Amperage, or current, is a measure of the amount of electrons moving in a circuit.

Voltage is a measure of how much force those electrons are under.

In a circuit, say a light and switch in your home, when the light is on there is a voltage across the filament of the bulb that is pushing amperage through the circuit.

When the switch is off there is voltage across the switch but there is no current flowing because it is "blocked" by the switch.

An analogy that normally helps to illustrate the difference between voltage and amperage:

You have a garden hose, the nozzle is closed. You’ve got pressure but no flow-voltage but no current (amperage). Open the nozzle and the pressure in the hose causes the water to flow - turn on the light and the voltage causes the current to flow (amperage)

Answer (in understandable terms)

Voltage is how much electricity there is.   
  
Amperage is how fast that electricity is moving (if at all).   
  
There are other things involved in electricity, electrical currents, etc., but this question is about amperage ("amps") and voltage ("volts").   
  
Likewise, if you want to fill your bucket up with water, you'll need to turn the water on, which you accomplish by twisting the handle in the other direction. This, in turn, moves the metal thing away from blocking the water, resulting in a flow (of water) into the hose. Now, you can use the hose to point the water so that it flows into the bucket. And, the more you loosen the handle on the spigot, the more water comes out at once.

This is basically the how amperage & voltage work. Like it says above, voltage is how much -- amperage is how fast.

What does change is the "rate of flow" -- aka "how fast it's flowing." Amperage can be defined as exactly that: the rate of flow (or current). You can have all the water ('voltage') in the world but if it's not flowing (because the spigot is shut off), and therefore the rate of flow ('amperage') is 'zero,' you'll NEVER fill your bucket (Try it! Put a hose in an empty bucket, and don't turn the water on -- I'll bet you'll find that the bucket stays pretty dry). :)

Ultimately, to sum up, you can think of it like this:   
Voltage is useless without amperage. If it's just 'sitting there' then it's probably not doing much of anything that would benefit you. Which is why it is equal to potential difference

Amperage 'doesn't exist' if there's no voltage. How can there be any rate of flow if there's nothing flowing in the first place?

Now (if you haven't fallen asleep already), maybe (hopefully) you can figure out / understand why & how it is that a smoke detector uses a 9-volt battery, while a car uses a 12-volt battery (not much difference), and-- well, you get the point.

There is a water source like a lake, the lake flows into a river, and there is a dam at some portion of the river and then there is at the end of the line the ocean.

The lake is the source or (Service Connection 120/240) The river is the current (amperage) the dam is the (switch), and the boulders, ravines, and sandbars are restrictions of the flow of water which is (Ohms -Resistance)the ocean is then the end of the line.

Voltage is the potential to cause current, to cause something electrical to happen. A 12 volt car battery has 12 volts of potential. Nothing happens unless that battery is connected to something, like a headlight bulb. A 120 volt household outlet has potential, but nothing happens unless you plug something into that outlet and turn it on.

Current is the flow of electrons. When you connect that battery to that headlight bulb, current flows, which causes the light to turn on.

Resistance is the ratio of the two, R = voltage divided by current. If the bulb has 4 ohms of resistance, then the current is I = E/R = 12/4 = 3 amps.

The power used by the bulb is voltage x current, in this case, 12v x 3 amps or 36 watts.