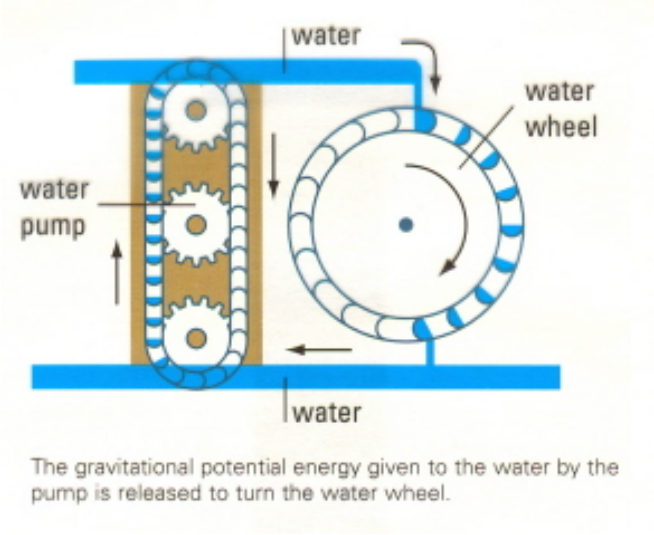
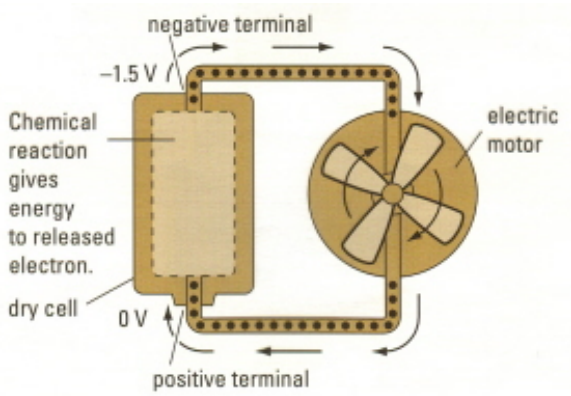
**Electric Potential**

-electric potential is defined as the energy an electron possesses
-greater the energy the greater the potential
-chemical reactions in the batteries provide the energy for the electrons
-each electron 'flows' through the closed circuit and release their energy to the 'load' in the circuit

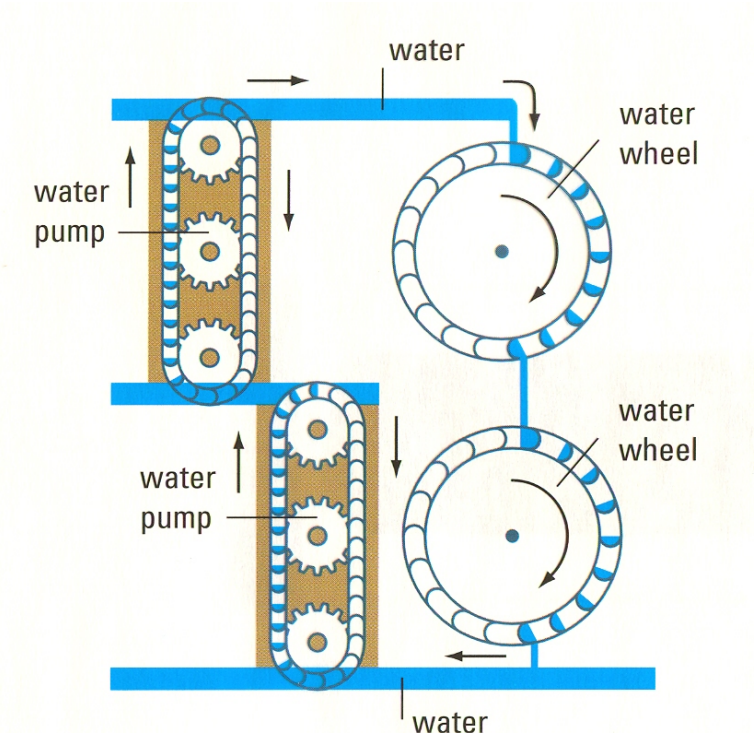


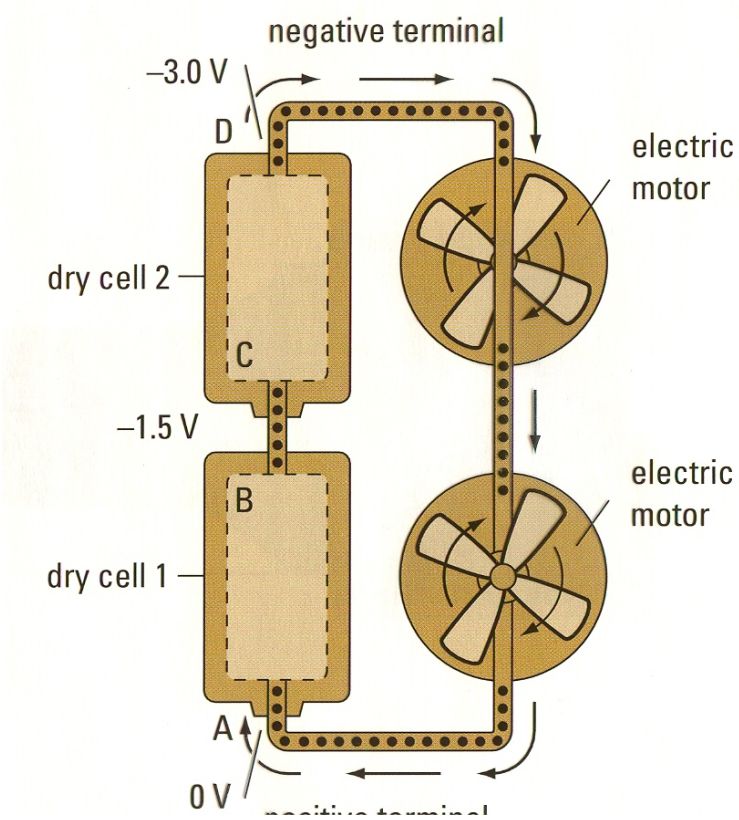

The gravitational potential energy given to the water by the pump is released to turn the water wheel.



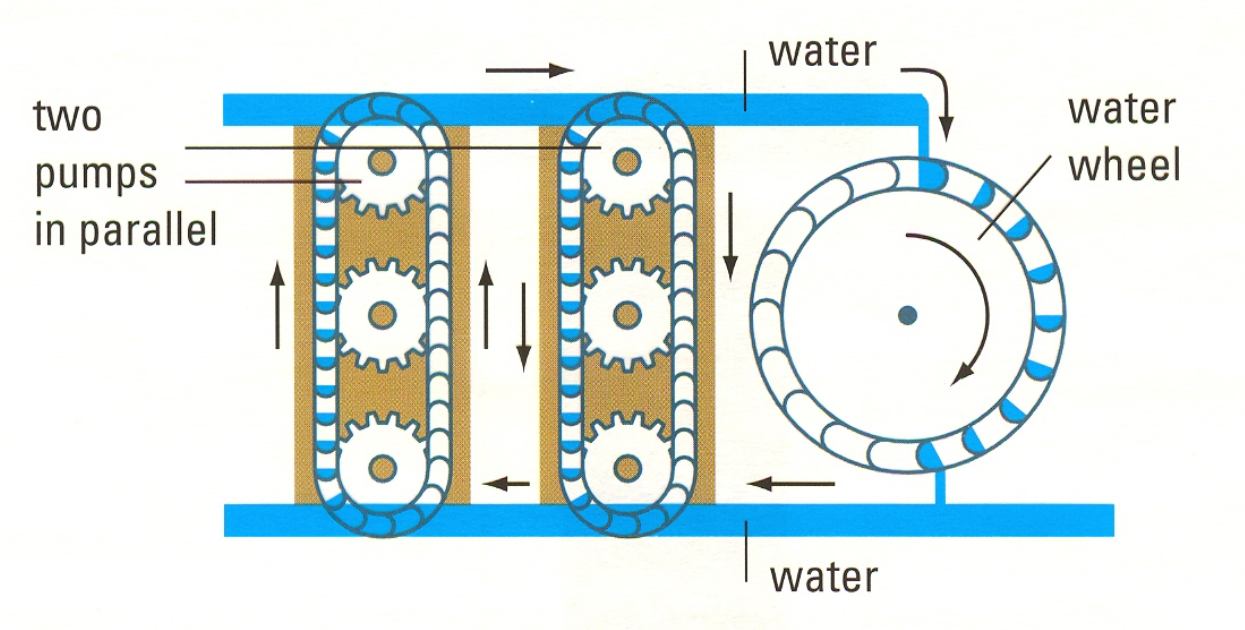

The electric potential energy released by the chemical reaction in the cell is used to turn the electric motor.

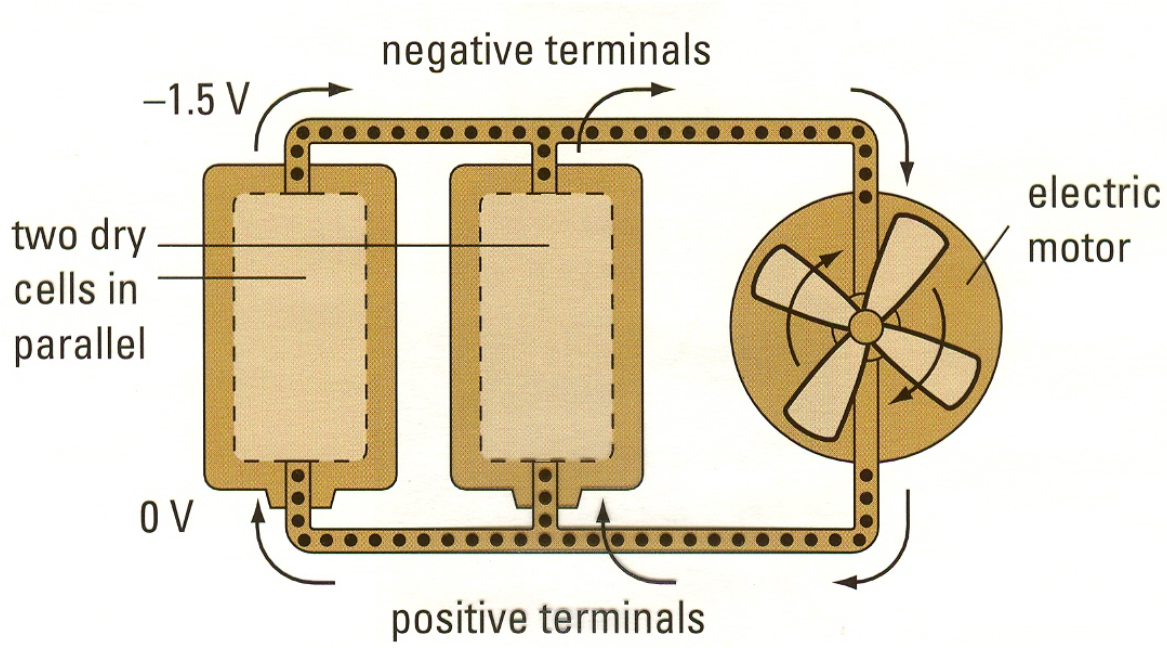
# *Series Circuits*






# *Parallel Circuits*






# Investigation 10.6
# p. 308-309

## Electric Current

-electrons flowing through a circuit is "electricity"
-electric current is a measure of the rate at which electrons flow past a point
-the SI unit for current is the ampere (A)
-slightly less than 1A of current flows through a 100W bulb connected to your household circuit

## Current Safety Levels

-0.001A is perceptible
-0.002A causes tingling muscles
-0.016A stops breathing
-0.050A ventricular fibrillation
***-0.833A current needed to run 100W bulb***

## Electrical Resistance and Ohm's Law

-electrons flow through the conductors at the atomic level
-ALL conductors impede (resist) the flow of electrons somewhat
-in some devices they are designed to resist the flow
-the property is called "resistance"
-the SI unit for resistance is the Ohm( Ω )and has the symbol R
-the resistance of a 100W bulb is about 144 Ω
-when electrons are resisted by a device, there is a "drop" of voltage referred to as a "potential difference"

## Ohm's Law

1827, German scientist Georg Ohm discovered a relationship between the potential difference in a conductor and the current that flows through it.

*The potential difference between two points is directly proportional to the current flowing through the conductor.*

Potential Difference = Electric Current X Electrical Resistance

$V = I \times R$ Ohm's Law

V=potential difference (volts)
I=current (amperes)
R=resistance (ohms)

Sample Problems

V=?

1) What is the voltage drop across a tungsten filament in a 100W bulb. The resistance of the filament is 144 Ω and the current flowing through the conductor is 0.833A

R

I

$V = I \times R$

$V = 144 \times 0.833$

$= 119.952\ V$

2) An electric toaster is connected to 120V outlet. If the heating element in the toaster has a resistance of 14 Ω, calculate the current flowing through it.

V I R

$V = I \times R$

$120 = I \times 14$

$\frac{120}{14} = \frac{I \times 14}{14}$

$8.57V = I$

A

$R = \frac{V}{I}$

$R = \frac{120}{14}$

$8.57A$

3) The current needed to operate and electric can opener is 1.5 A. What is it's resistance if the supply voltage is 120V

$R = \frac{V}{I}$

$\frac{120}{1.5}$

$R = 80\Omega$