Basics of Electronics

Electronics Circuit

Terminology
Components
Basic Circuit with Arduino

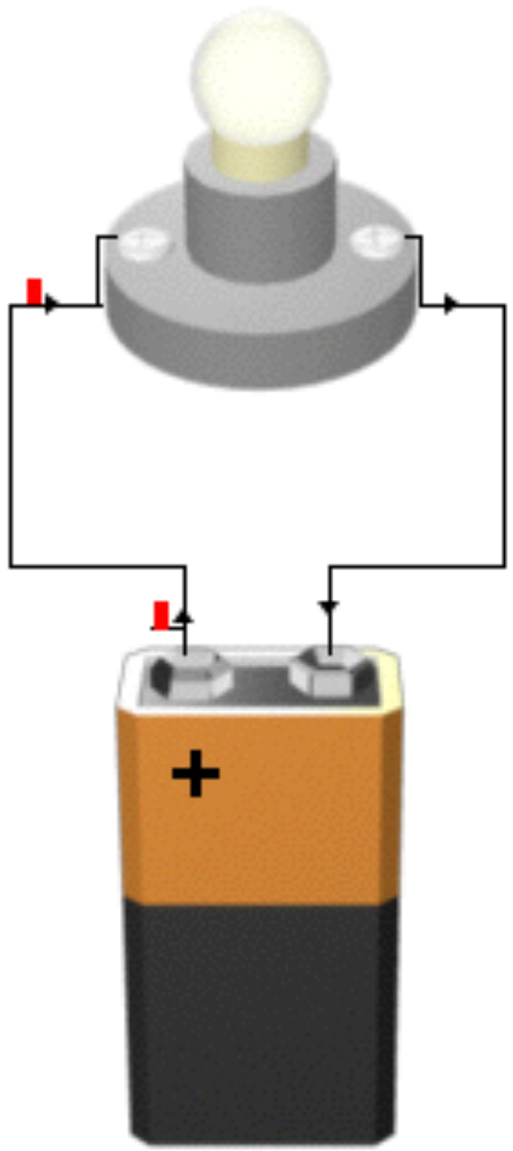
Electronic Circuit

- Electronic components, connected by wire through which electric current can flow

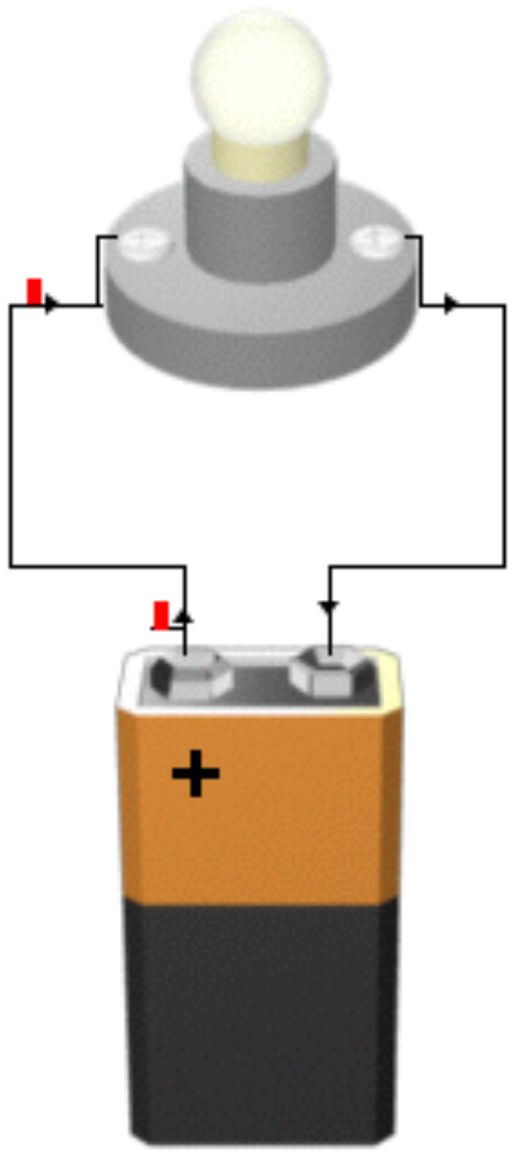
- Needs three components: source, connection, consumer

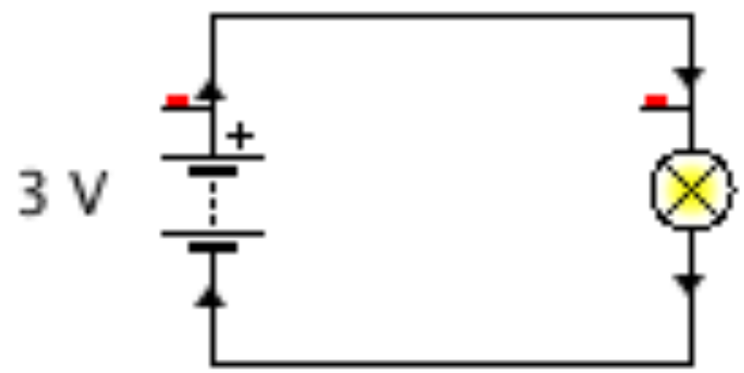
- Specific laws, symbols and terminology

Simple Circuit

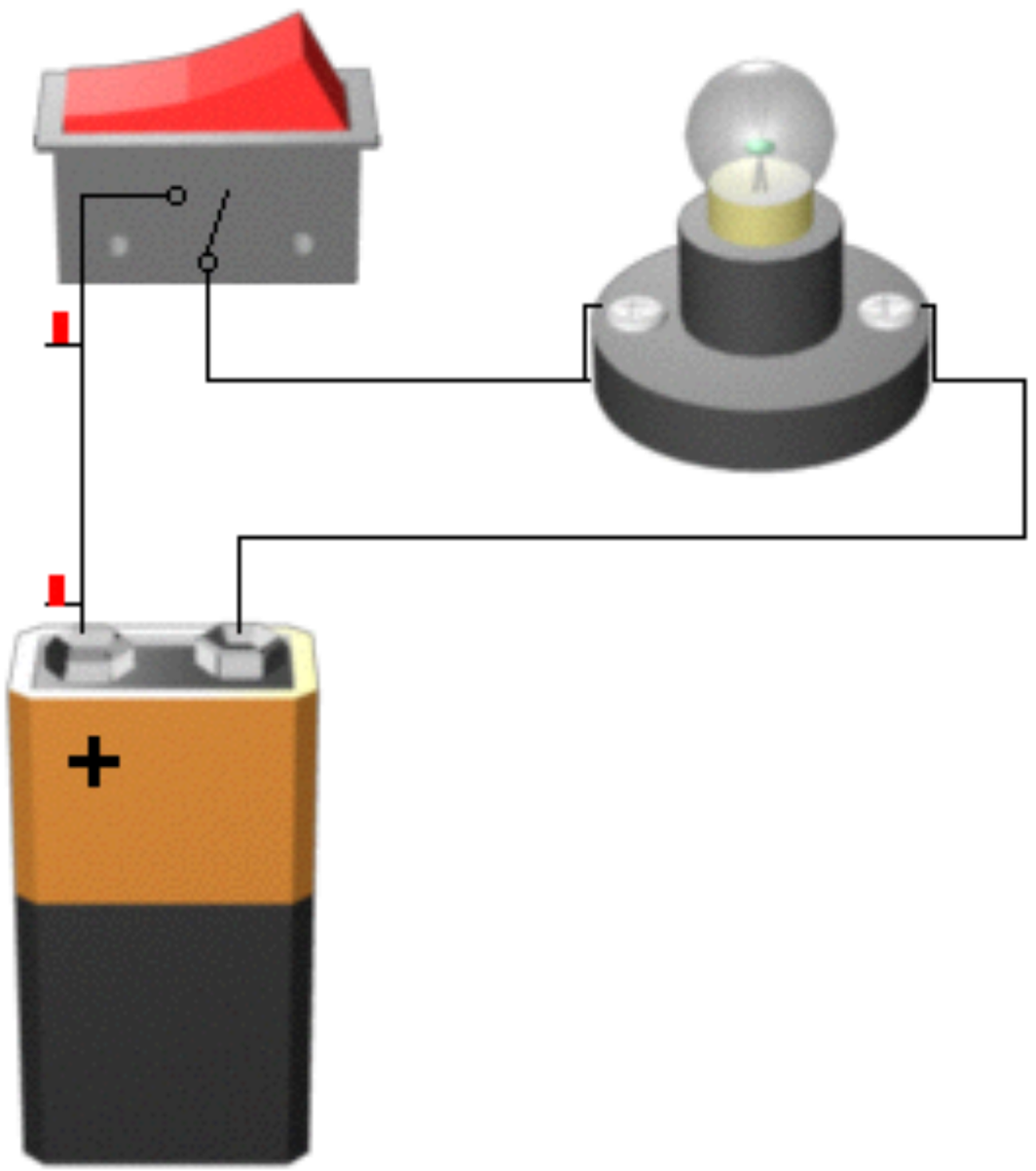


Simple Circuit

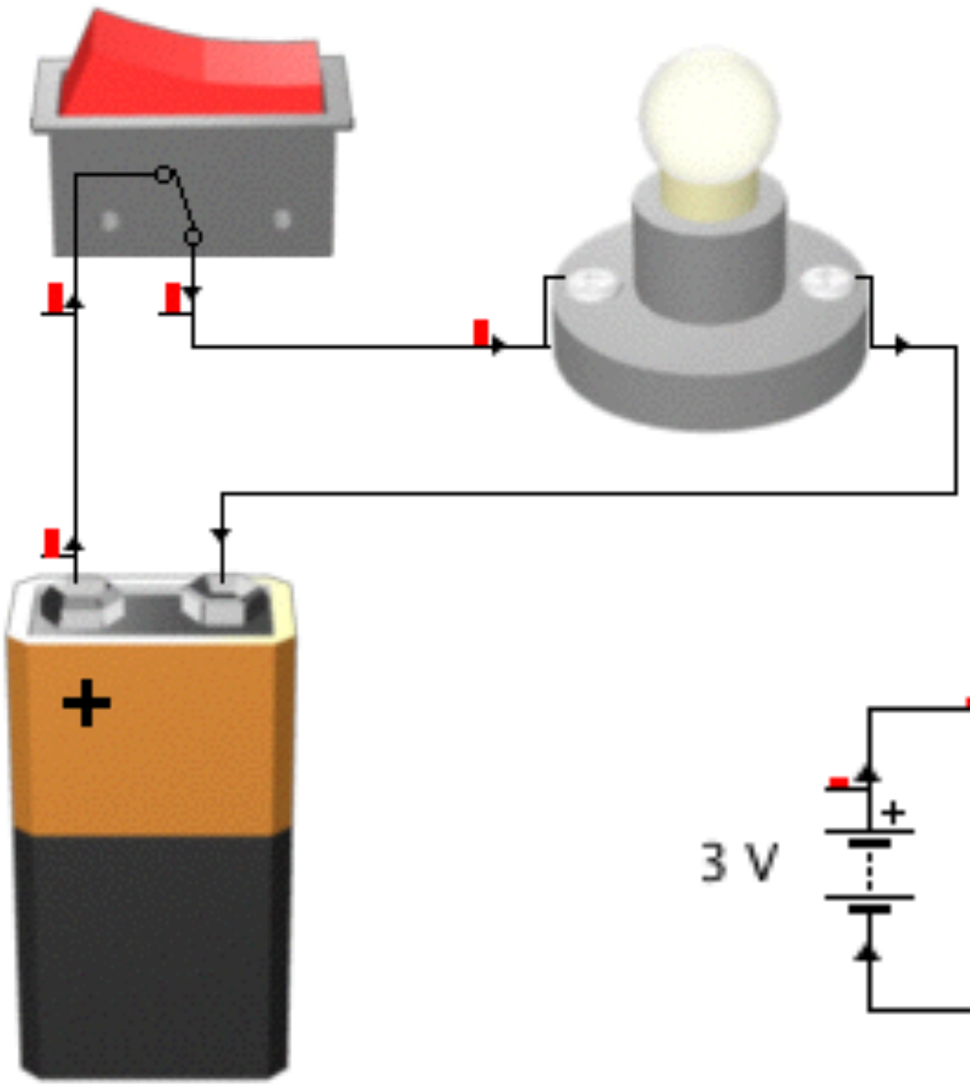


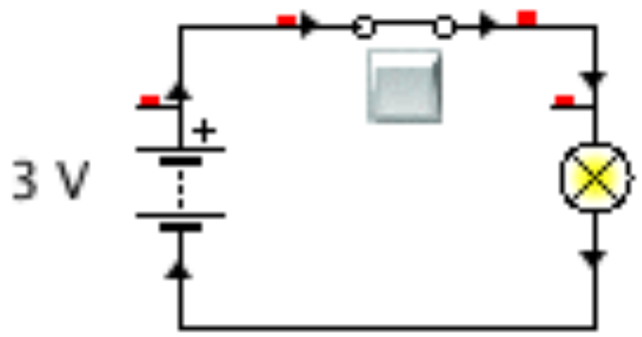


Simple Circuit 2

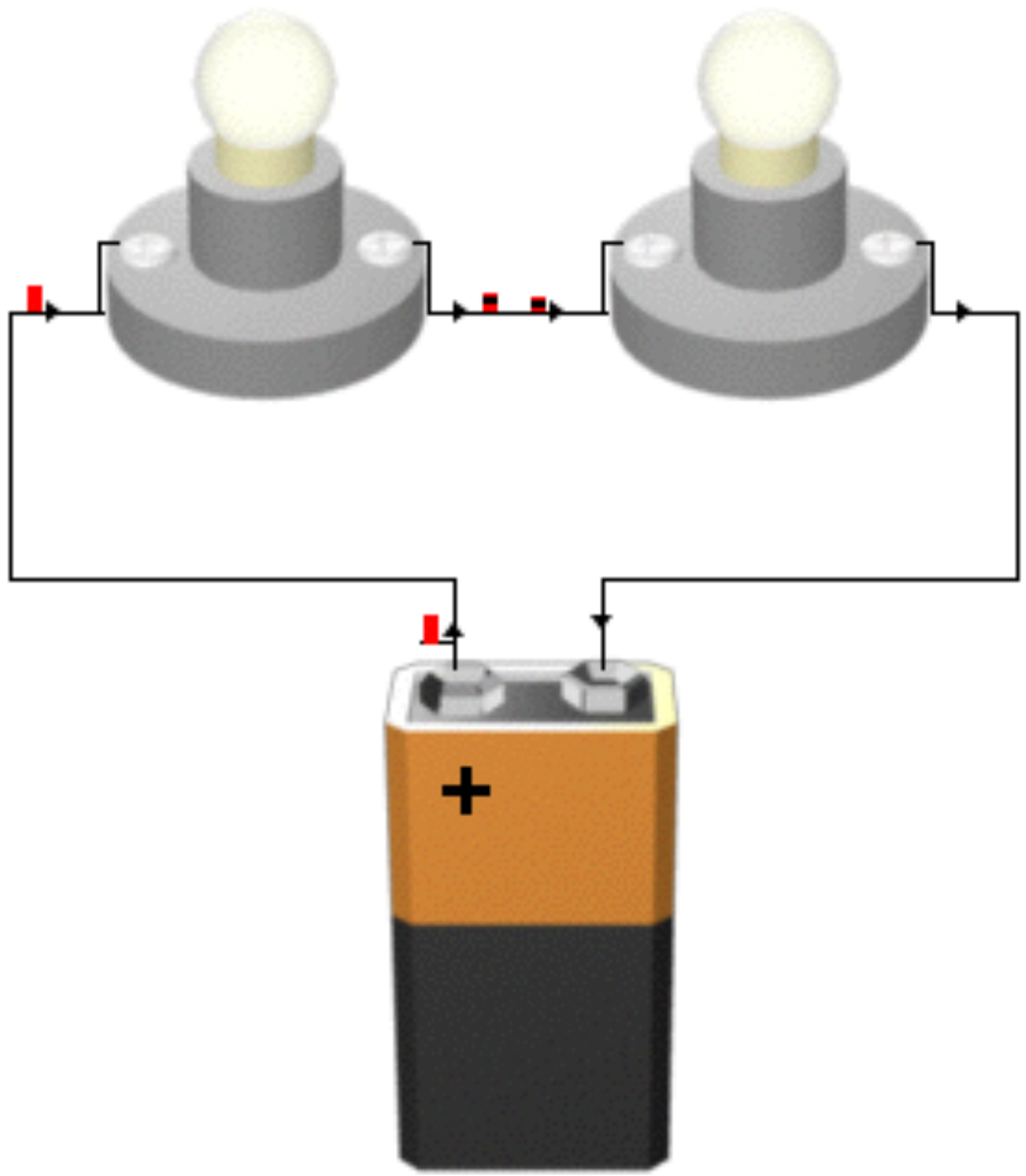


Simple Circuit 2

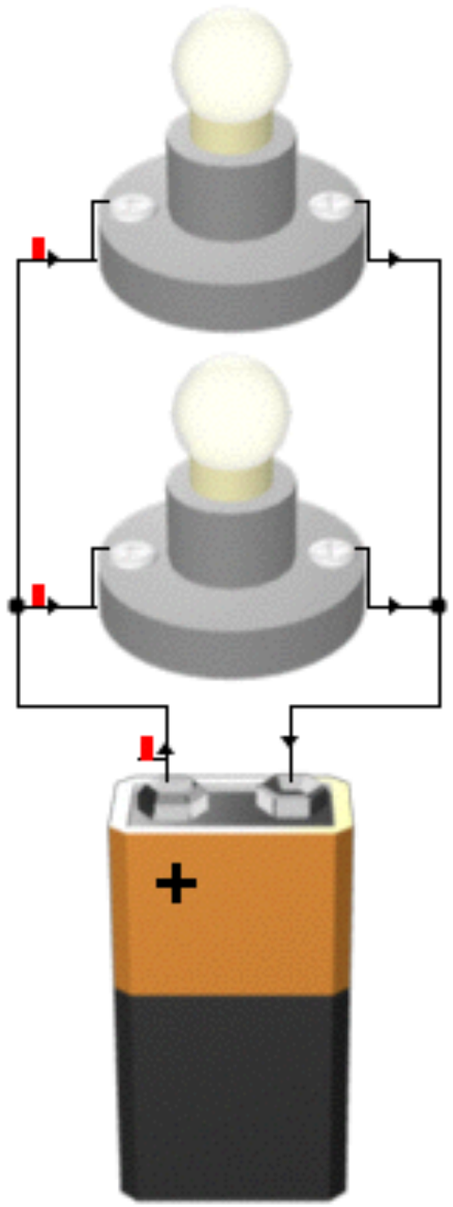




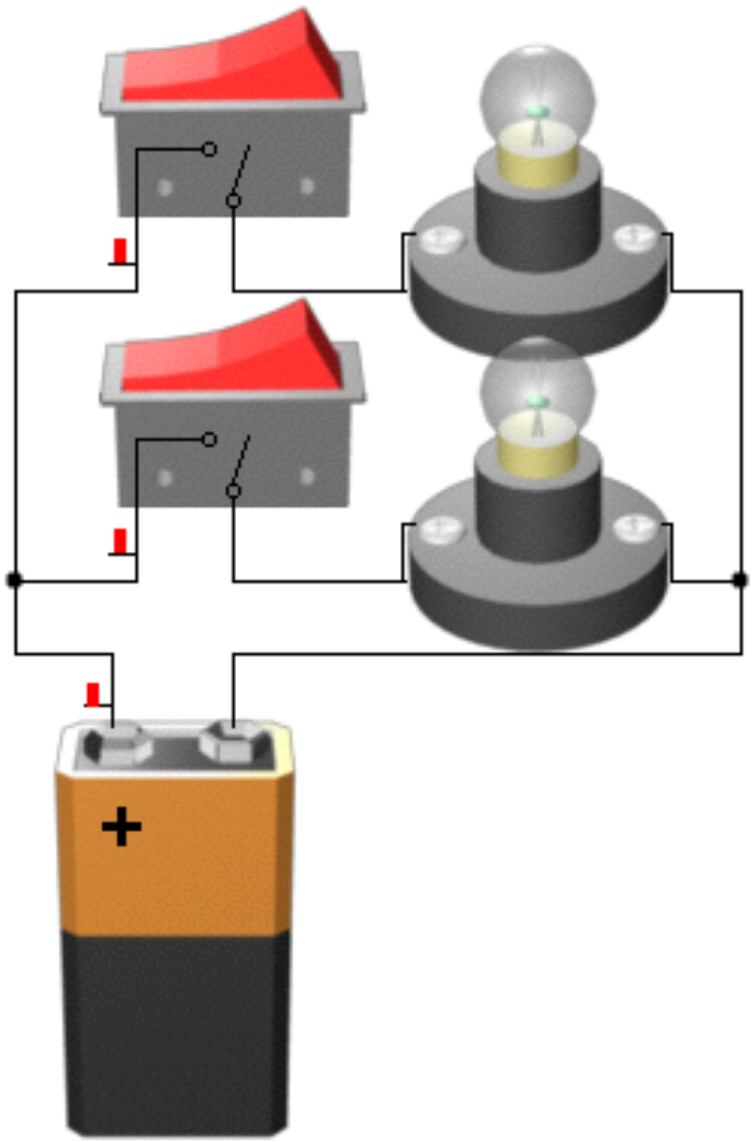
Series Circuit



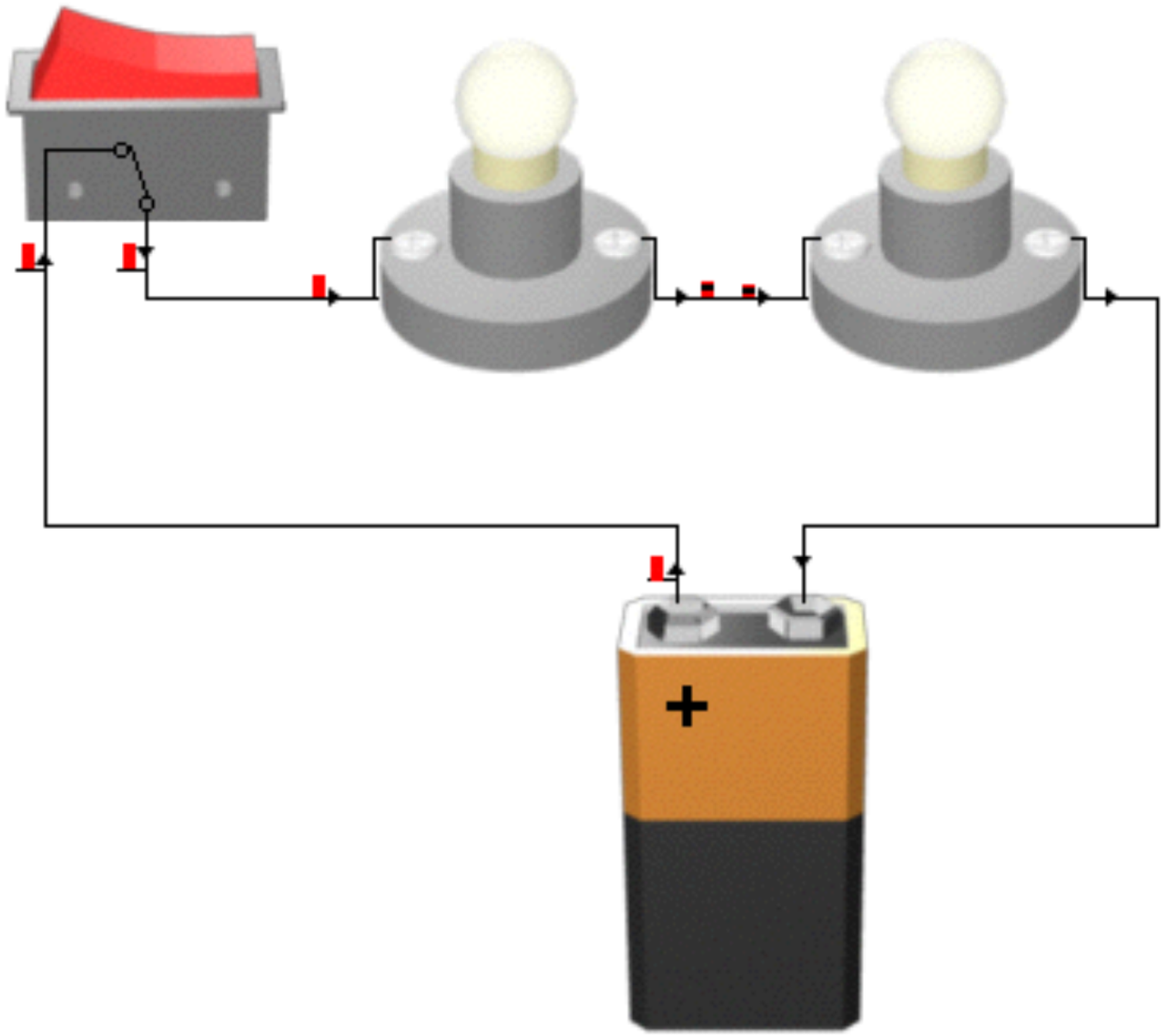
Parallel Circuit

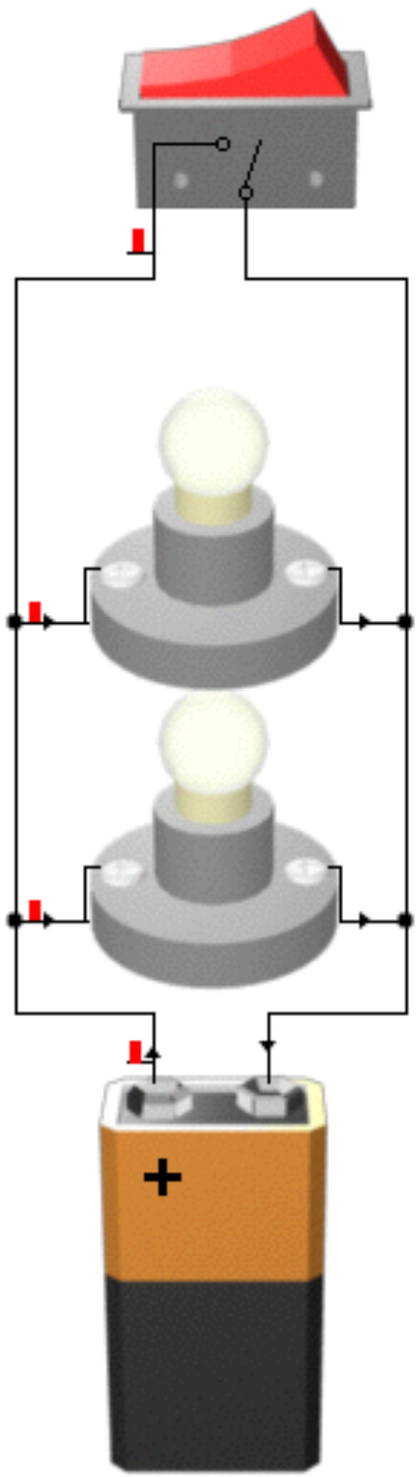


Circuits

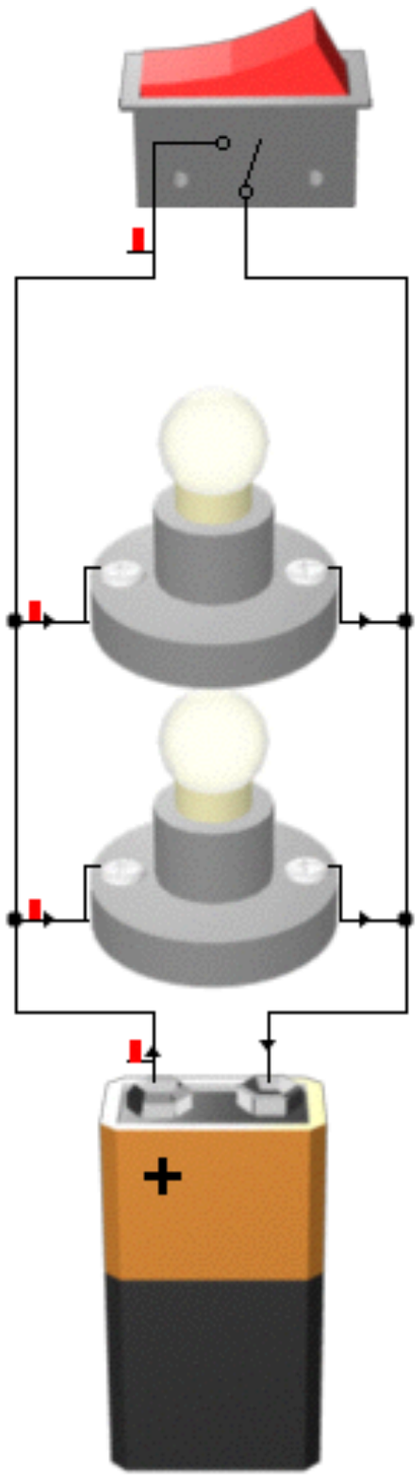


Circuits





Circuits



Circuits

Never create something like this!

short circuit

-> electronic circuit with no consumer

Ohm's Law

$$U = R * I$$

U = Voltage in Volt, R = Resistance in Ω, I = Current in Ampere

Ohm's Law

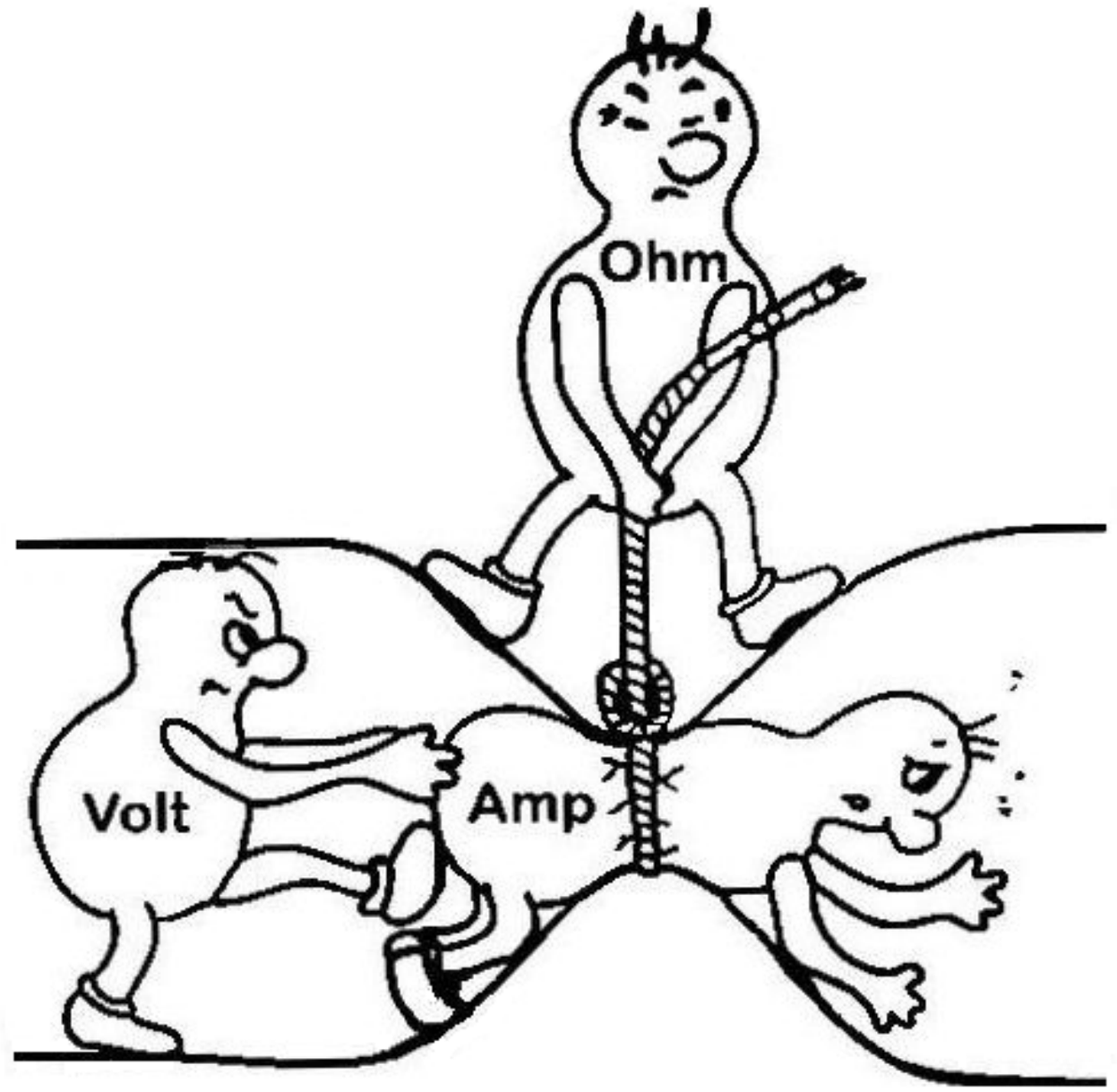
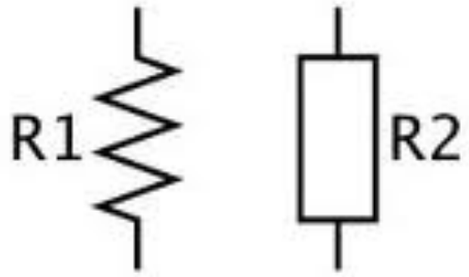
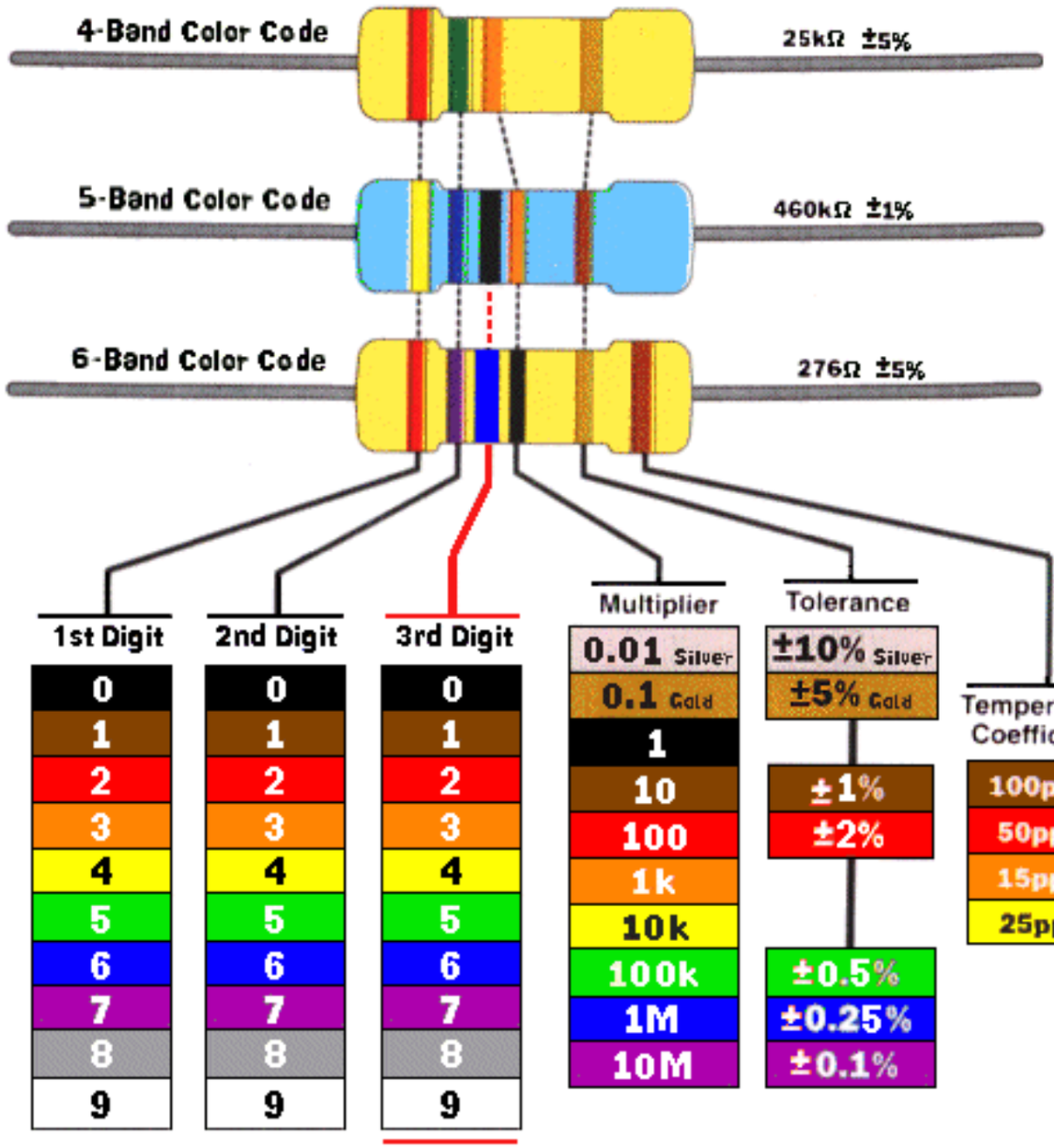


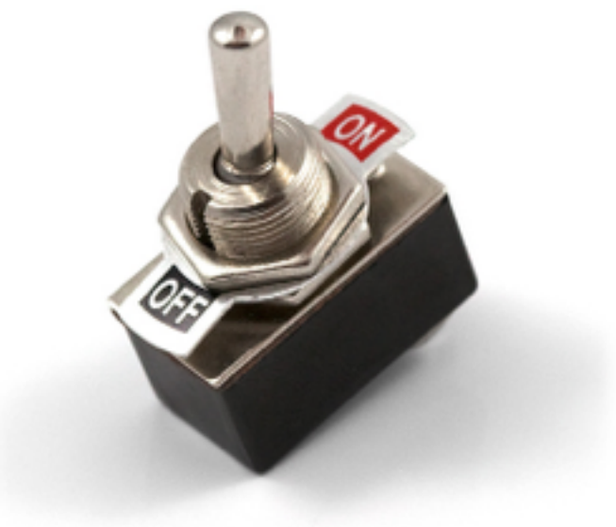
image source: http://www.sengpielaudio.com/Rechner-ohmschesgesetz.htm

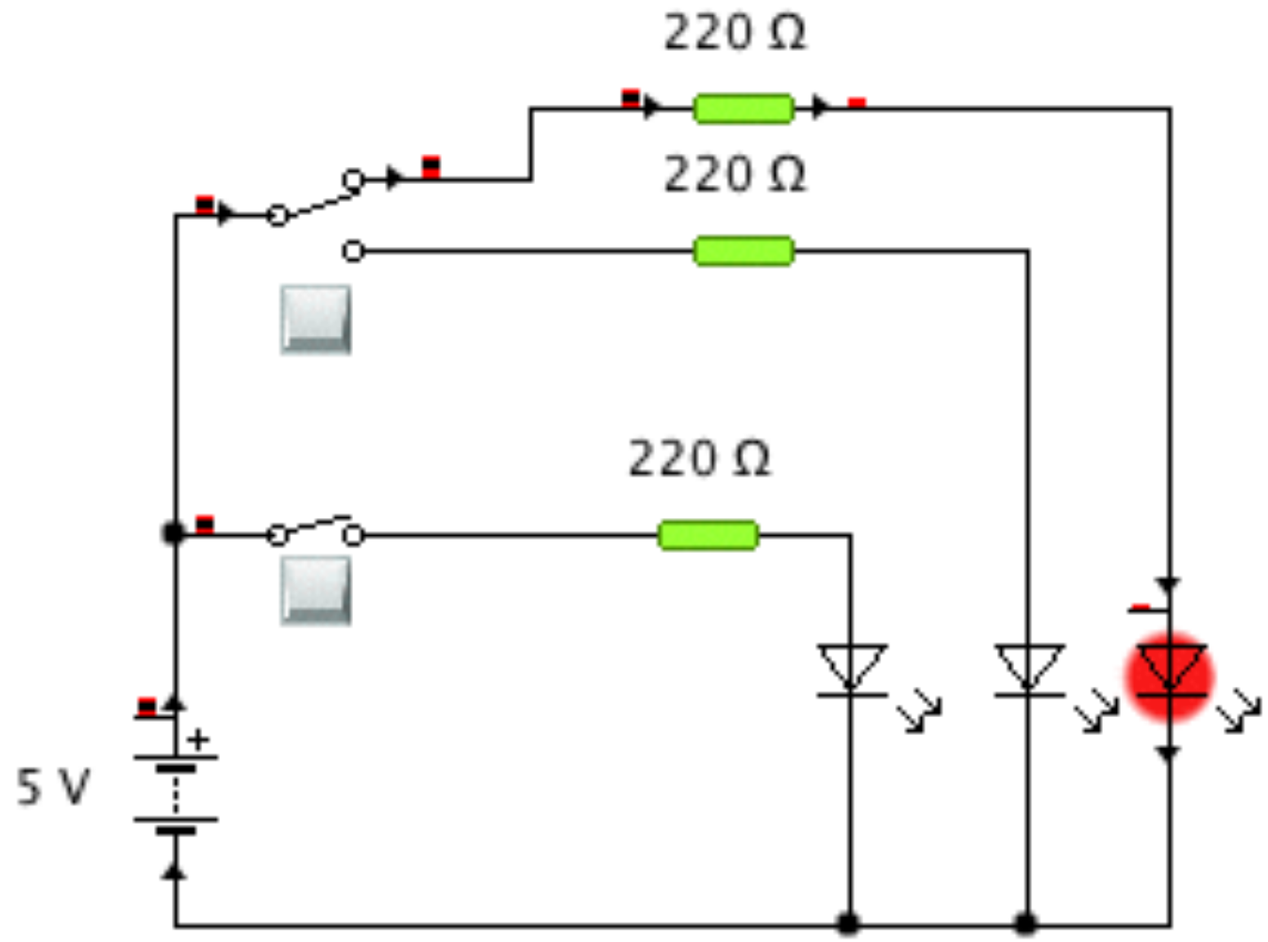
Components - Resistor





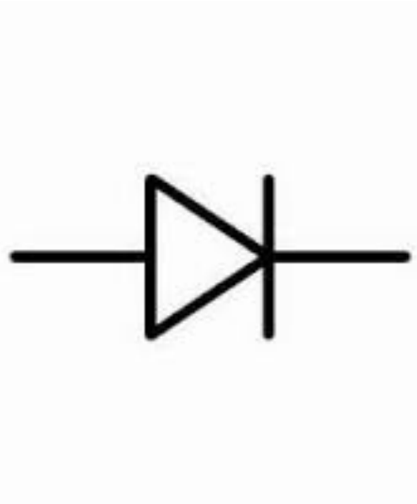
Components - Buttons

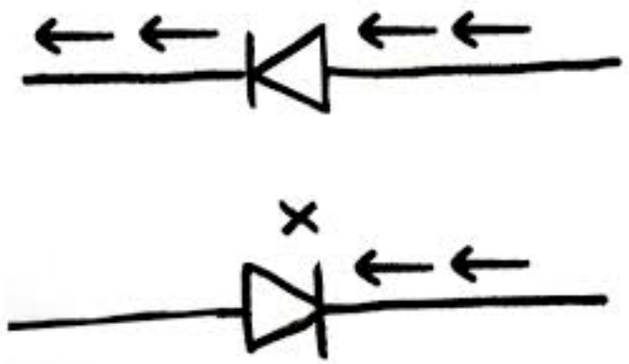


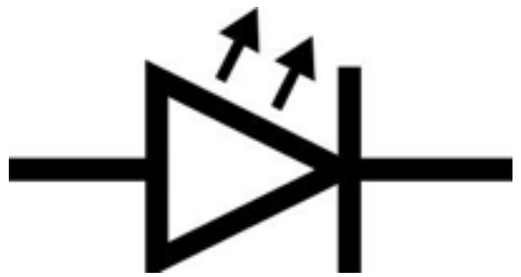


Components - Diodes

- allows current to pass in one direction only
- often used to decouple the effect of one component from another
- special case: LED = light emitting diode

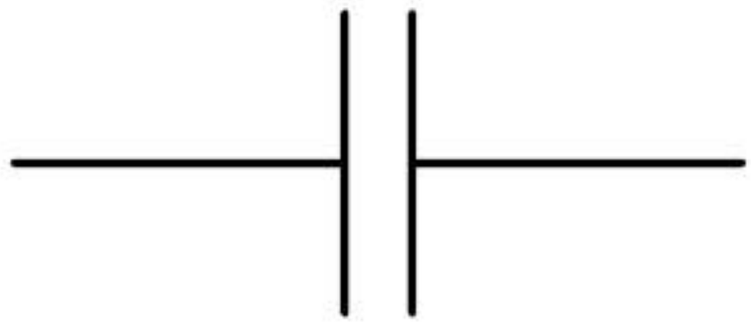






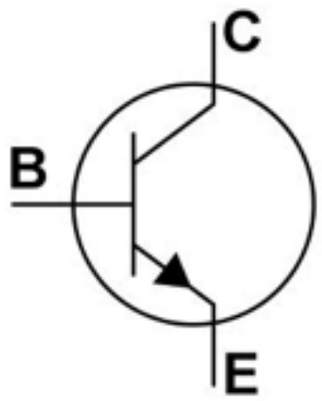
Components - Capacitor

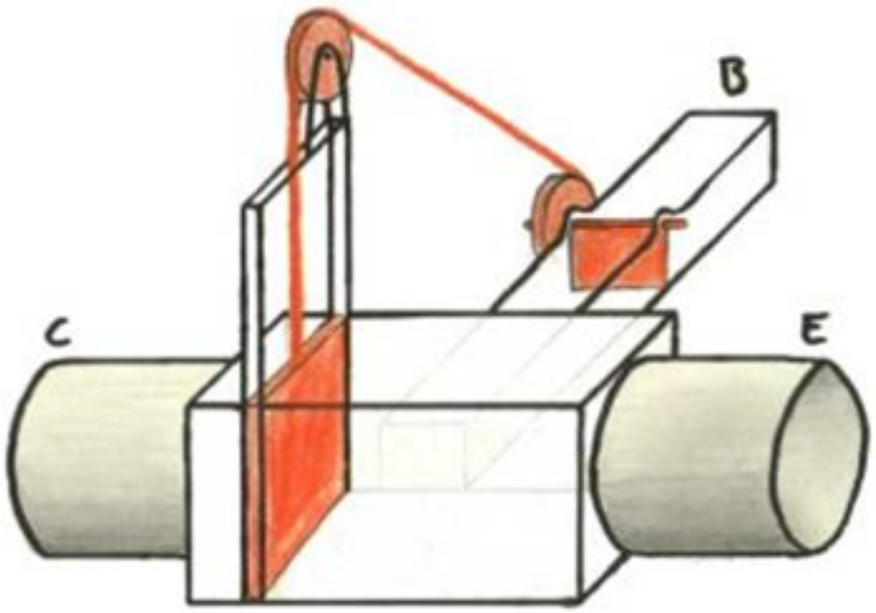
simplification: capacitors are like batteries
work in completely different ways, but both can store electrical energy



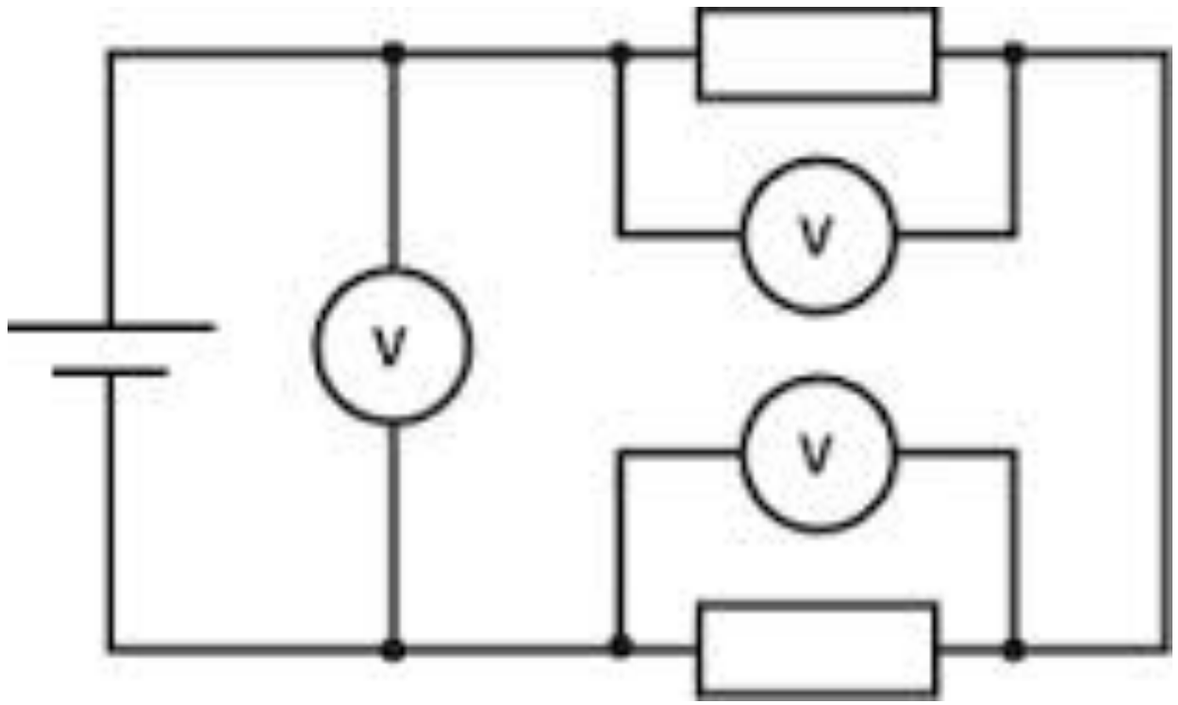
Components - Transistor

simplification: electronic version of a switch

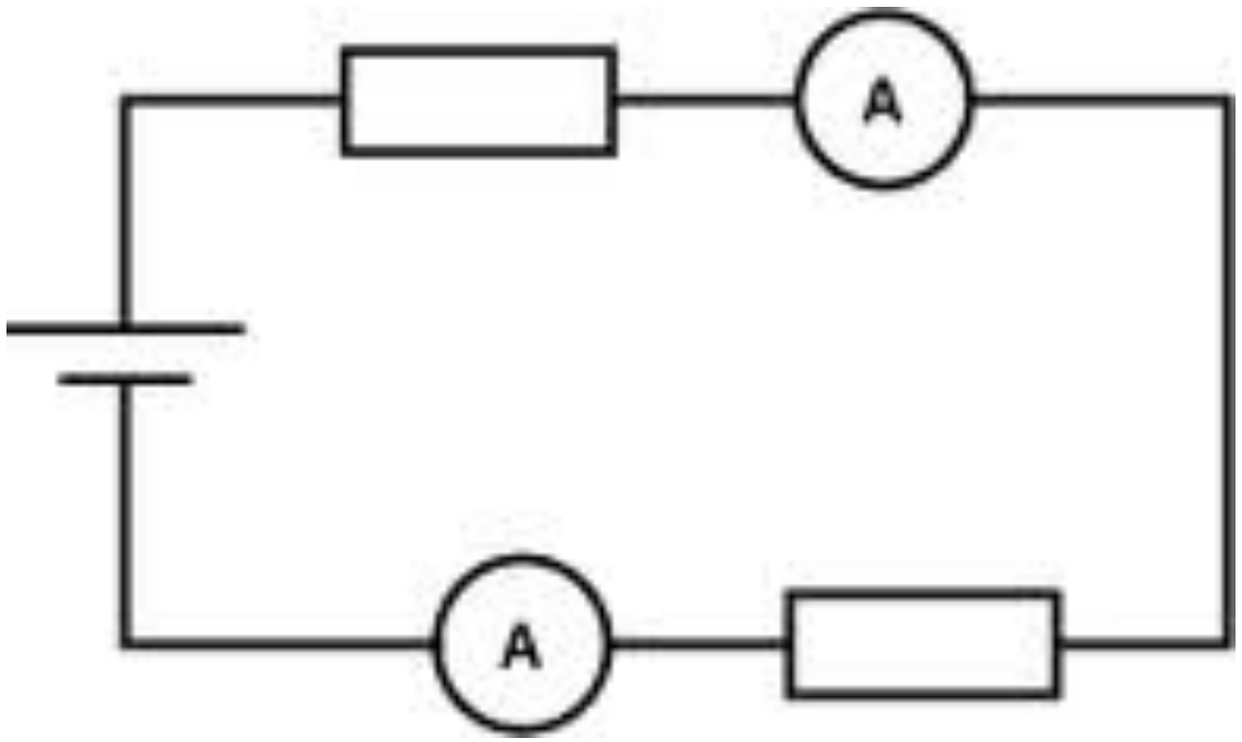




Measure Voltage



Measuring Current



Arduino Circuit