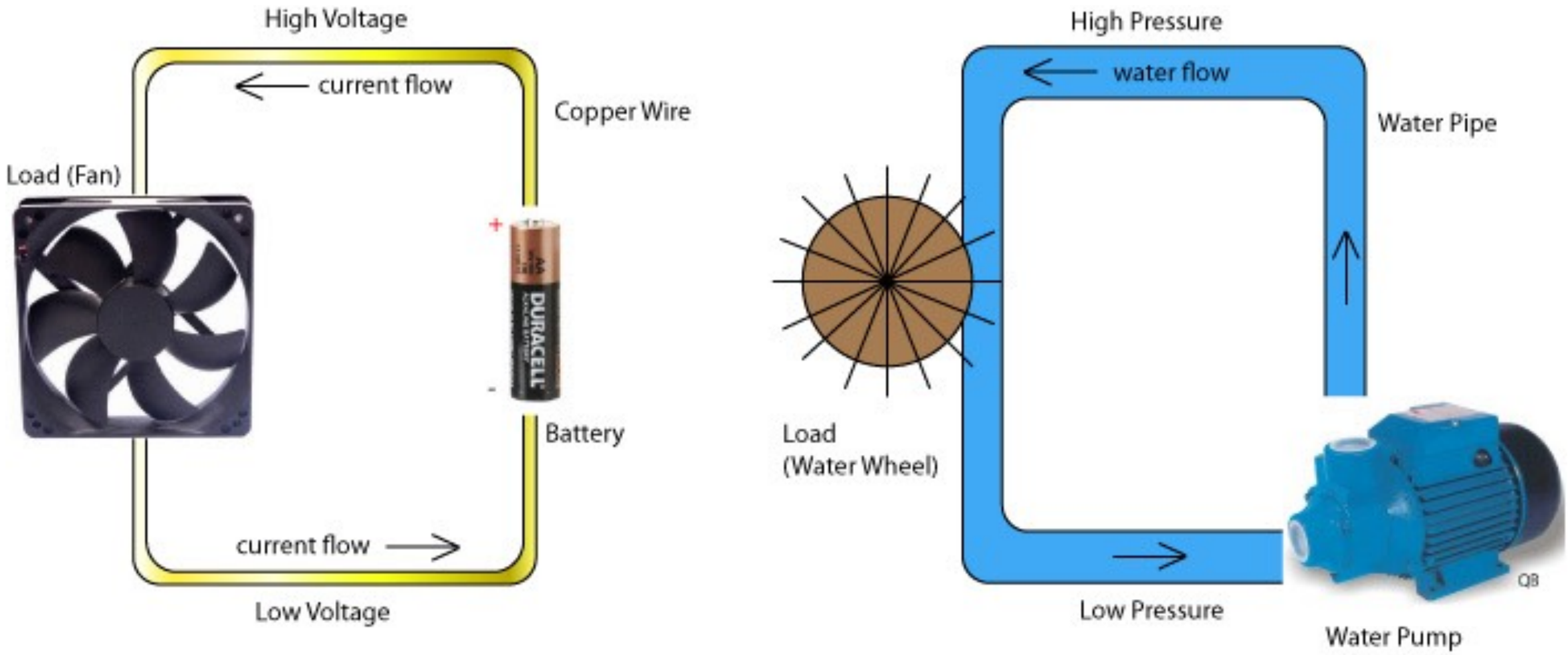
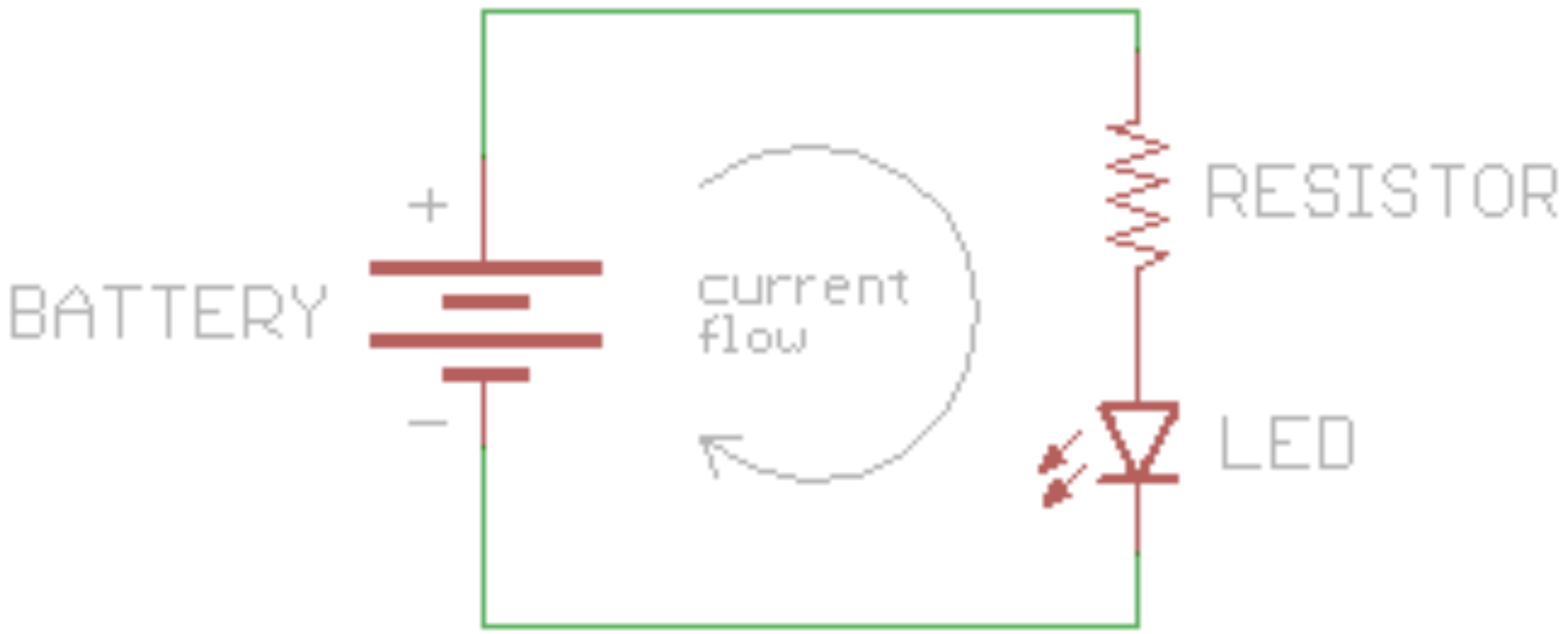
what is a circuit?



Wednesday, January 14, 15

Electrical sources are like pumps. Pumps always have two sides, an outlet that blows something out, and an inlet that sucks something in.



circuit

Wednesday, January 14, 15

The reason we want to build circuits is to make electricity do useful things for us. The way we do that is by putting things in the circuit that use the current flow to light up, make noise, run programs, etc.These things are called loads, because they “load down” the power supply, just like you’re “loaded down” when you’re carrying something

short circuit - DO NOT DO THIS

Wednesday, January 14, 15

short circuit !!!!Don't do this!!! Read the tutorial on I=VR for more info DON'T DO THIS, but if you connect a wire directly from the positive to the negative side of a power supply, you'll create what is called a short circuit. This is a very bad idea. Side bar to talk bout this

Wednesday, January 14, 15

This is a common mnemonic to help remember the equation. From the triangle it suggests that I = V/R, R= V/I, and V=I*R

math time! let's figure out what the Amperage is on a short circuit on a 9volt battery

assume we have a fresh 9 volt and electrical wire has close to zero resistance... call it .01 Ω

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Now, it turns out that most batteries will only hold around 2 or 3 amps. This means the battery will drain almost immediately, which is not good. To use the water analogy, a very low resistance wire is like a really big pipe. In fact, in this case, the pipe is almost the same diameter as the tank. If you allow the water to flow, it will empty the tank all at once.

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$$I = V / R$$

$$? = 9 / .01$$

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There is some additional danger involve here. It turns out that when electrons flow through a wire, they encounter some friction as they pass through the wire. Normally, this isn't a problem. However, if too many electrons flow through a wire, then the wire will become very very hot, and could melt. You have seen this if you have ever looked at a normal light bulb. The way an light bulb works is by allowing a lot of current to flow through a very small wire. The wire turns white hot and would like to burn away. However, since light bulbs have no air in them, the wire cannot burn, so it is stuck being very very hot.

So, as a rule, you should never allow electricity to flow from one end of the battery to the other without using some sort of resistance. If this occurs, its called a short circuit, and will usually start to burn or at least smoke badly. Perhaps you have heard the term electrical short or shorted out when referring to a badly damaged electronic gadget. It isn't a good situation.

Now, armed with that information, lets look at our first circuit again, this time looking at resistance.

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900 Amps!!

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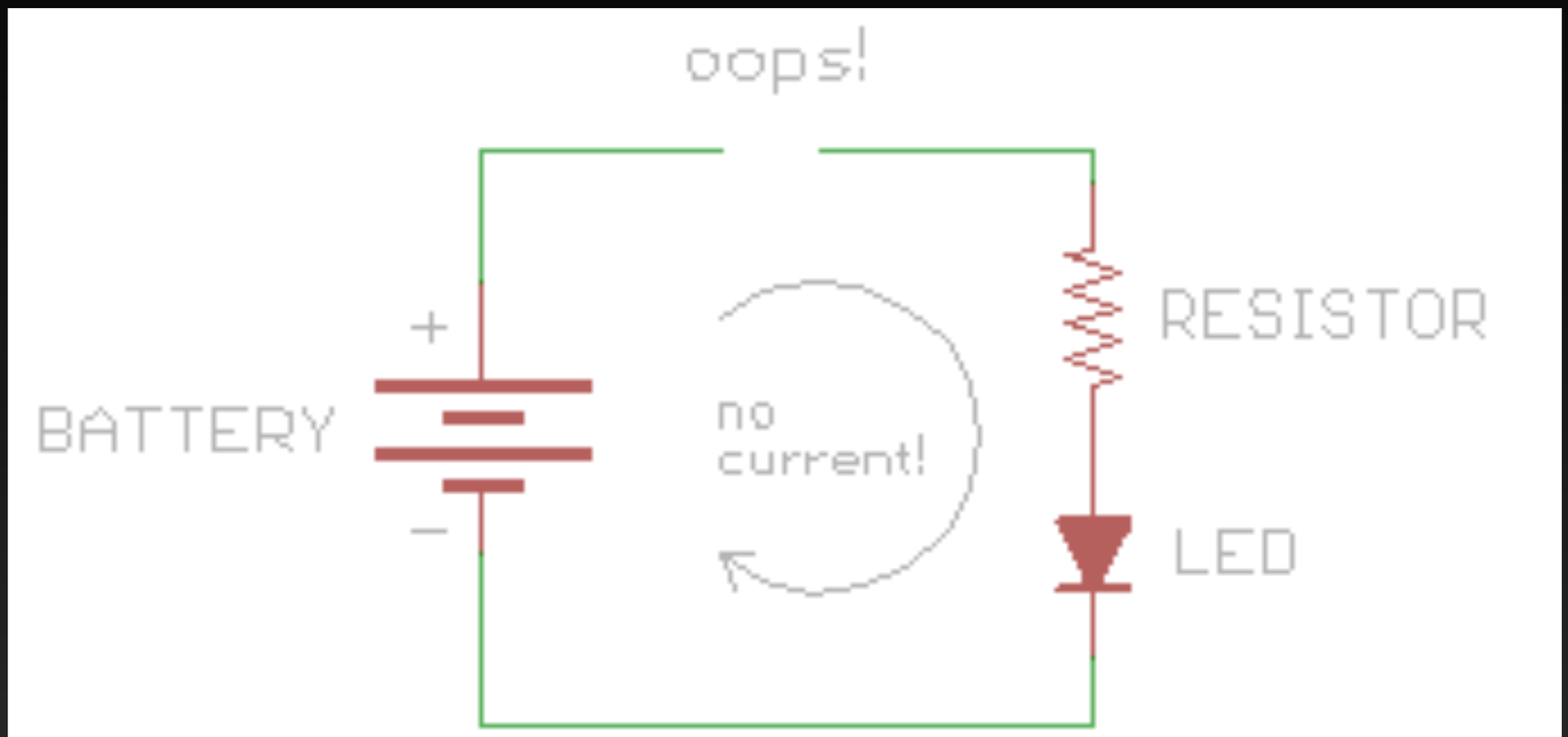

Open Circuit

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The opposite of a short circuit is an open circuit. This is a circuit where the loop isn’t fully connected (not continuous) so this ain't gonna work. You have essentially cut the power. This can be done on purpose after all this is what a switch does, cutting the line on or off to power the load...

recap

- circuit - usually refers to the setup of a continuous path for electricity and current
- an OPEN CIRCUIT has a break in the path
- SHORT CIRCUITS are when power connects directly to ground. This is very dangerous, don't do this!