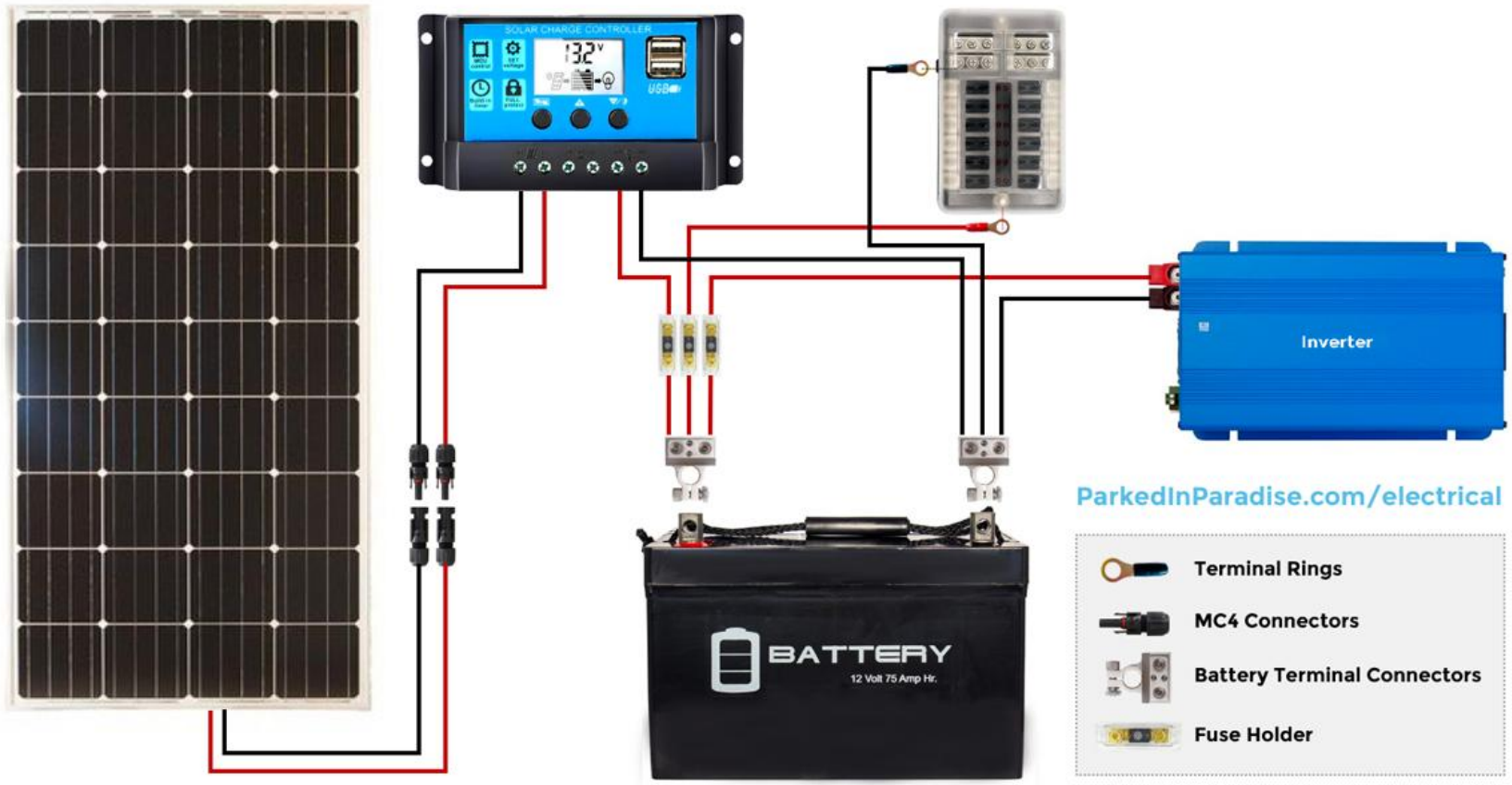


Power: Watts = Volts x Amps

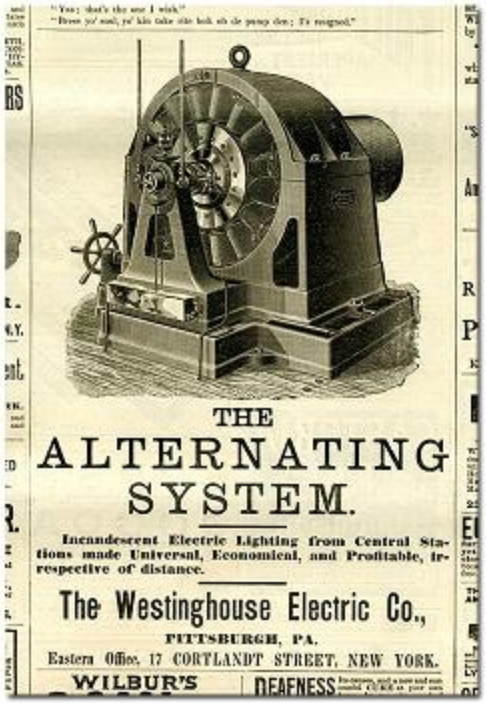


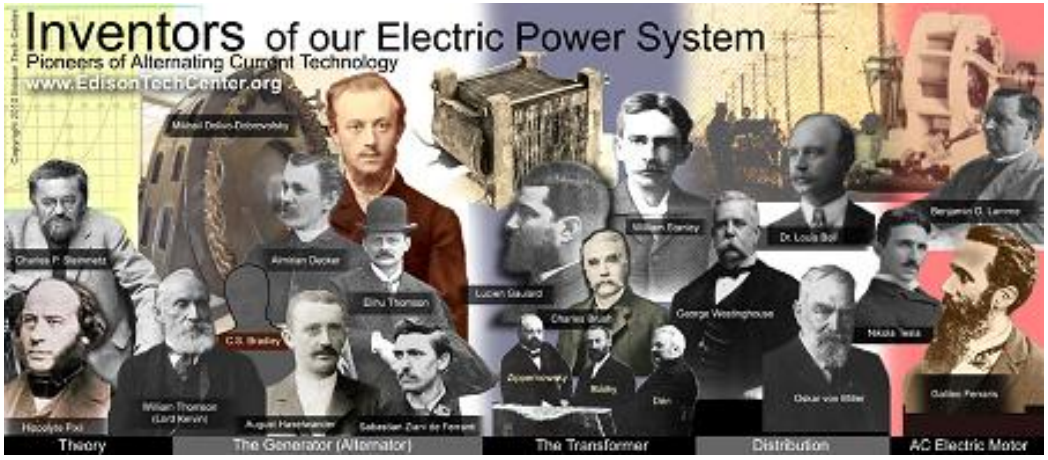
Energy: Power over Time

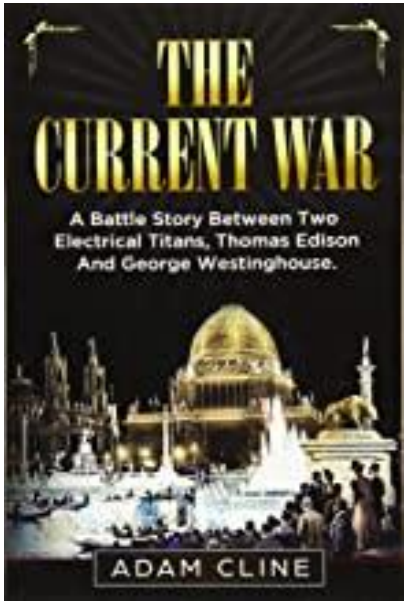
An Off Grid Power System



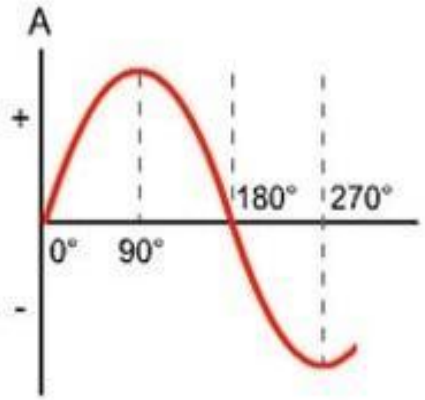
Alternating Current AC

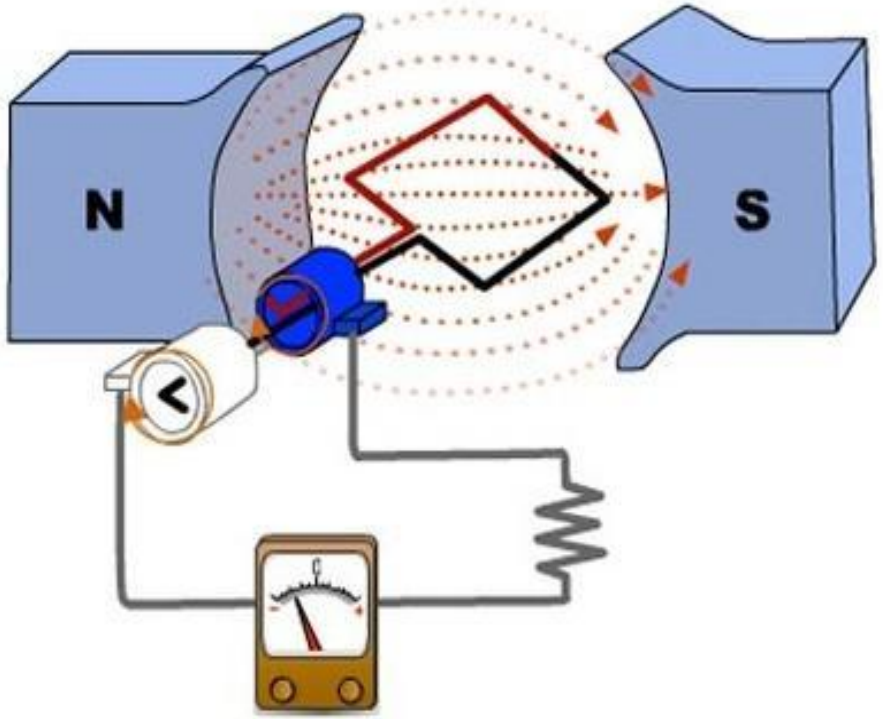




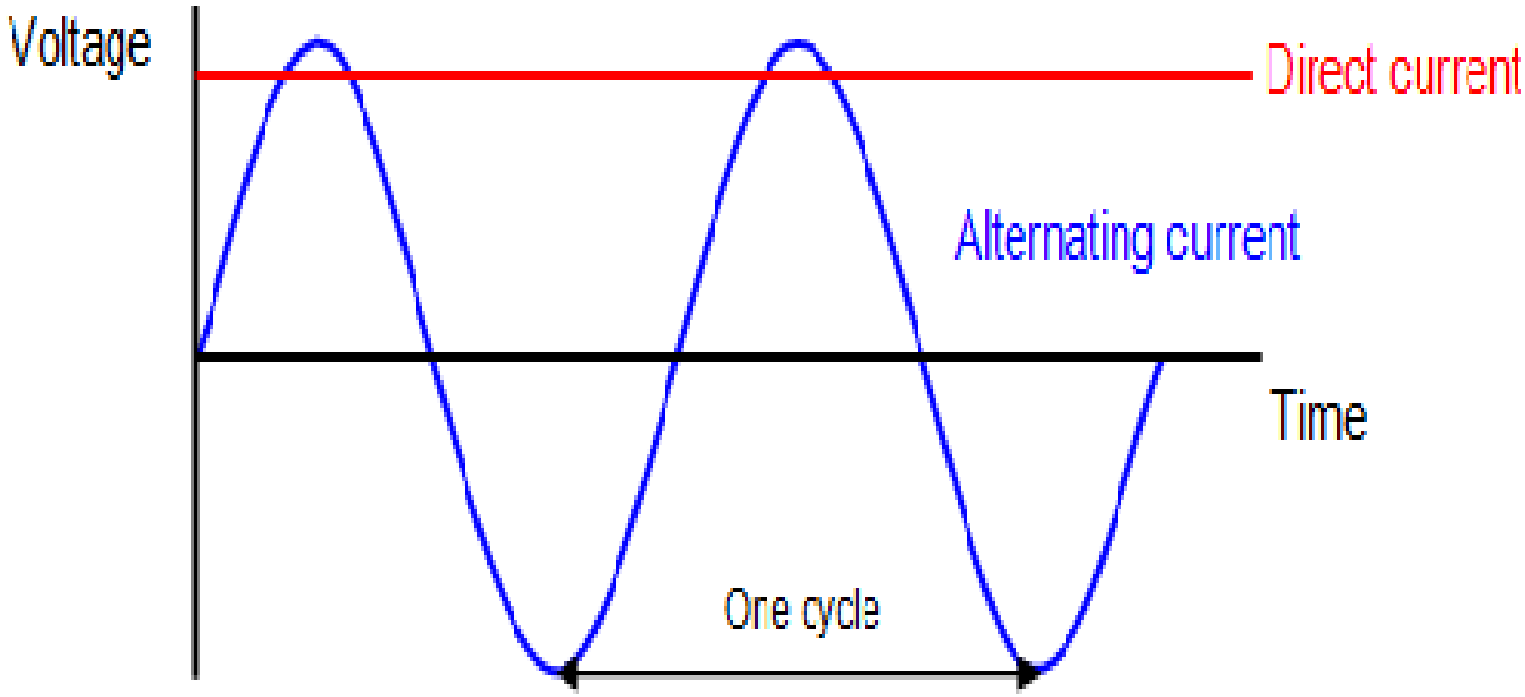


Generation of Alternating Current

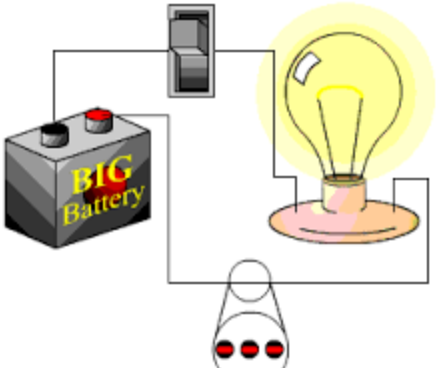


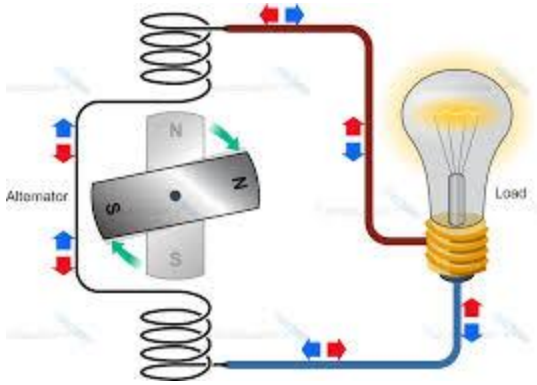


AC vs DC

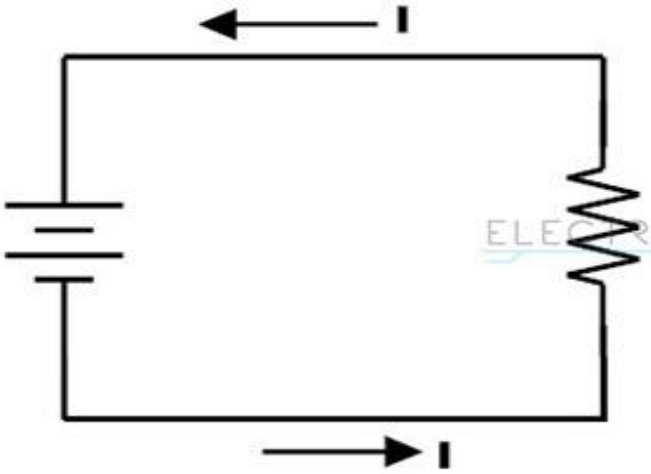

Voltage
Direct current
Alternating current
Time
One cycle

DC vs AC

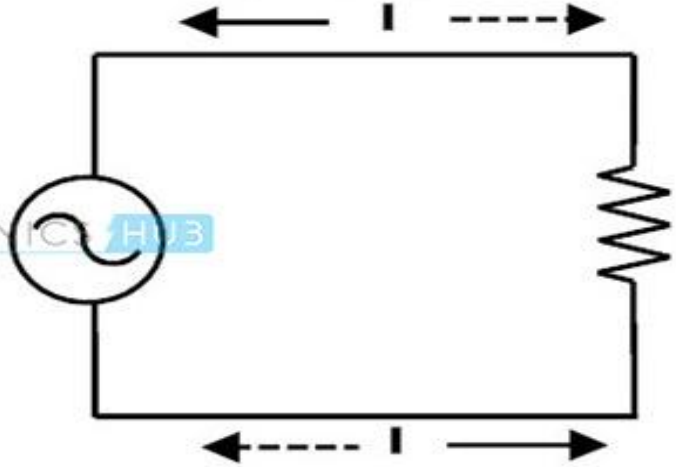




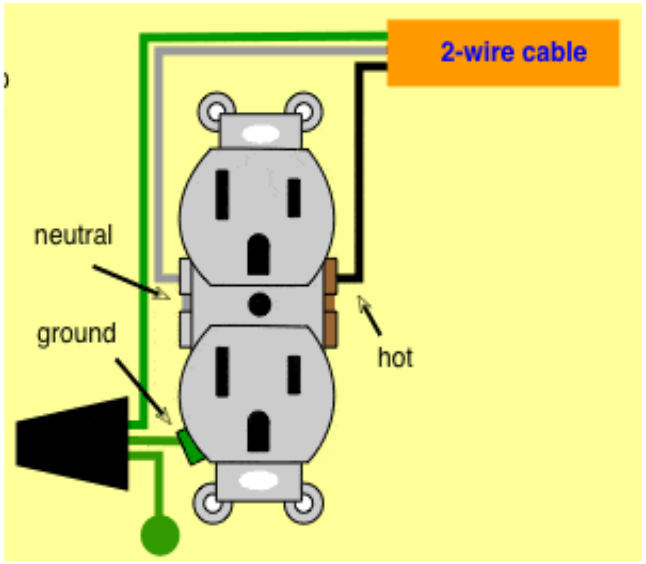
Direct Current



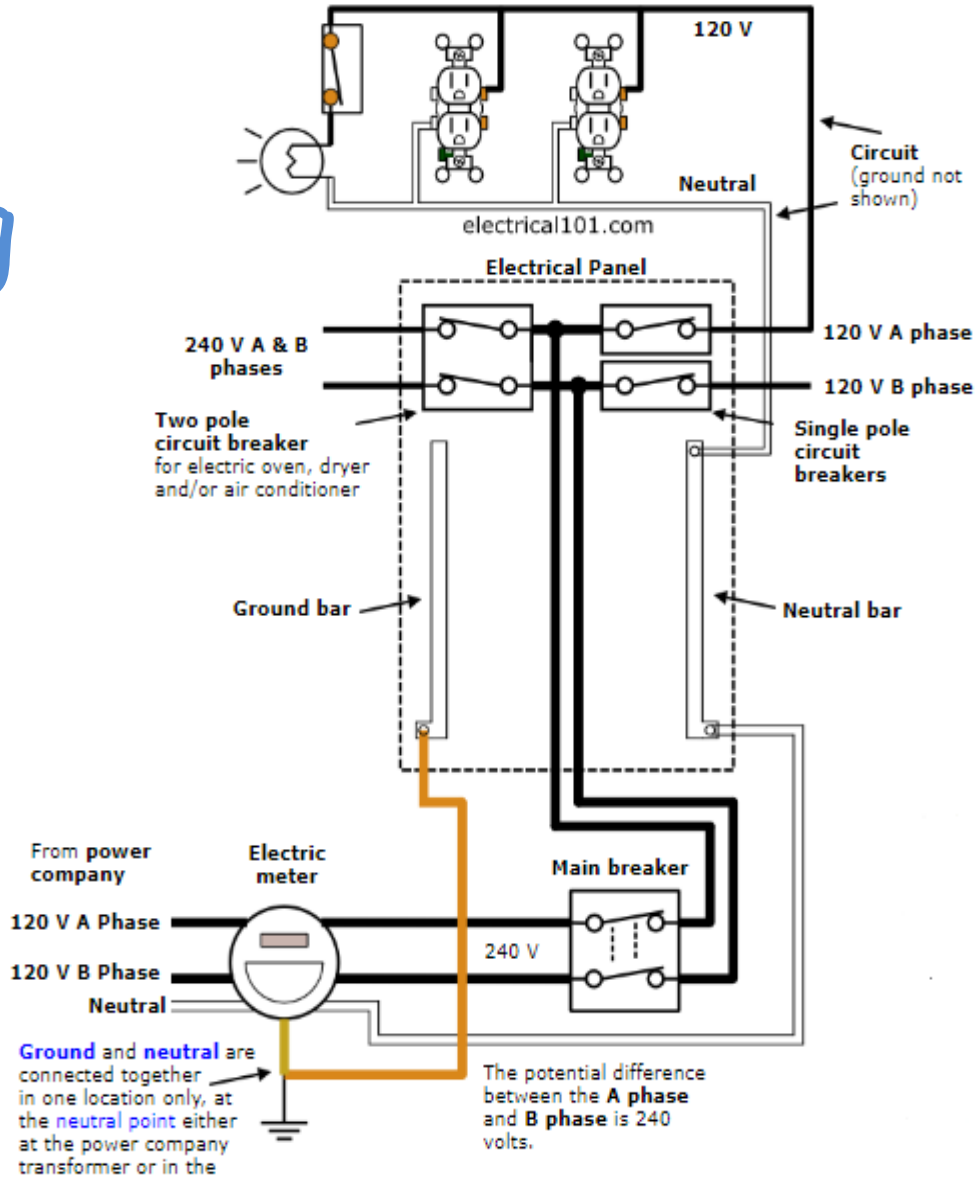
Alternating current



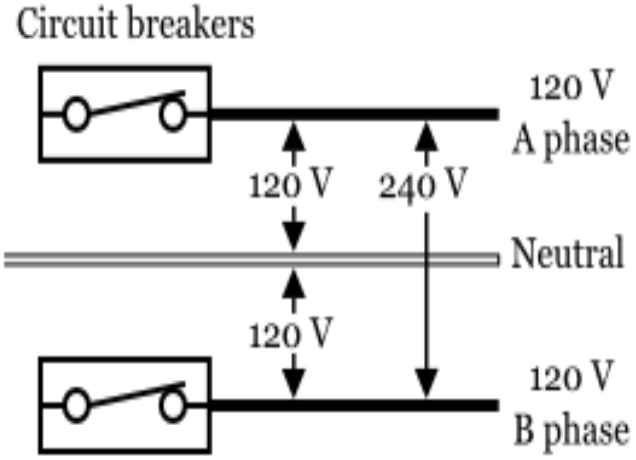
Neutral and Ground



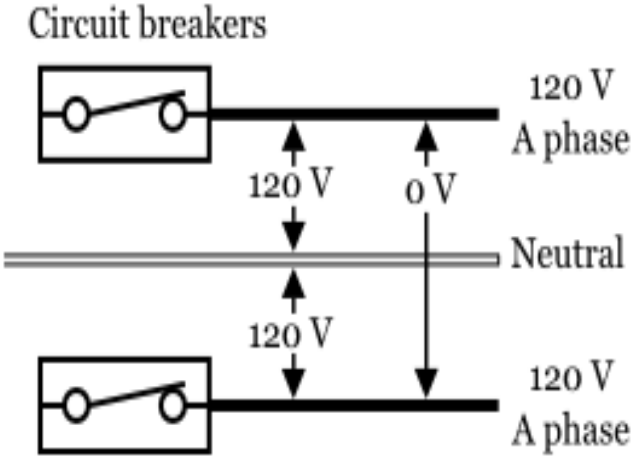
House Wiring



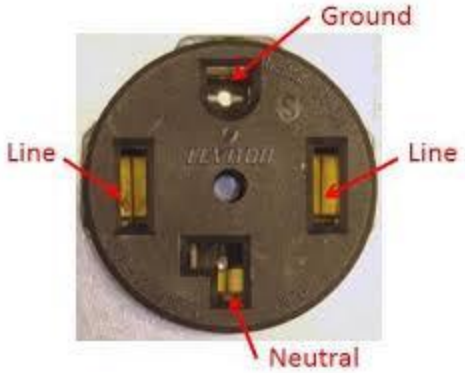
120 volt and 240 volt circuits



Voltage between A and B phase is 240 Volts

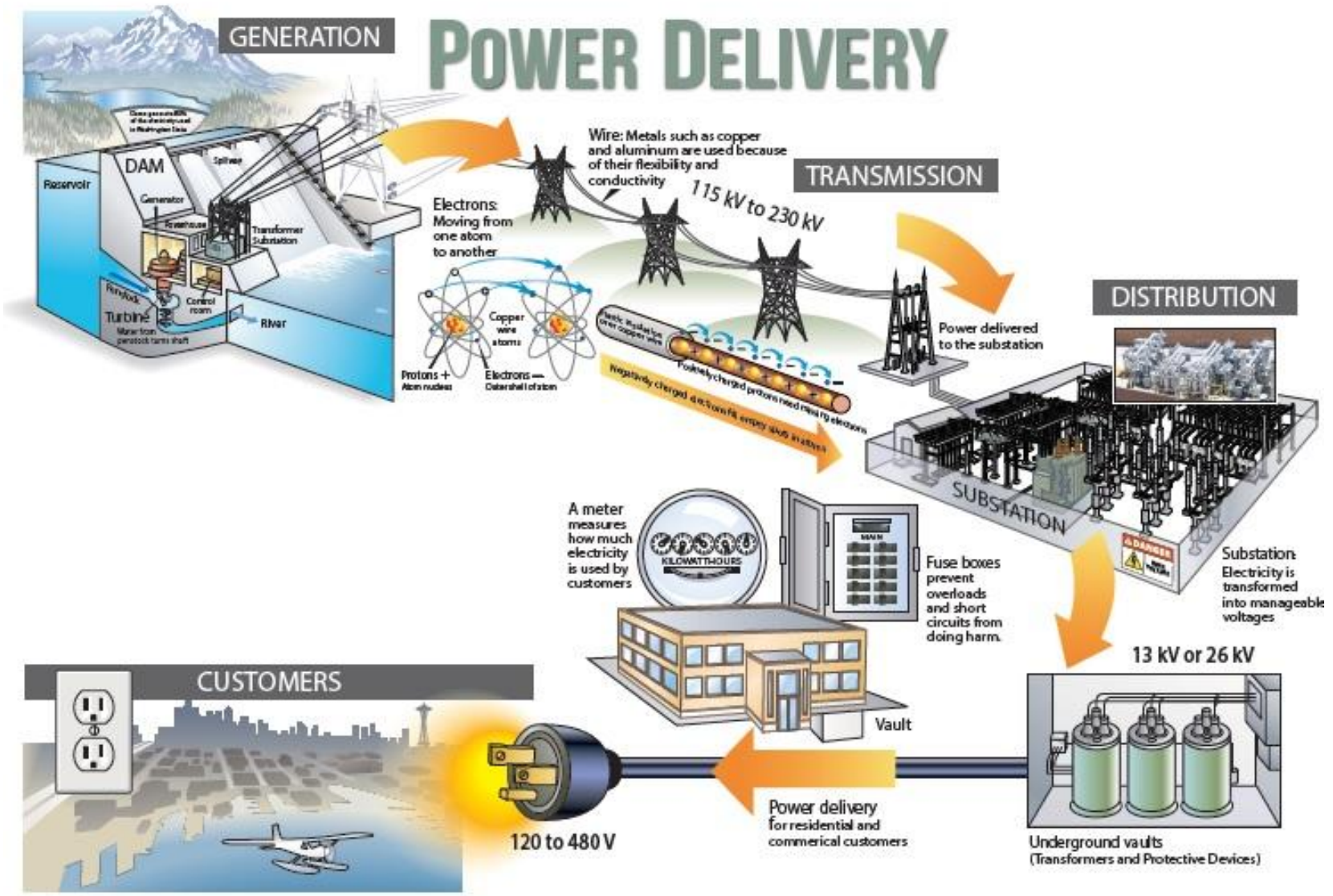


Voltage between A and A phase is 0 Volts



Outlet testing


DANGER
PELIGRO
SIEMENS
USE COPPER OR ALUMINUM 60/75°C WIRE
100
100
SERVICE DISCONNECT


GENERATION
POWER DELIVERY
DAM
Spillway
Reservoir
Generator
Powerhouse
Transformer Substation
Penstock
Turbine
Control room
River
Wire: Metals such as copper and aluminum are used because of their flexibility and conductivity
TRANSMISSION
115 kV to 230 kV
Electrons: Moving from one atom to another
Copper wire atoms
Protons + Atom nucleus
Electrons − Outershell of atom
Power delivered to the substation
DISTRIBUTION
SUBSTATION
Substation: Electricity is transformed into manageable voltages
A meter measures how much electricity is used by customers
KILOWATTHOURS
Fuse boxes prevent overloads and short circuits from doing harm.
Vault
13 kV or 26 kV
CUSTOMERS
120 to 480 V
Power delivery for residential and commerical customers
Underground vaults
(Transformers and Protective Devices)

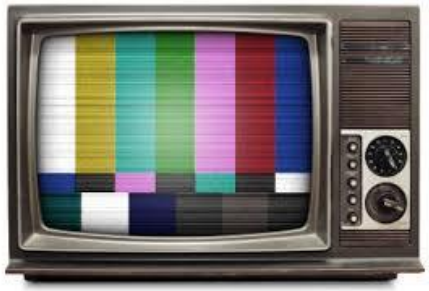
Power: Watts = Volts x Amps

Energy: Power over Time

What is a kW?

- **watt (W)** – the unit of electric power
- **kilowatt (kW)** – 1000 watts
- **kilowatt-hour (kWh) –** a measure of electric power production or consumption over a period of time

An electric heater rated at 1000 watts (1 kilowatt), operating for one hour uses one kilowatt-hour of electricity



A television rated at 100 watts operating for 10 hours continuously uses one kilowatt-hour of electricity

A 40-watt light bulb operating continuously for 25 hours uses one kilowatt-hour of electricity

Statement

Liberty Utilities

1 Liberty Utilities
P.O. Box 1380
Londonderry, NH 03053-1380
Visit our website at www.libertyutilities.com

FOR QUESTIONS REGARDING YOUR BILL CALL (800) 375-7413
FOR EMERGENCIES CALL (855) 349-9455

>000009 9131087 0001 092170 10Z

5 JOHN Q SAMPLE
99 KUMON RD
SALEM NH 11121

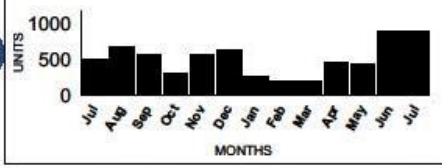
2 ACCOUNT INFORMATION

Account Number:	XXXXXXXX XXXXXXX
Statement #:	2780095
3 Bill Date:	07/17/2015
Due Date:	08/14/2015
Next Meter Read:	08/12/2015

4 *Service Address:* 99 KUMON RD SALEM NH 11121

MONTHLY CONSUMPTION CHART

6



00009 9131087 0000016 0000031 0001 00002

7

Meter Number	Type of Service	Rate Code	Read Type	# of Days	Service Dates	(Current - Previous) x	Multi-plier	= Usage	Demand	KVA/ KVAR
E-92265008	Energy	D-10	A	27	06/16/15-07/13/15	43420 - 42520	1	900		
E-92265008	Peak	D-10	A	27	06/16/15-07/13/15	73618 - 73318	1	300		
E-92265008	Off Peak	D-10	A	27	06/16/15-07/13/15	69802 - 69201	1	600		

8 Type Banner text here Type Banner text here Please take note of our new phone number for electric emergencies or to report a power outage: 1-855-349-9455. Program this number into your cell phone for easy access. We look forward to serving you.

ACCOUNT ACTIVITY

Voltage Delivery Level 9	0 - 2.2 kv
10 **Previous Balance:**	139.40
Payments Received: 11	139.40 CR
12 **Balance Forward:**	0.00
Current Charges: 13	
Customer Chg	11.95
Consumption Tax 900.00 units @ 0.00055	0.50
Dist Chg Off Pk 600.00 units @ 0.00108	0.65
Dist Chg On Pk 300.00 units @ 0.09039	27.12
Energy Service 900.00 units @ 0.07063	63.57
Storm Recovery 900.00 units @ 0.00221	1.99
Stranded Cost Chg 900.00 units @ -0.00154	1.38 CR
Sys Benefits Chg 900.00 units @ 0.00330	2.97
Transmission Chg 900.00 units @ 0.03558	32.02
Miscellaneous Charges: 14	
Meter Test Charge	25.00
Meter Test Charge	25.00
16 **Total Amount Due:**	189.39

17 **SPECIAL MESSAGE**

Sign up for Storm Alert Emails. We'll keep you informed when significant storms are approaching and we'll provide updates on major power outages.
www.libertyutilities.com/east/electricity/email.

Please include your account number on your check
Make checks payable to Liberty Utilities

KEEP THIS PORTION FOR YOUR RECORDS

12 ...CH AND RET... 15 ...IS REMITTA... 13 ...RTION OF T... 16 ...WITH YOUR PAYMENT

BALANCE FORWARD	VOID & MISC CHG/CREDITS	CURRENT CHARGES	AMOUNT DUE	ENCLOSED AMOUNT
0.00	50.00	139.39	189.39	

18 Payment Coupon

Please check box and see reverse for: ☐ Update phone/address

Service Address: 99 KUMON RD SALEM NH 11121 19

JOHN Q SAMPLE
99 KUMON RD
SALEM NH 11121

Account Number: XXXXXXXX-XXXXXXXX
Statement #: 2780095
Bill Date: 07/17/2015
Due Date: 08/14/2015

Energy Conservation

- Turn off lights/appliances (smart power strips)
- Phantom power
- Use LED lights
- Energy efficient appliances
- Turn down thermostats
- Heat pumps

www.plainfieldnh.org/energy

21 no cost tips to conserve electricity

More Energy Savings Tips

Links to other resources

READY FOR 100% ACTION