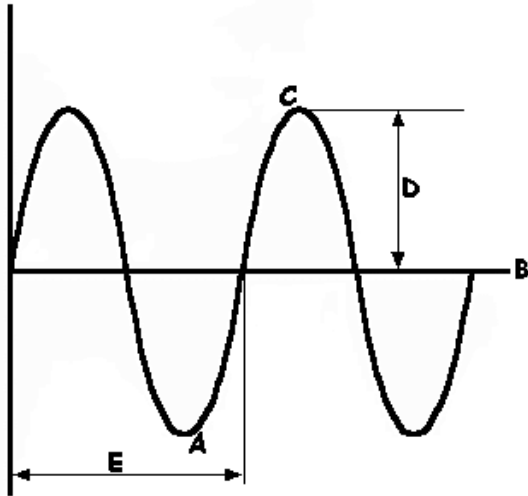


Waves and Sound

Sound waves are mechanical / electromagnetic (circle one) waves
Sound waves are transverse / longitudinal (circle one) waves.



Label the diagram to the left:

- A: _____
- B: _____
- C: _____
- D: _____
- E: _____

Describe the motion of particles of **traverse waves**. _____

Describe the motion of the particles of **longitudinal waves**. _____

Describe the **Doppler effect**. _____

Define **Compression**: _____

Define **Rarefaction**: _____

Define **frequency**. _____

What are the units for **frequency**? _____

Given the **frequency**, write the formula for solving for the period:

Given the **period**, write the formula for solving for the frequency:

Practice Problems:

Calculate the period from the following: 60 Hz _____; 120 Hz _____; 0.05 Hz _____

Calculate the frequency from the following: 5 s _____; 0.2 s _____; 0.0025 s _____

List the three formulas for wave speed.

Practice Problems:

The speed of sound in air is 343 m/s. It takes 7 seconds after you see the lightening flash until you hear the thunder. Calculate the distance to the lightening strike.

In fresh water it take sound about 8 seconds to travel 12 km. What is the speed of sound in water?

Electric Charges and Fields

List the four fundamental forces in order from weakest to strongest:

1. _____
2. _____
3. _____
4. _____

Only the _____ (subatomic particle) can move about.

If an object has an excess of _____ then the charge is _____.

If an object has a deficiency of _____ then the charge is _____.

If the charge on two objects is the same, the objects will _____.

If the charge on two objects is different, the objects will _____.

If an object has a positive charge on one end and a negative charge on the other end, the object is said to be _____.

A charge that does not move is said to be a _____ charge (think "cling").

State the law for conservation of charge. _____

What are the characteristics of **insulators**? _____

What are the characteristics of **conductors**? _____

Describe charging by **contact**. _____

Describe charging by **induction**. _____

Describe the charge on an object that is **polarized**. _____

Current Electricity

Three components of electric current flow – list, define, state units:

1. _____

2. _____

3. _____

An **electric current** in a circuit always flows from _____ to _____.

What is “**Drift Velocity**?” _____

Describe the composition and function of a **resistor**. _____

Describe the composition and function of a **capacitor**. _____

Describe the **charging process** of a **capacitor**. _____

Describe the **discharge process** of a **capacitor**. _____

Describe the composition and function of a **battery**. _____

What is the **force** behind the movement of an electric charge? _____

What are the units for **electromotive force** (emf)? _____

What are the units for **resistance**? _____

What are the units for **capacitance**? _____

What are the units for **current**? _____

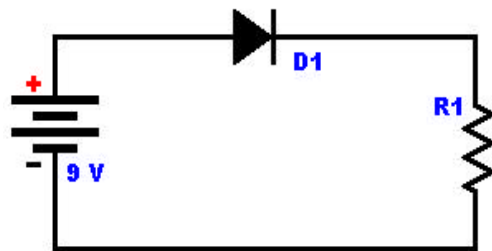
State the formula for **Ohm's Law**.

Practice Problems:

A battery provides 1.5 volts of emf and a current of 0.3 amperes flows through an incandescent lamp. Calculate the resistance of the lamp.

A LED requires only 2.1 volts at a current of 0.01 amps. What is the internal resistance of the LED?

A 2 volt, 0.015 amp LED is going to be connected to a 9 volt battery. What value of dropping resistor is required to prevent the LED from burning out?



Write the formula for calculating the power of a circuit.

Practice Problems:

The LED above, 2 V at 0.015 A, calculate the power consumption.

After you solve for R1 in the above circuit, calculate the power dissipated by that resistor.

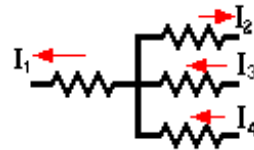
The power supply for your computer has an output of 19.5 V at 3.34 A. What is that output power?

An electric heater plugged into the 120 V wall socket consumes 2400 watts of power. How much current does the heater require?

State Kirchhoff's Law for current. _____

Practice Problem:

If I_1 is 3 amps, I_2 is 3 amps, and I_3 is 4 amps, what is I_4 ?



Series and Parallel Circuits

How does current behave in a **series circuit**? _____

How does current behave in a **parallel circuit**? _____

How does voltage behave in a **series circuit**? _____

How does voltage behave in a **parallel circuit**? _____

State what happens to the total resistance when **resistors are connected in series**. ____

Write the formula for **calculating series resistance**.

State what happens to the total resistance when **resistors are connected in parallel**. ____

Write the formula for **calculating parallel resistance**.

Practice Problems:



To the left R1 is 25 ohms, R2 is 25 ohms, and R3 is 50 ohms. What is the total resistance?

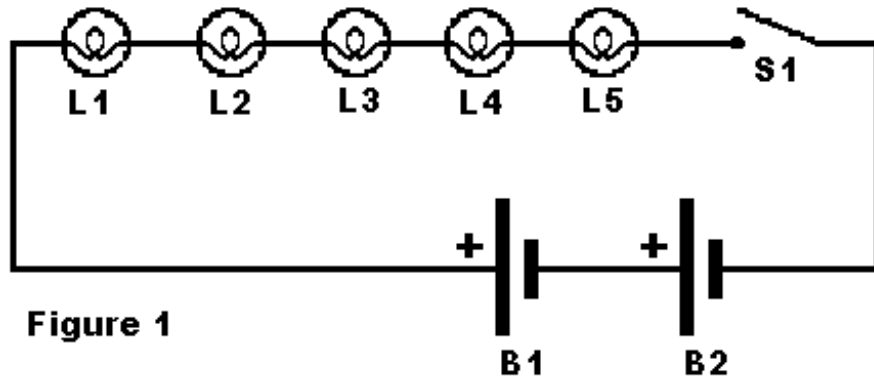


Figure 1

In the circuit above each lamp has a resistance of 4 Ω and each battery is 1.5 v.

1. What is the total voltage supplied by the batteries?
2. What is the total resistance of all the lamps?
3. Use Ohm's Law to solve for the current in the circuit.
4. Is the above circuit a series or parallel circuit?

In the circuit to the right, R1 is 50 ohms, R2 is 100 ohms and R3 is 100 ohms. Calculate the total resistance. Is the circuit a series or parallel circuit?

