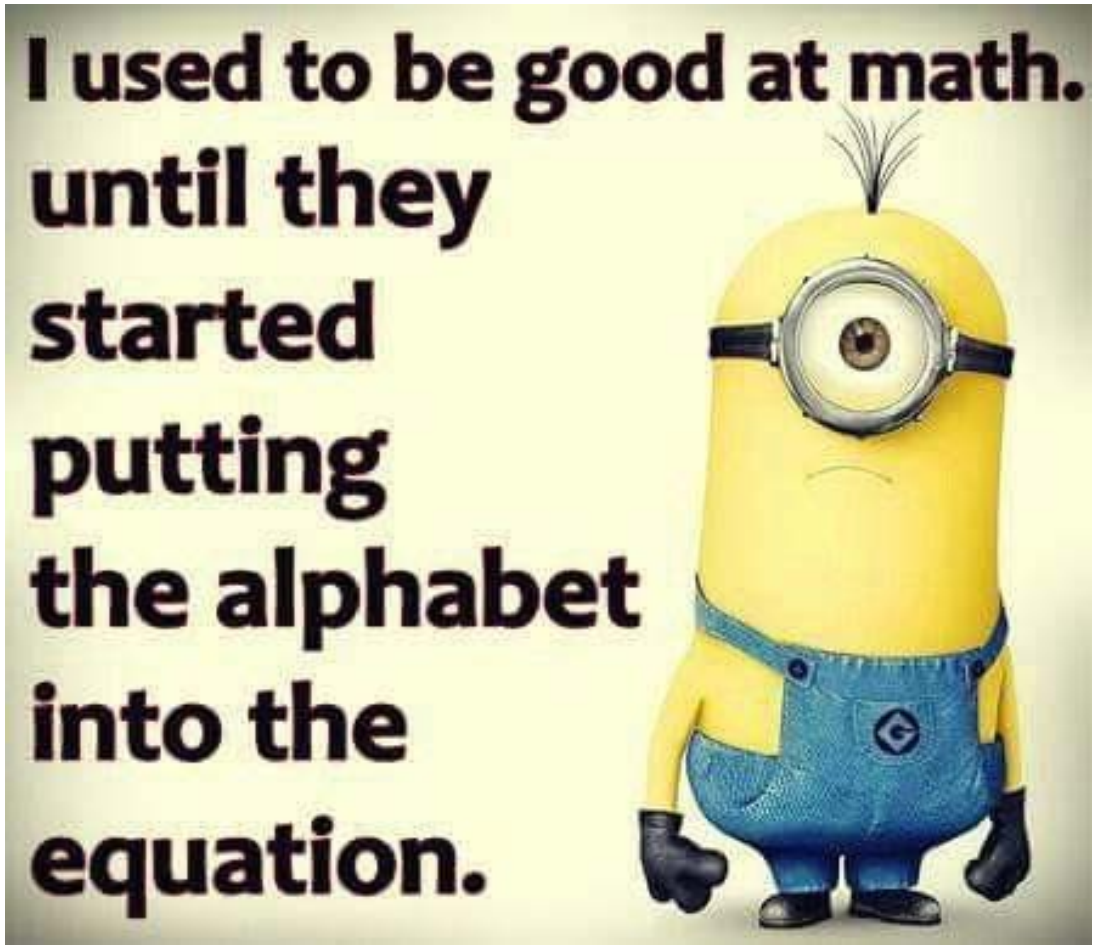
Algebra Review



Algebra Review…

In the next part of the unit, we will be solving equations relating to electricity. In order to do this, we need to be able to do a little bit of algebra...

"Solving for an Unknown"

We must be able to **REARRANGE** an equation to solve for an **UNKNOWN**. The unknown value (**LETTER**) must be by itself on one side of the equal sign and the known values (**NUMBERS**) must all be on the other.

Here are some examples....

1. $6 = 3x$

2. $5 = \frac{x}{10}$

3. $10 = \frac{50}{x}$

Algebra Review…

These are the only 3 types of problems you will see…now try some on your own:

1. $100 = 4a$

2. $48 = 6y$

3. $45 = \frac{b}{15}$

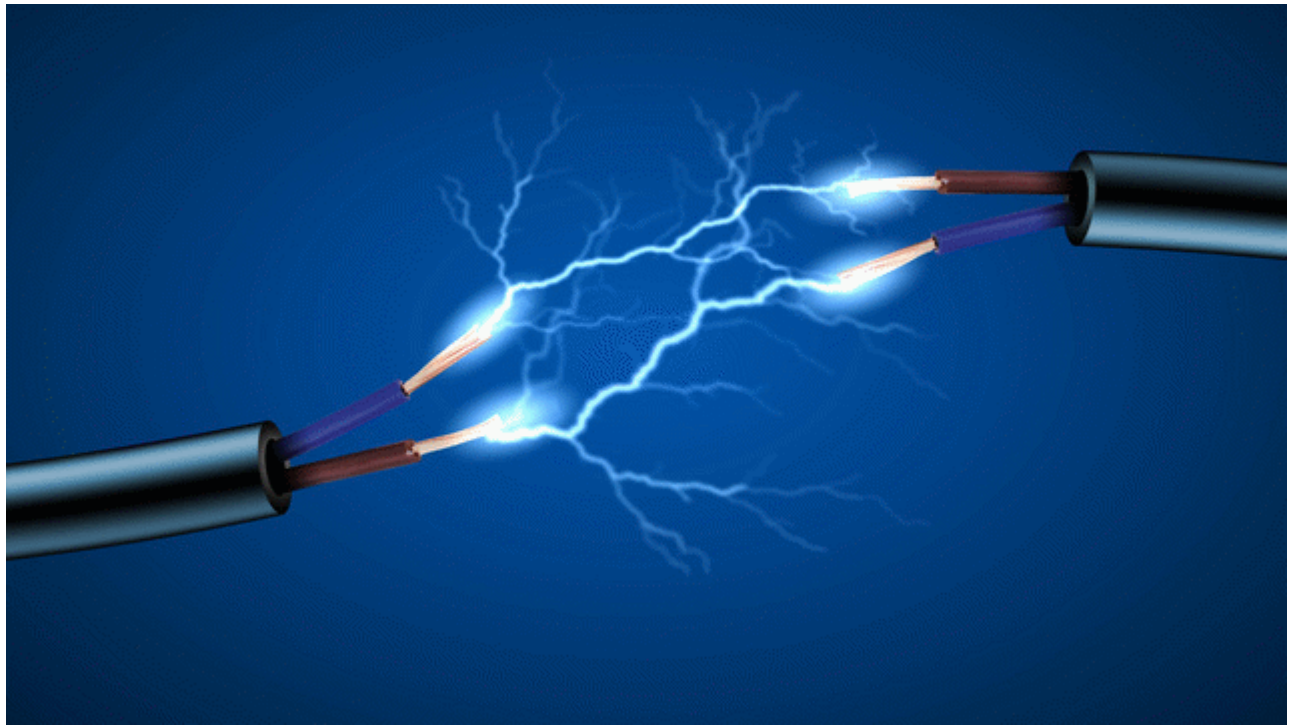
Algebra Review…

4. $2 = \frac{x}{20}$

5. $5 = \frac{20}{c}$

6. $4 = \frac{32}{x}$

Current Electricity



S1-3-09 Define electric current as charge per unit time and solve related problems. Include: I = .Q/t

Current Intro…

So far we have looked at **STATIC** electricity, but we have also seen some examples of **CURRENT** electricity in our investigations:

- **ELECTROPHORUS**
- **LIGHTNING**
- **SHOCKS**

Anytime electric charge is "**ON THE MOVE**" it can be considered **CURRENT ELECTRICITY.**

In current electricity, **ELECTRONS** are either **FLOWING**, or **ENERGY** is being carried by **ELECTRONS**.

For current electricity to occur, we must have a **CIRCUIT**

A **CIRCUIT** is a **PATHWAY** for electricity to **FLOW**. It usually forms a "**LOOP**" from a **POWER SOURCE** (battery/generator) through **WIRES** back to the **POWER SOURCE** or to the **GROUND**

Current…

Current is a word used to describe how **FAST** something is **FLOWING**. In a **RIVER**, it is how much **WATER** flows past a point in a certain amount of **TIME**

Niagra falls – Lots of Current

Assiniboine River – not much Current

Electric Current…

We know that electricity is caused by the **FLOW** of **ELECTRONS**, so we define electrical current as:

The number of charges (electrons) that pass a certain point per unit time (t).

- The **SYMBOL** for current is ***"I"***
- Unit for current in **AMPERES** ***(Symbol – "A")***

Since electrons are so **SMALL**, it is hard to measure individual electrons passing a point, so we measure **A LOT** of them at once.

We call this large amount a **COULOMB** ***(C)*** → our unit for **CHARGE** **(Q)**. It's like a really big **DOZEN:**

1 dozen = 12 electrons

1 Coulomb = 6.25×10^{18} electrons

Electric Current…

We can now say that current is how many **COULOMBS** of **ELECTRONS** flow every **SECOND**, which is represented by the following equation

$$I = \frac{Q}{t}$$

Where:

I = **CURRENT** in **AMPERES (A)**
Q = **CHARGE** in **COULOMBS (C)**
t = **TIME** in **SECONDS (S)**

A current of ***1.0 Amp*** means that exactly **1 COULOMB** of charges are moving past a **POINT** in a circuit every **SECOND**.

We can measure current using an **AMMETER**.

We put the **AMMETER** in the circuit, in **SERIES**, and it will measure the current. The circuit symbol for an ammeter is:

Electric Current…

Current at Home…

The following table shows the current usage of some household appliances:

Appliance	Current (A)
Radio	0.4
100W Lamp	0.8
Colour Television	1.7
Toaster	8.8
Microwave Oven	11.7
Electric Kettle	12.5
Electric Range (Stove)	40

Electric Current Eamples…

$$I = \frac{Q}{t}$$

1. A charge of 15 coulombs passes a point in a circuit every 5.0 seconds. What is the current at this point?

Electric Current Examples…

$$I = \frac{Q}{t}$$

2. 100 A is run through a “thingamabob” for 3 seconds, what is the charge in the “thingamabob”?

Electric Current Examples…

$$I = \frac{Q}{t}$$

3. Mary bought a tazer (rated at 20 Amps) for protection. It takes 10 C of charge to stun a person. How long must she “zap” a robber to stun him?

Try these ones…

$$I = \frac{Q}{t}$$

1. A flashlight uses 2 coulombs of charge every 10 seconds. How much current flows through the light?

2. A stove is rated for 40A of current. How much charge flows if the stove is on for 10min?

3. If 720 coulombs of charge flow through a microwave that is rated for 12 Amps, how long was the microwave on for?