PHOENIX PERRY

@PHOENIXPERRY


DOZEN EYES
PS VITA

the
CODE LIBERATION FOUNDATION

NYCRESISTOR

“The present is theirs; the future, for which I really worked, is mine.”

Nikola Tesla

WHO IS **TESLA?**

RADICAL

OPENNESS

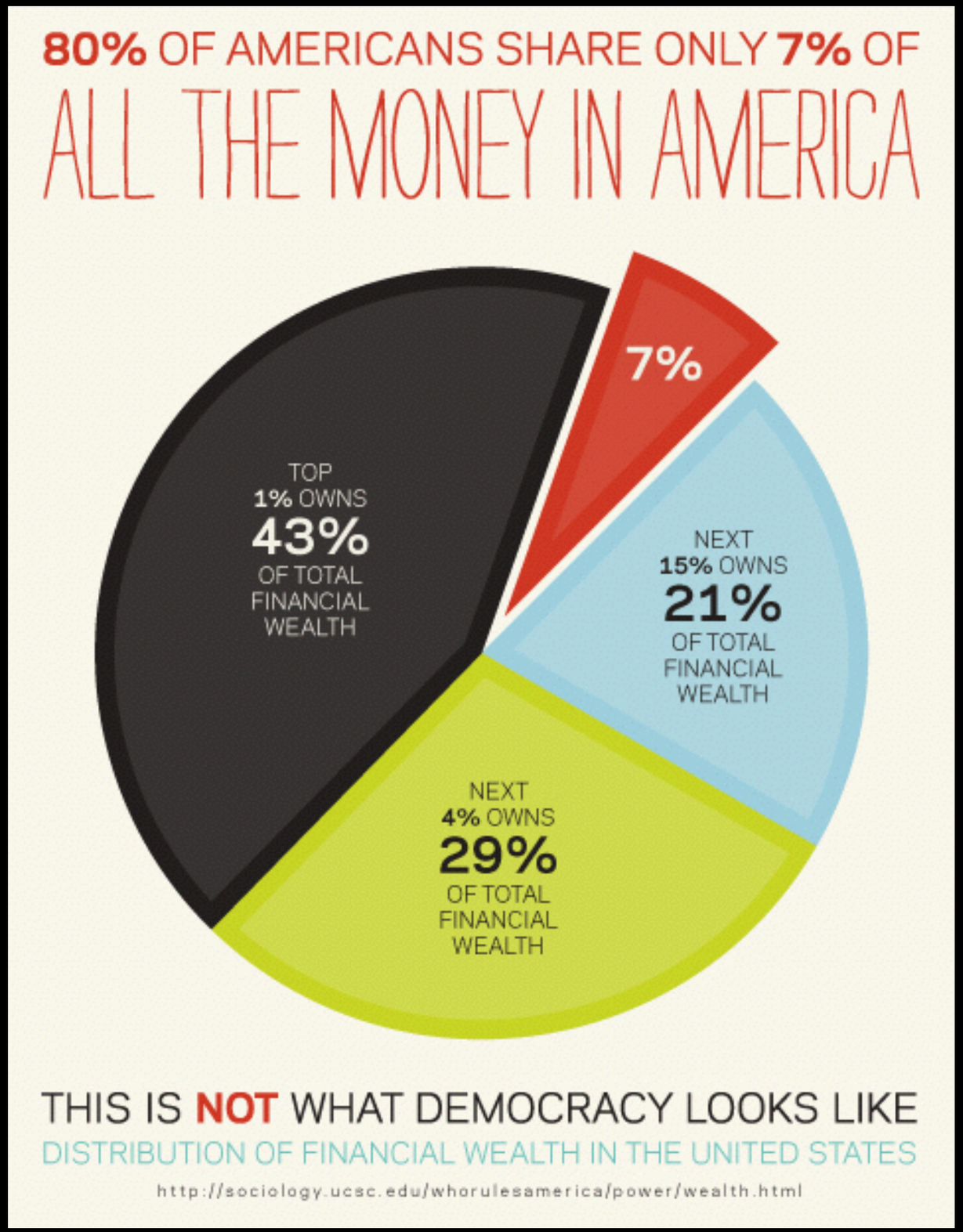
TRANSMUTATION

open source software

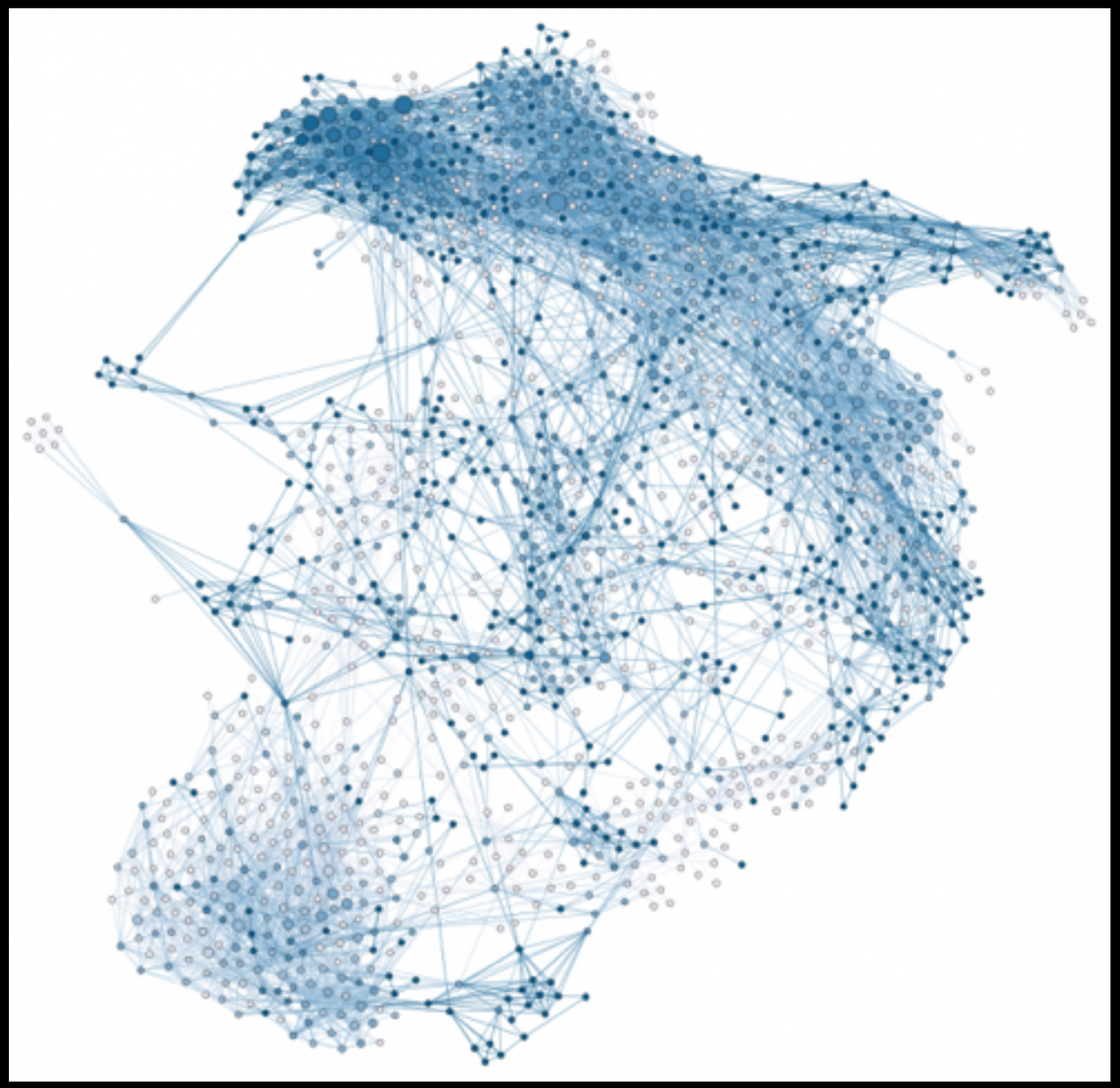
Open-source software (OSS) is computer software with its source code made available with a license in which the copyright holder provides the rights to study, change, and distribute the software to anyone and for any purpose.

open source hardware

Open-source hardware (OSH) consists of physical artifacts of technology designed and offered by the open design movement. Both free and open-source software (FOSS) as well as open-source hardware is created by this open-source culture movement and applies a like concept to a variety of components. It is sometimes, thus, referred to as FOSH (free and open source hardware). The term usually means that information about the hardware is easily discerned so that others can make it - coupling it closely to the maker movement.[1]

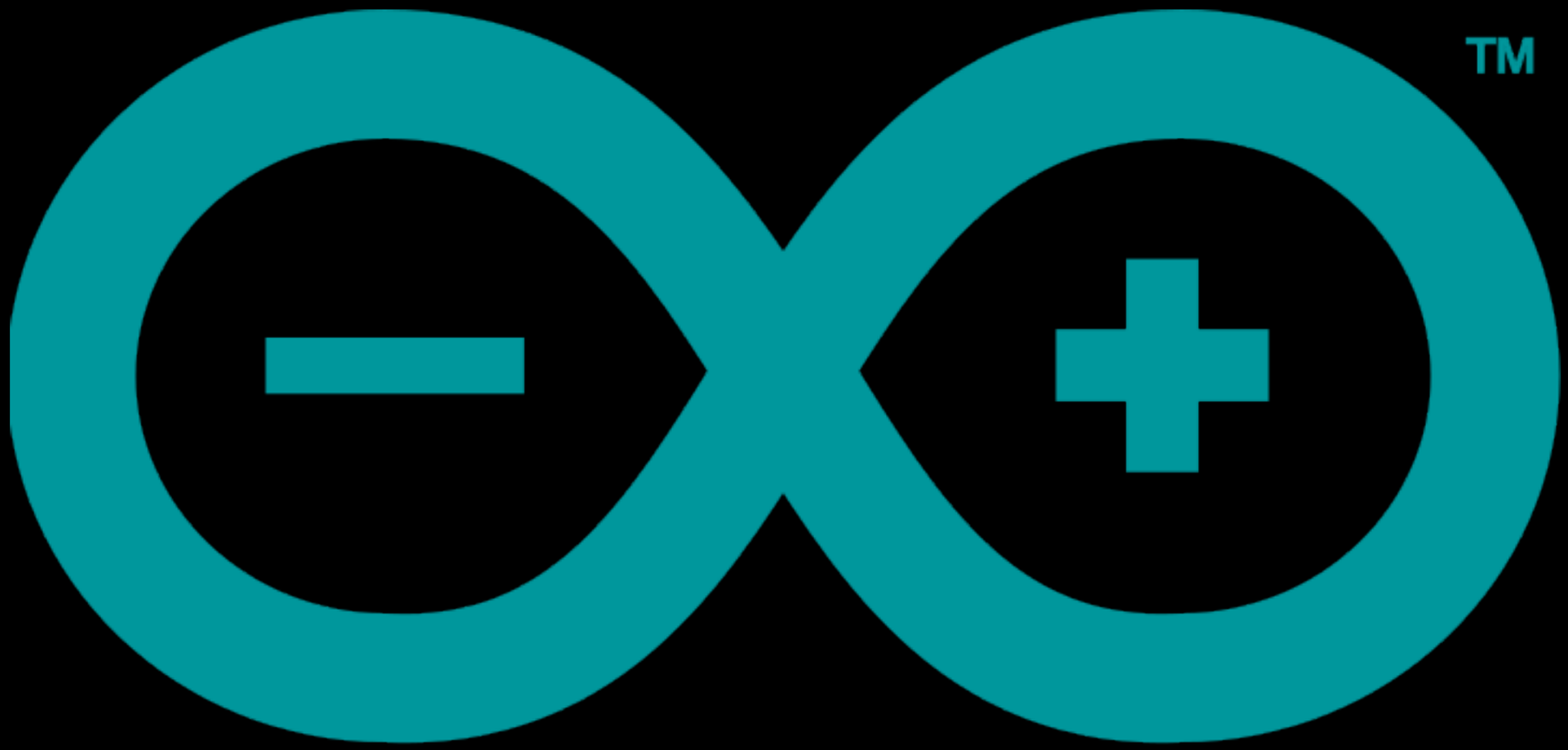


THE SHAPE OF POWER



THE SHAPE OF COMMUNITY

WHY CARE?


TM
ARDUINO


Processing

TOGETHER WE

KNOW MORE

Anyone can create

Create interesting interventions

Remind people of our interconnectivity

Empower others

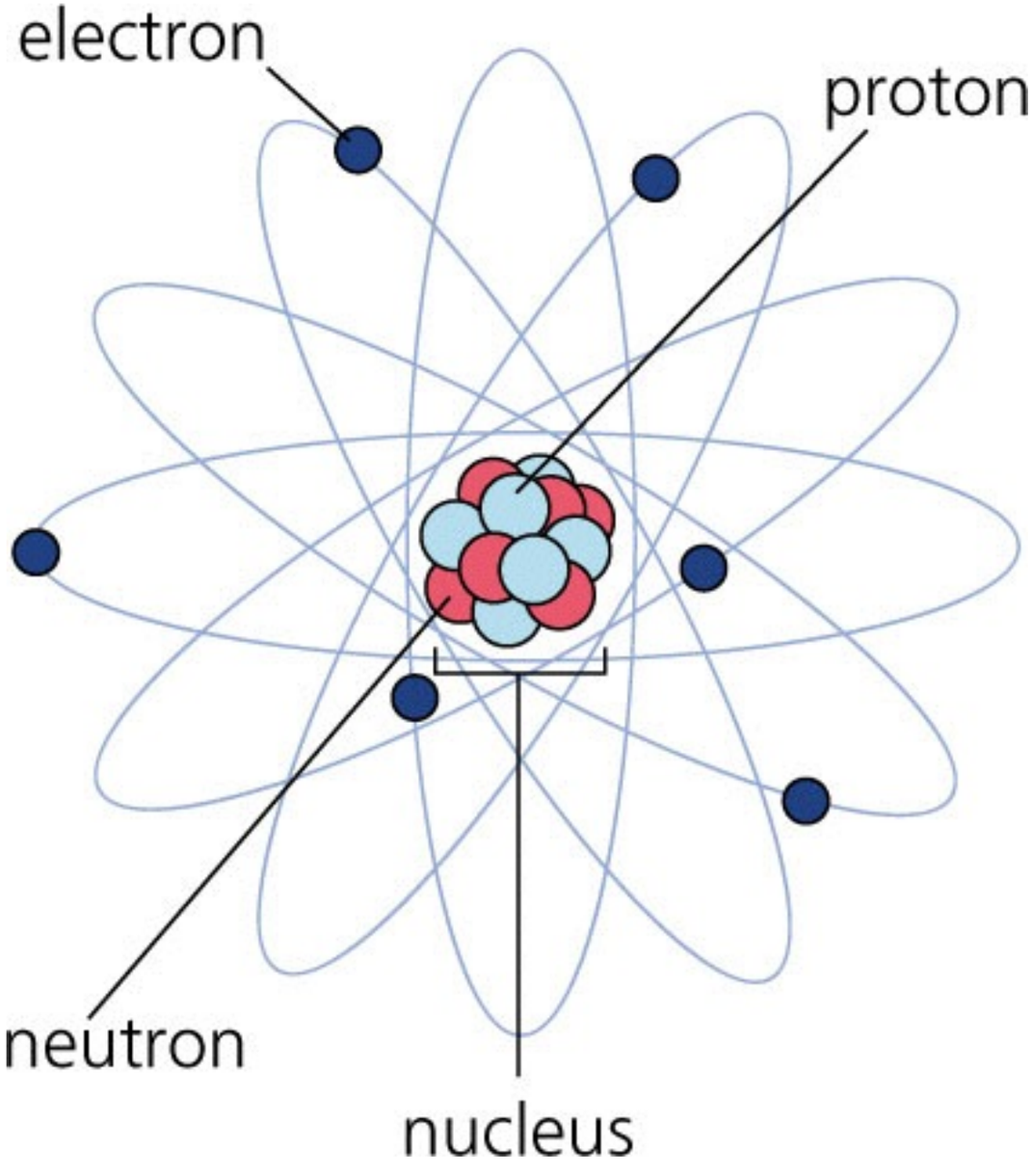
HAVE FUN

Great resources

GIVE BACK

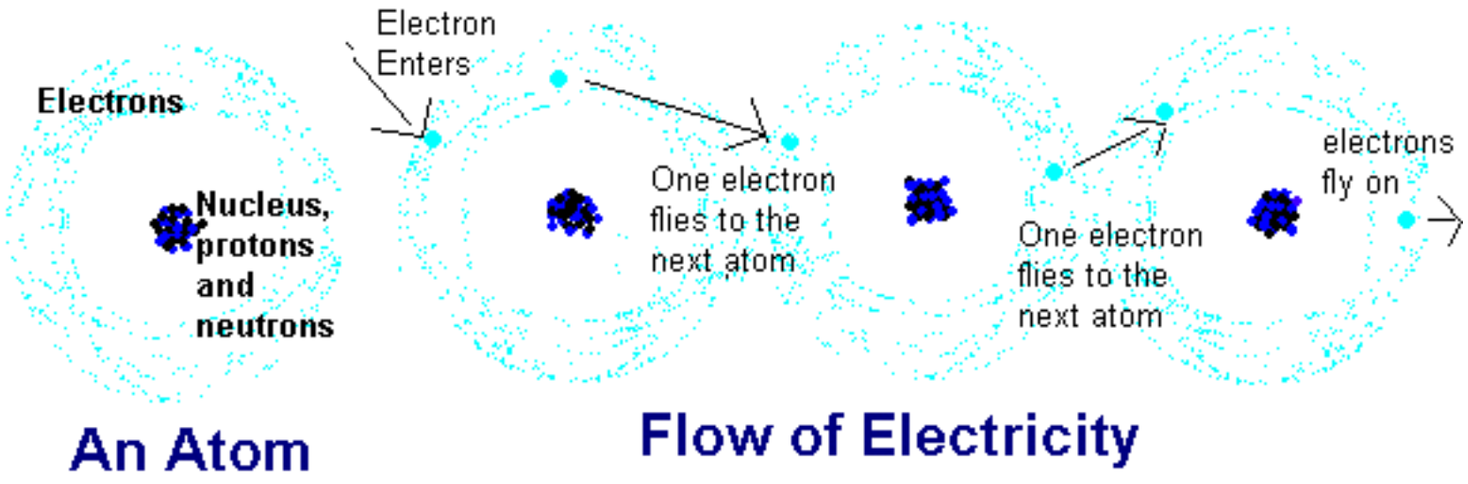
FAILURE IS **LEARNING**

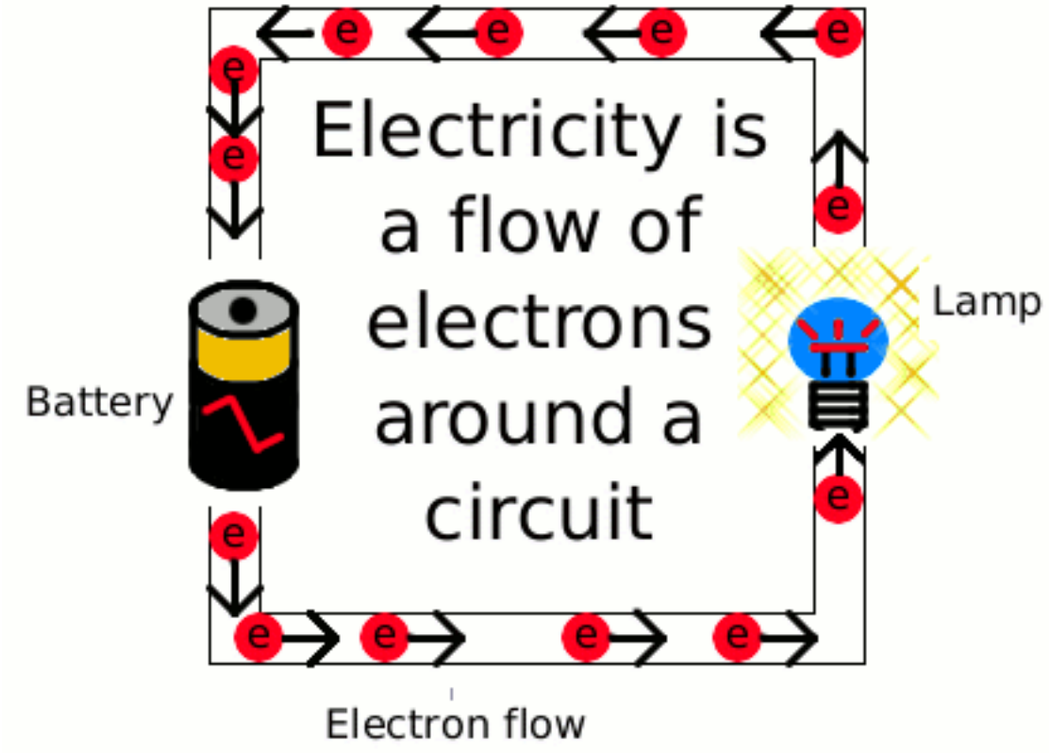
It’s all about agitating the **electrons….**

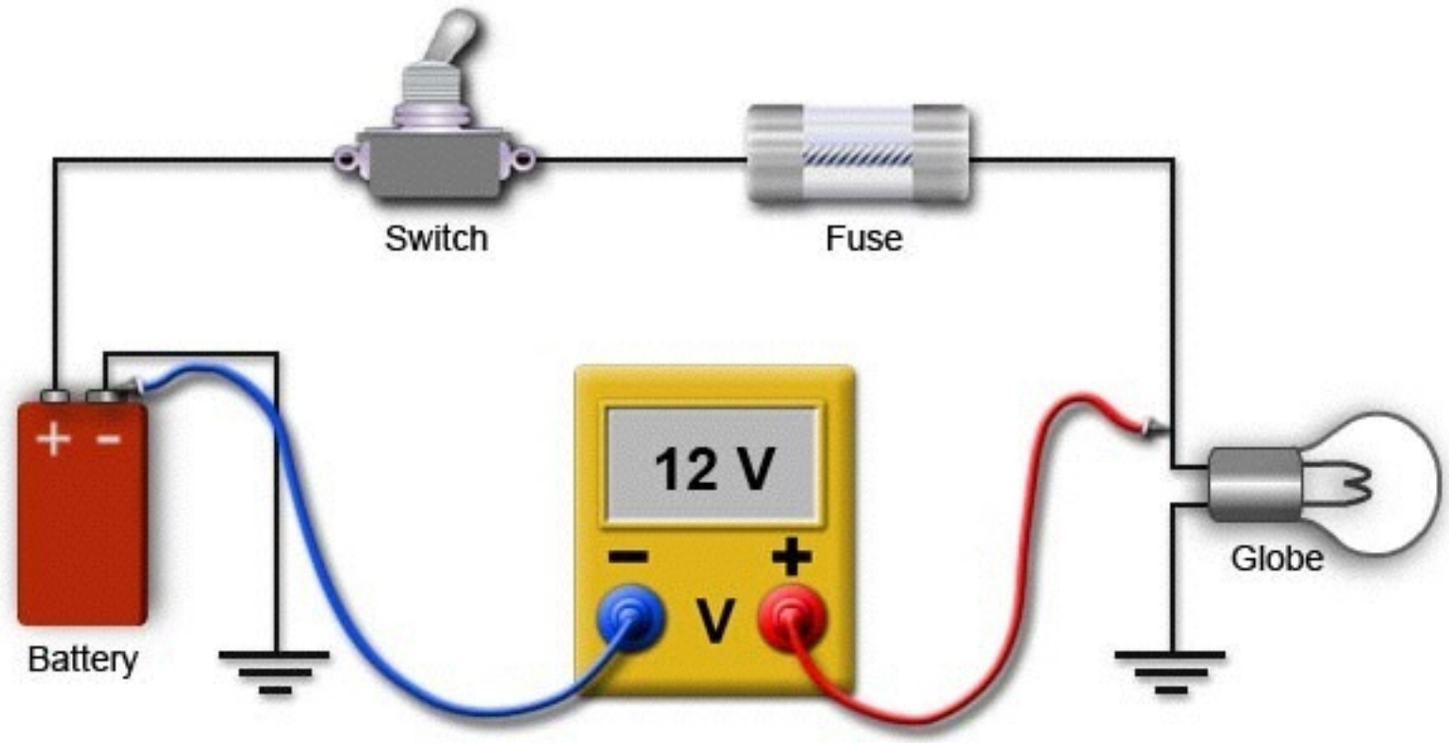


Nature likes

balance


Electrons
Nucleus, protons and neutrons
Electron Enters
One electron flies to the next atom
One electron flies to the next atom
electrons fly on
An Atom
Flow of Electricity

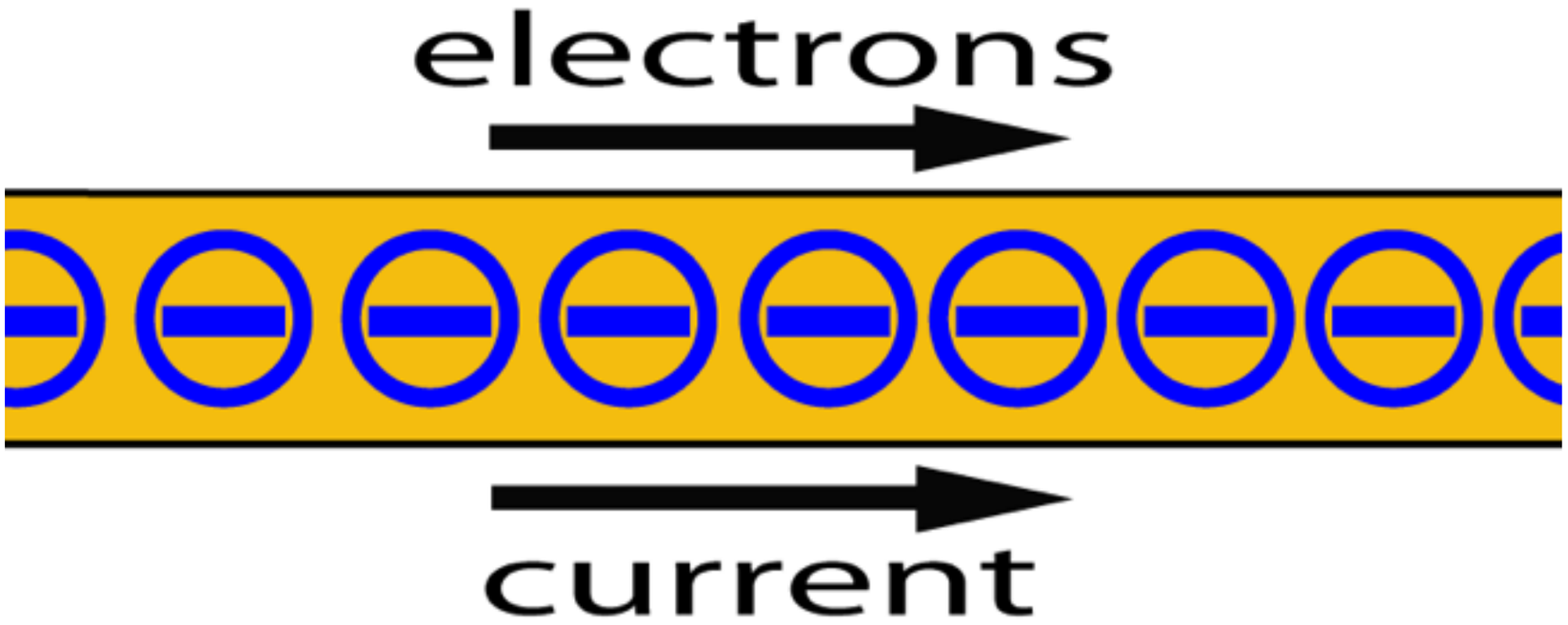

Electricity is a flow of electrons around a circuit
Battery
Lamp
Electron flow



Voltage (V)

also a volt or an EMF or as potential difference

1. What’s an electron?
2. What’s Arduino?
3. What’s electricity?

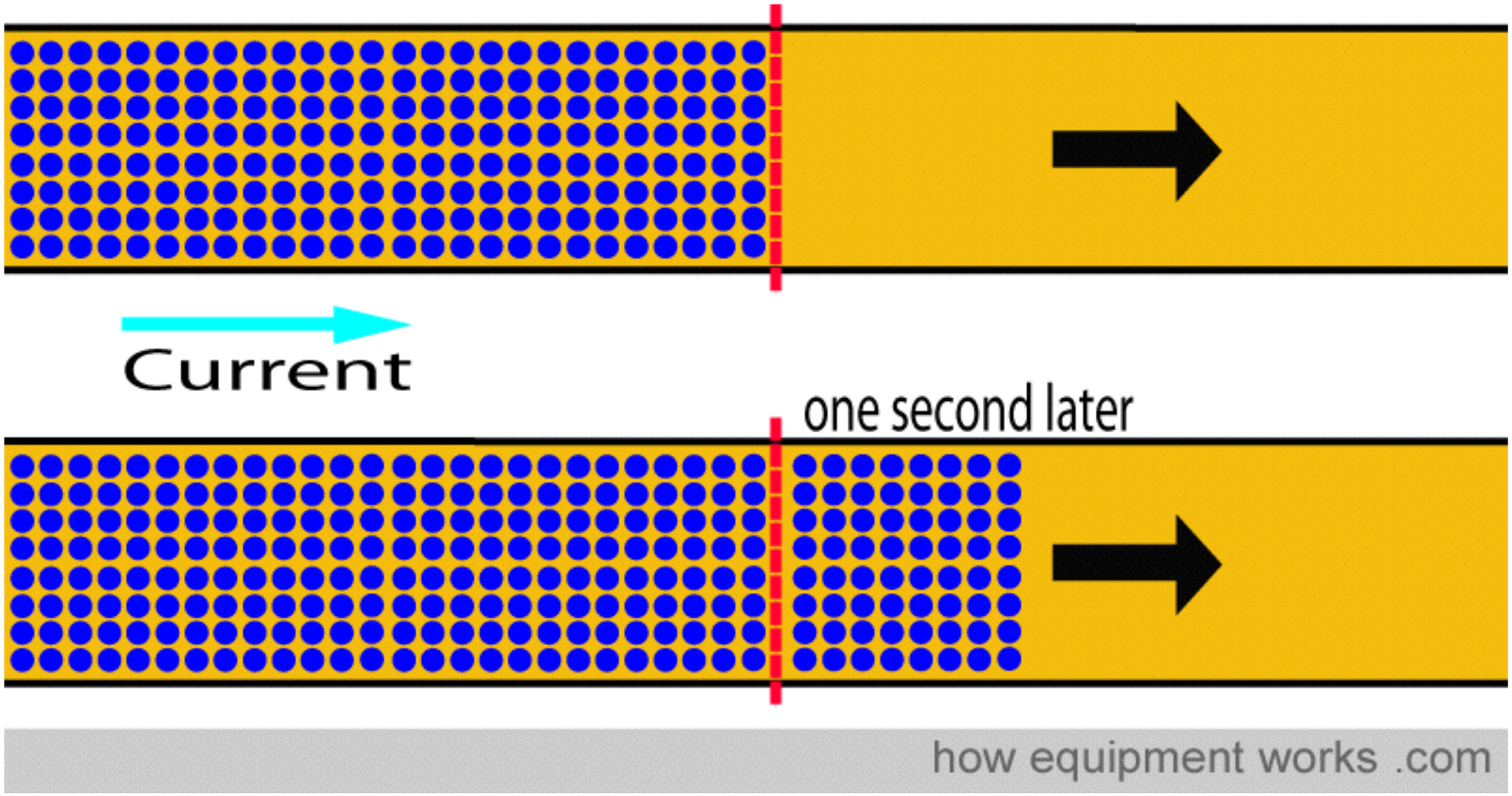


Current (I)

Electrons can be thought of as negatively charged “particles”. The movement of these electrons is called current.

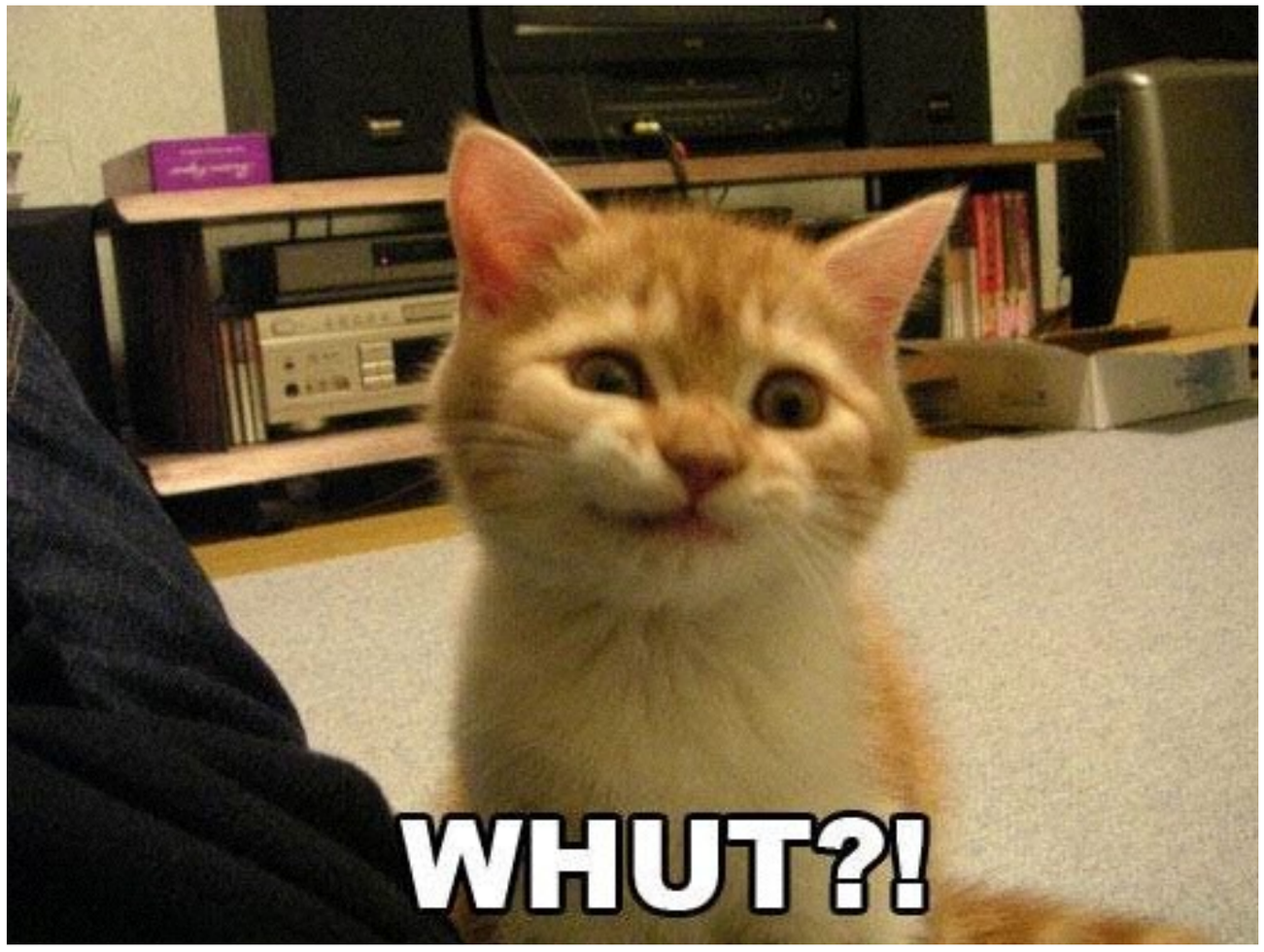
Amperes (Amps)

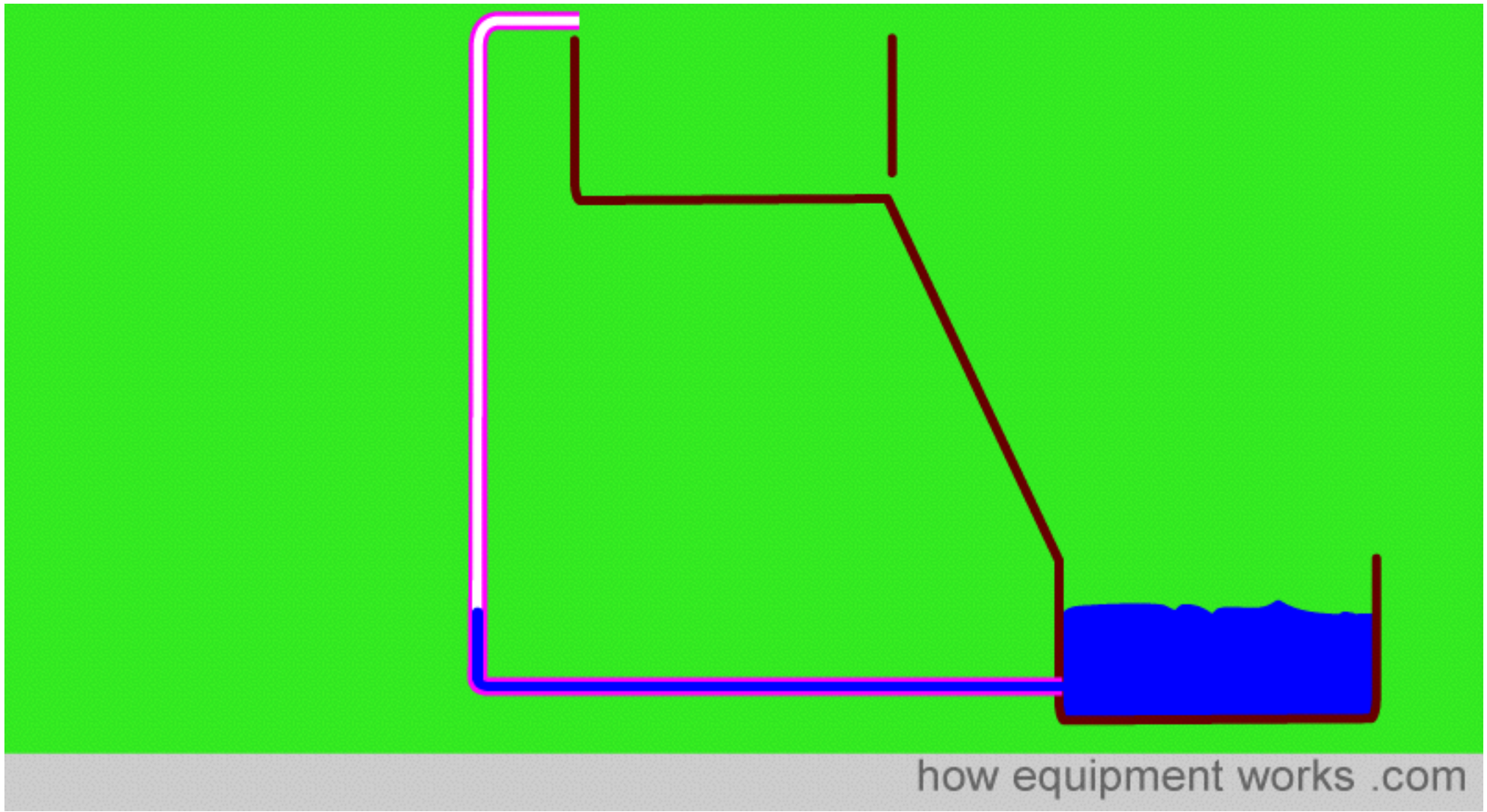
Current is measured in units called ‘amperes’. The number of amperes in a wire relates to how many electrons pass a cross section of the wire per second.



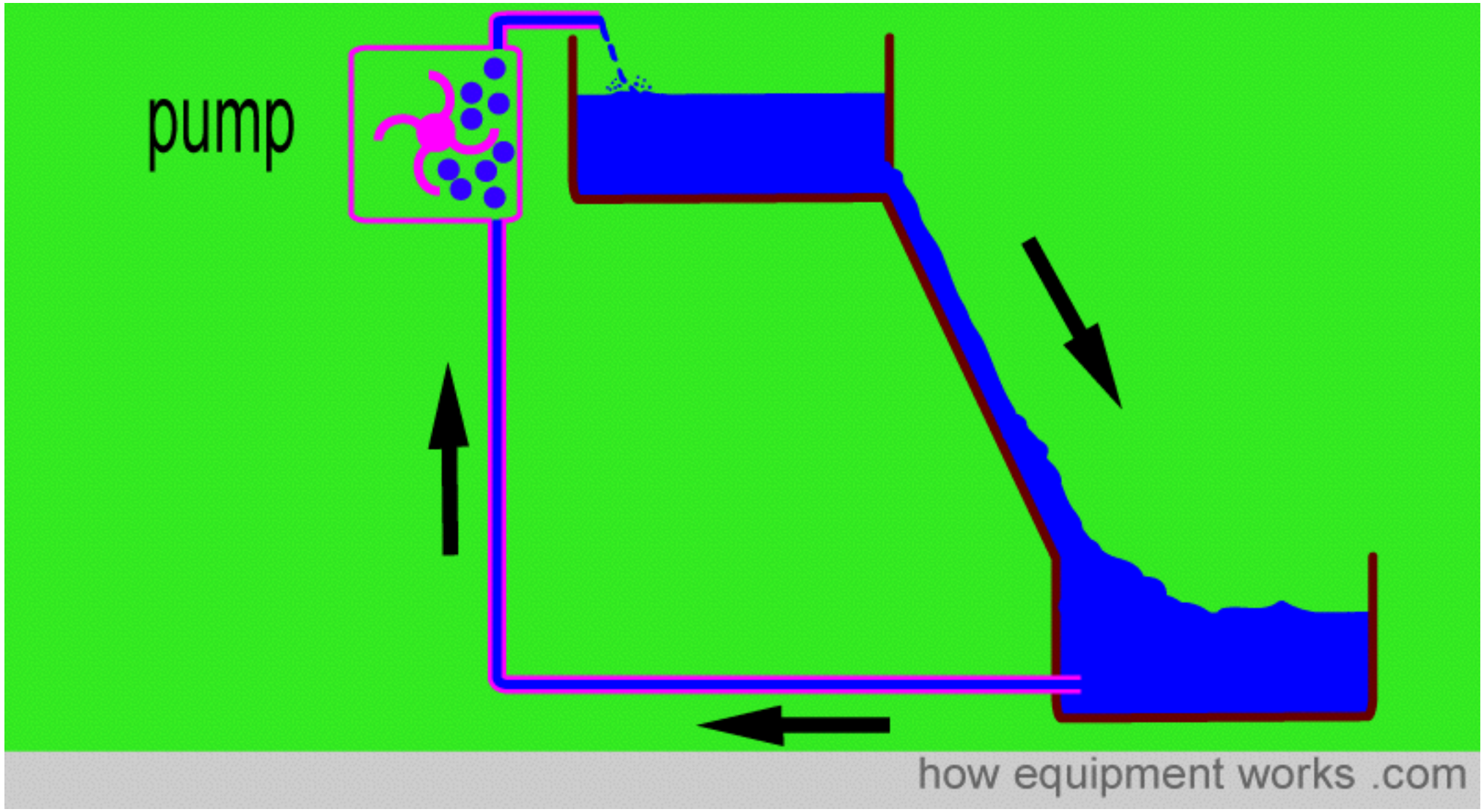
1. What's V?
2. What's I?
3. What's an A?

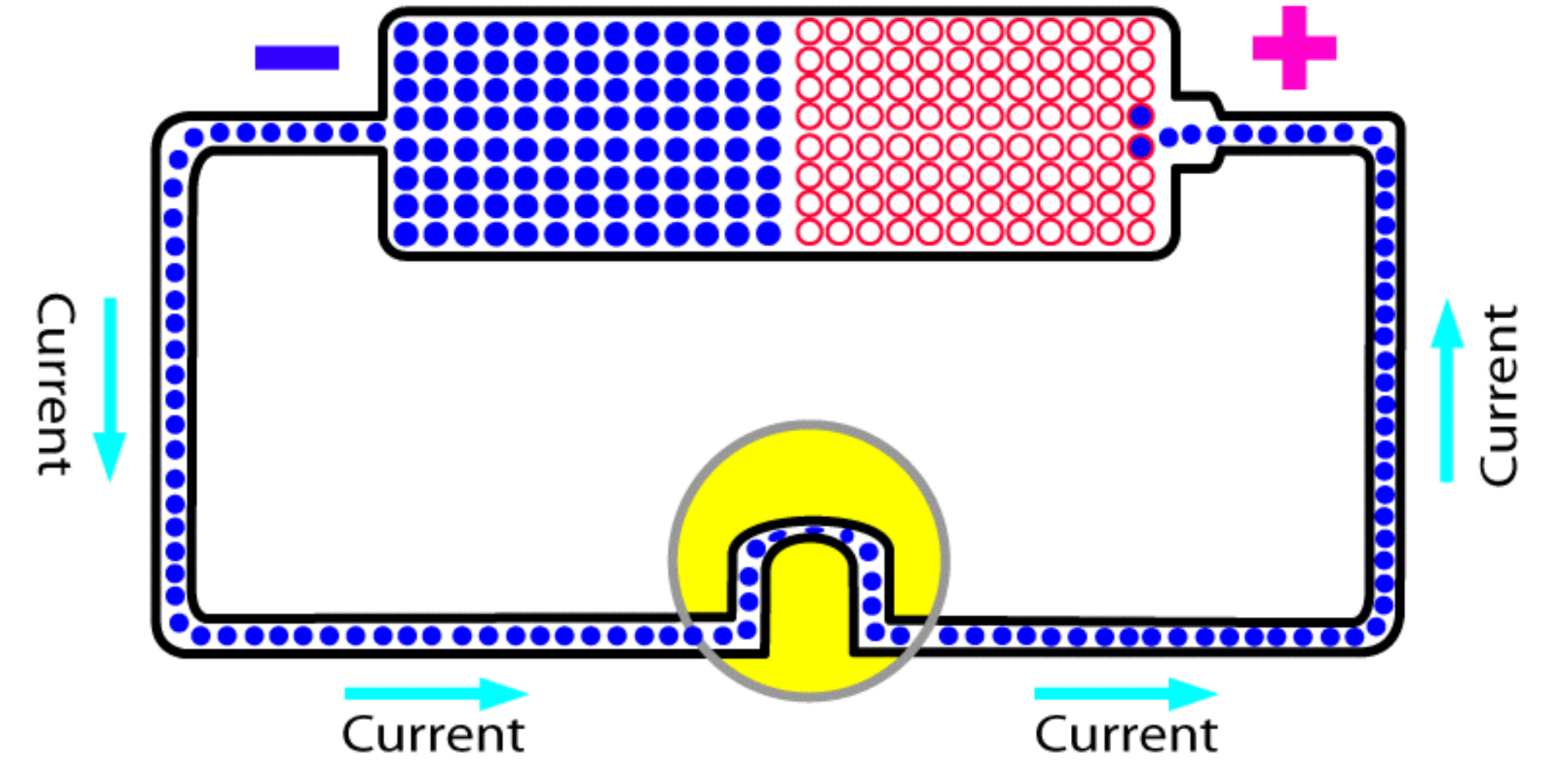
It’s convention to refer to current as flowing downhill even though the electrons are going the other way in actuality.
Because science.

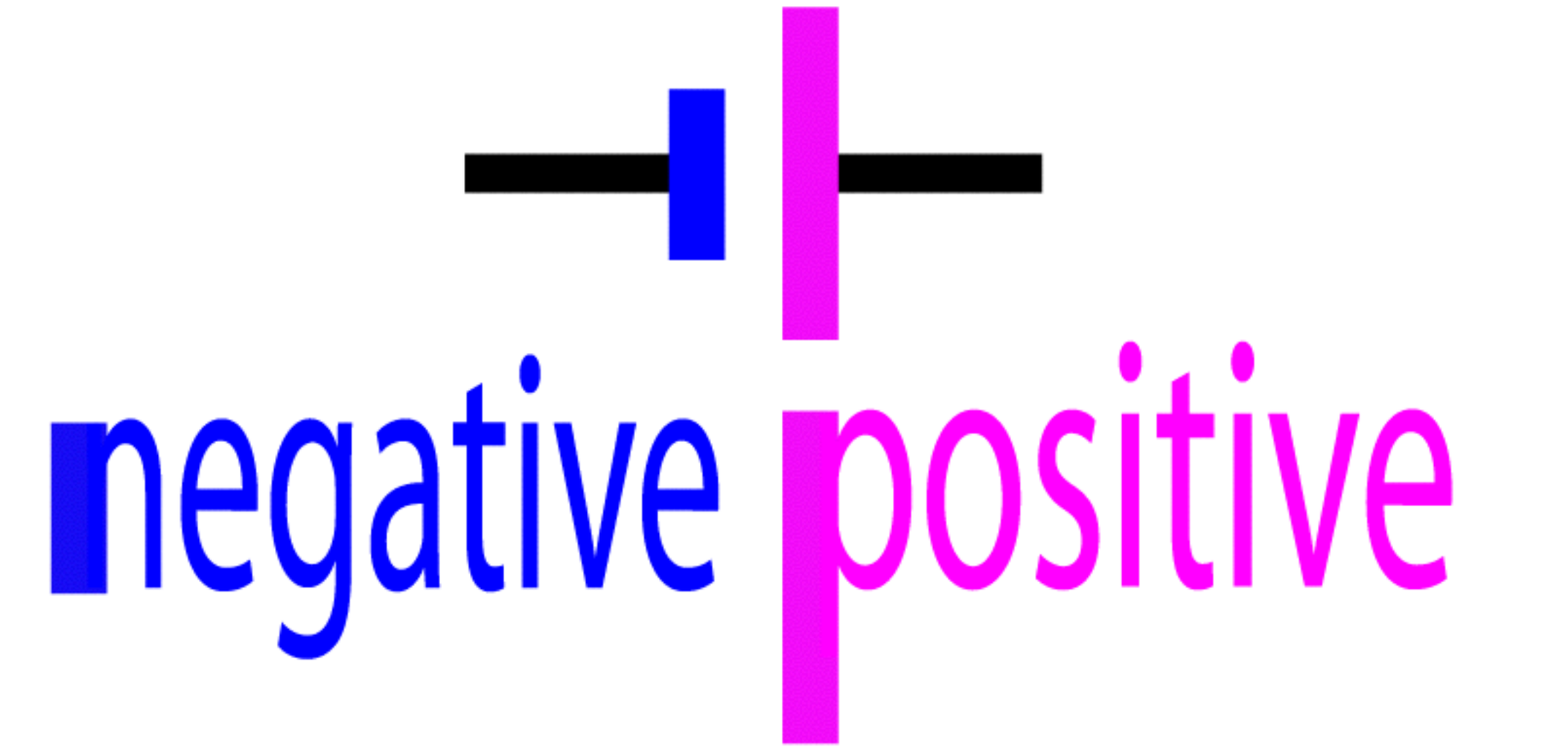


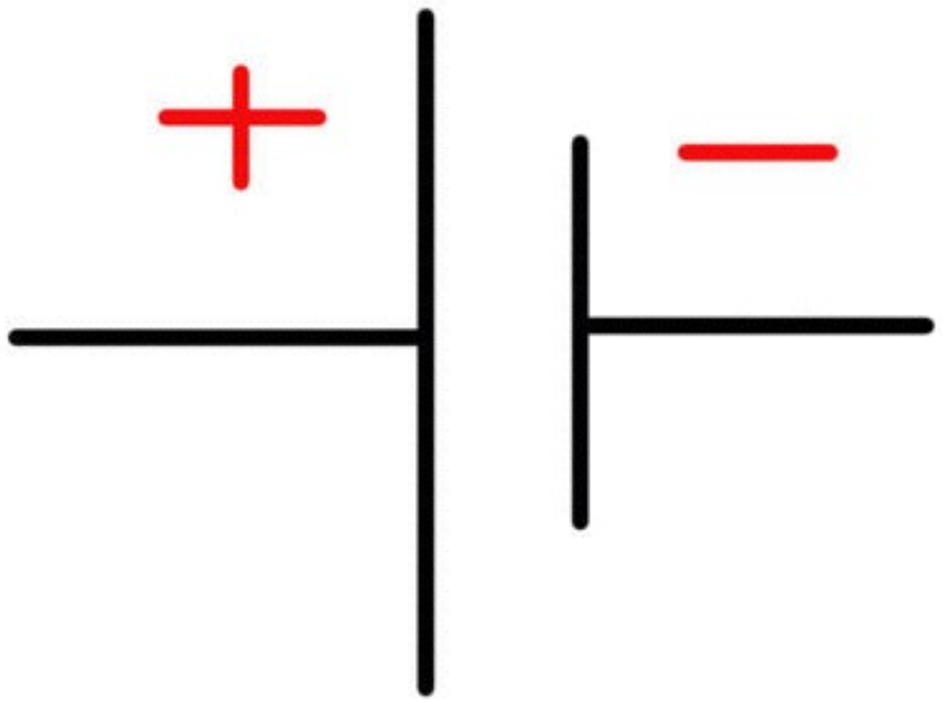

how equipment works .com

What’s a circuit?

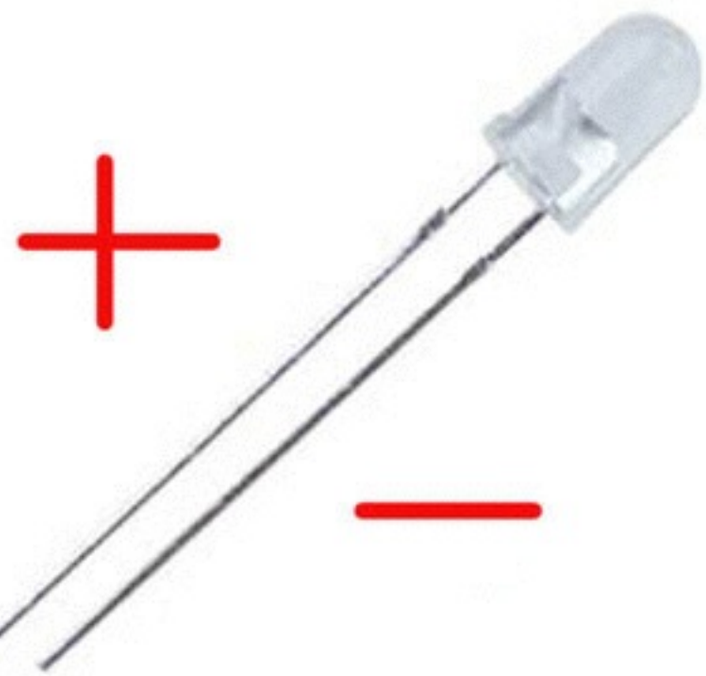

pump
how equipment works .com




negative
positive

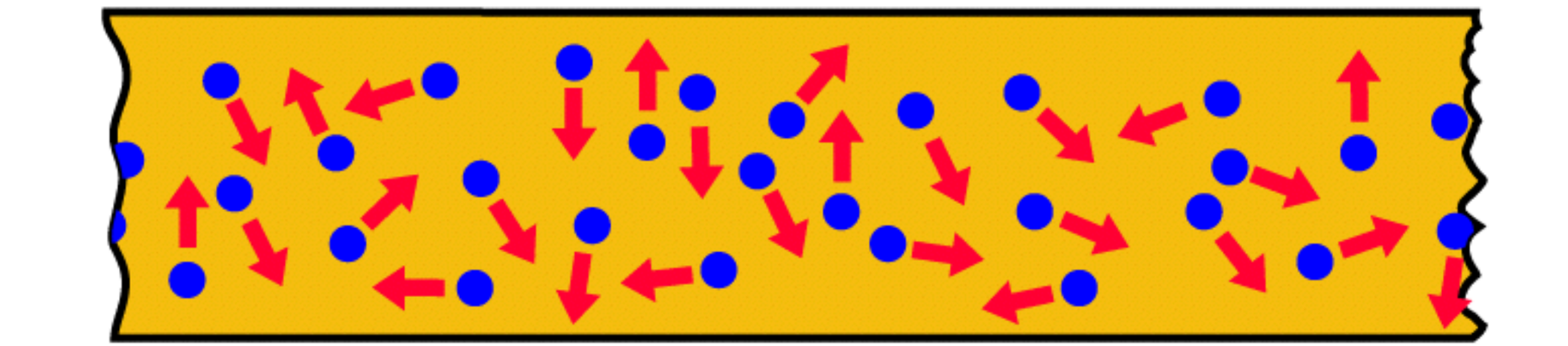


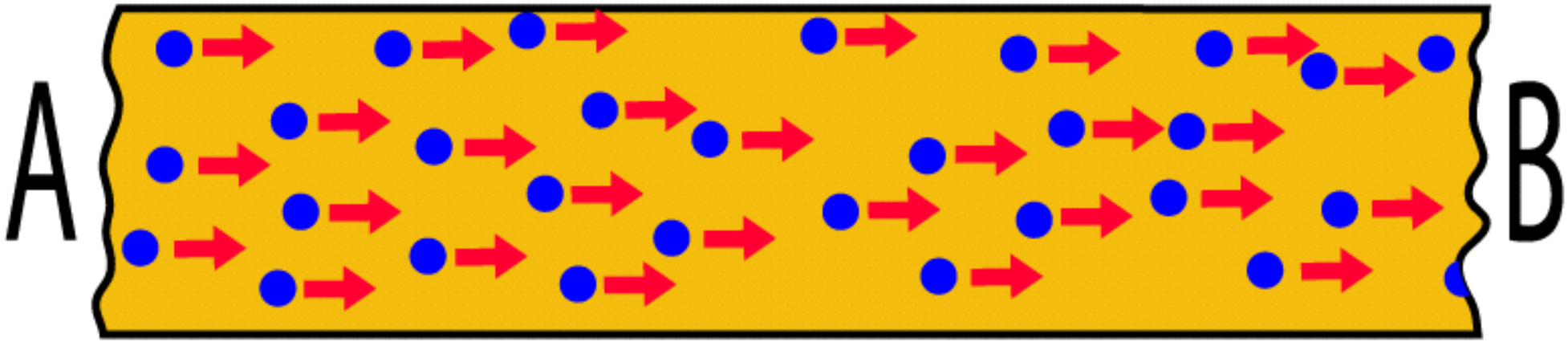
BATTERY



longer lead is postive.

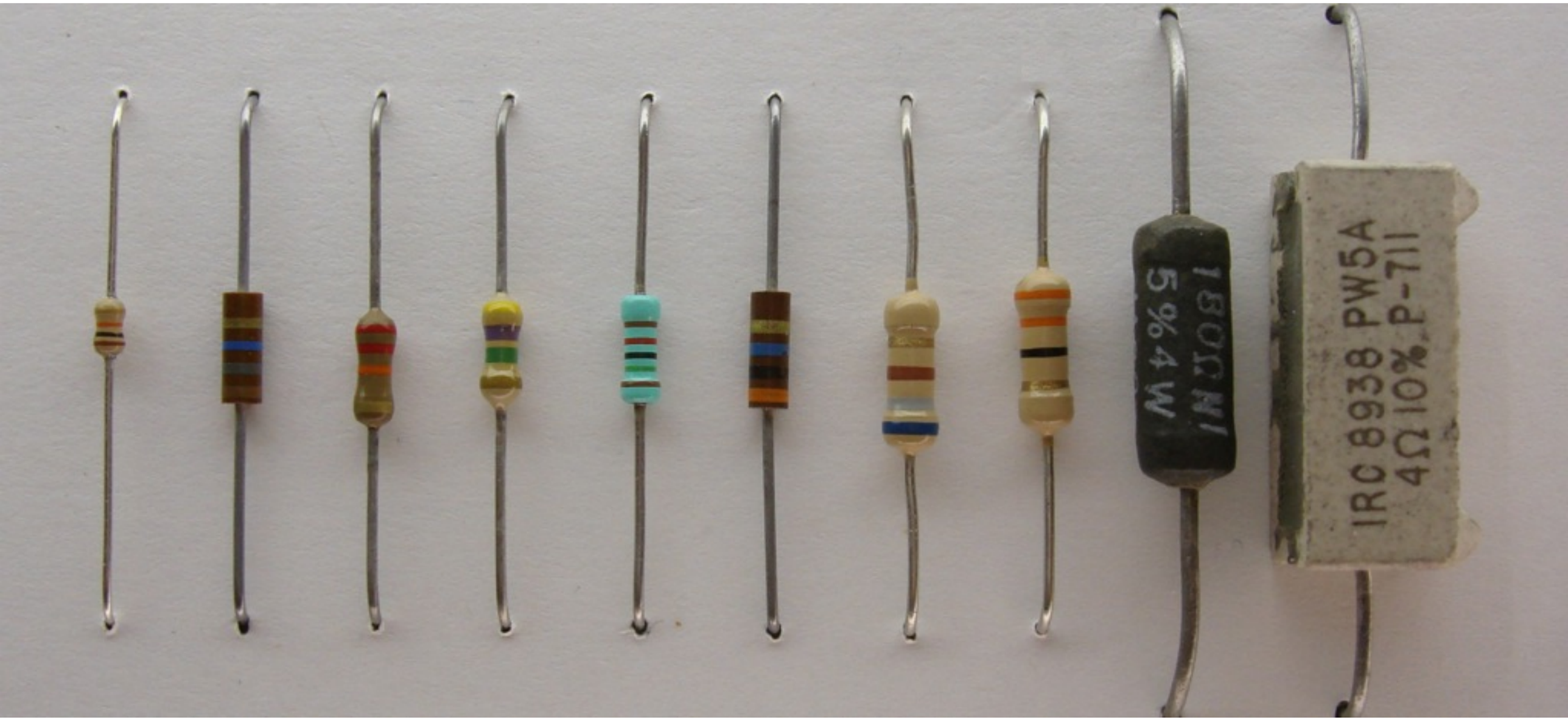
http://www.instructables.com/id/HOW-TO-READ-CIRCUIT-DIAGRAMS/





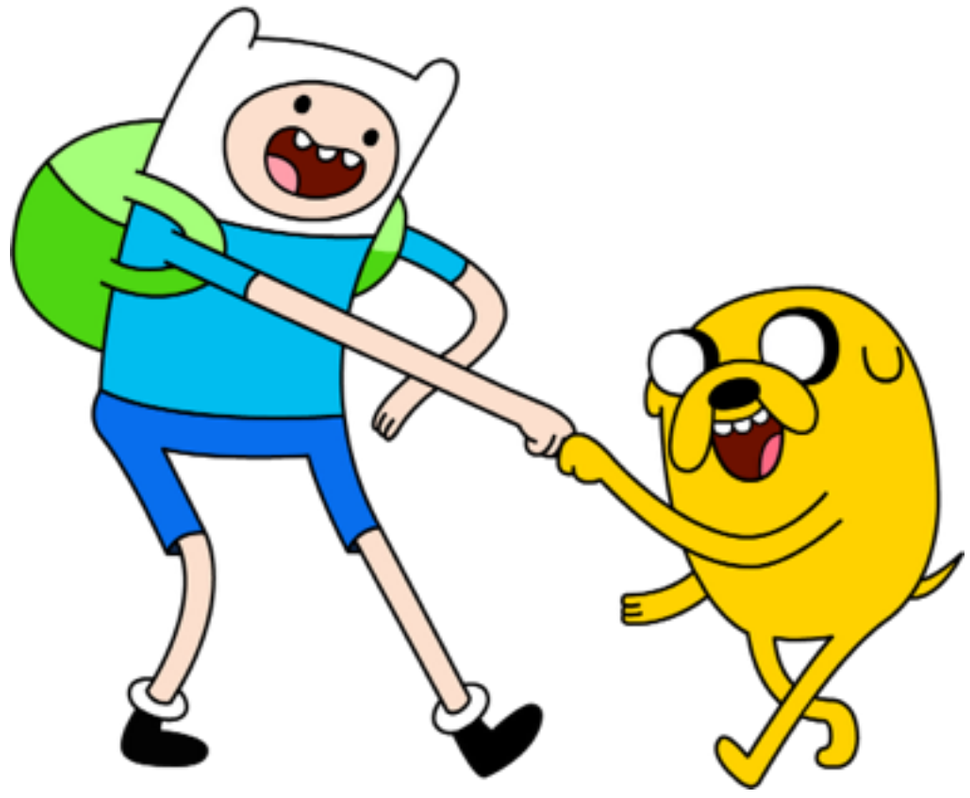
Resistance (R)

How easily can the current flow?


IRC 893
4Ω 10

Resistance (R)

How much is resistance varying



1. What’s a circuit?
2. Which foot of the LED is positive
3. What’s a resistor?

Ohm's law

- Ohm's law says *that the tension is equal to the product of the intensity and the resistance*

$$V = R \cdot I$$

- *This is equivalent to:*

$$I=V/R \leftrightarrow R=V/I$$

How much power is spent?

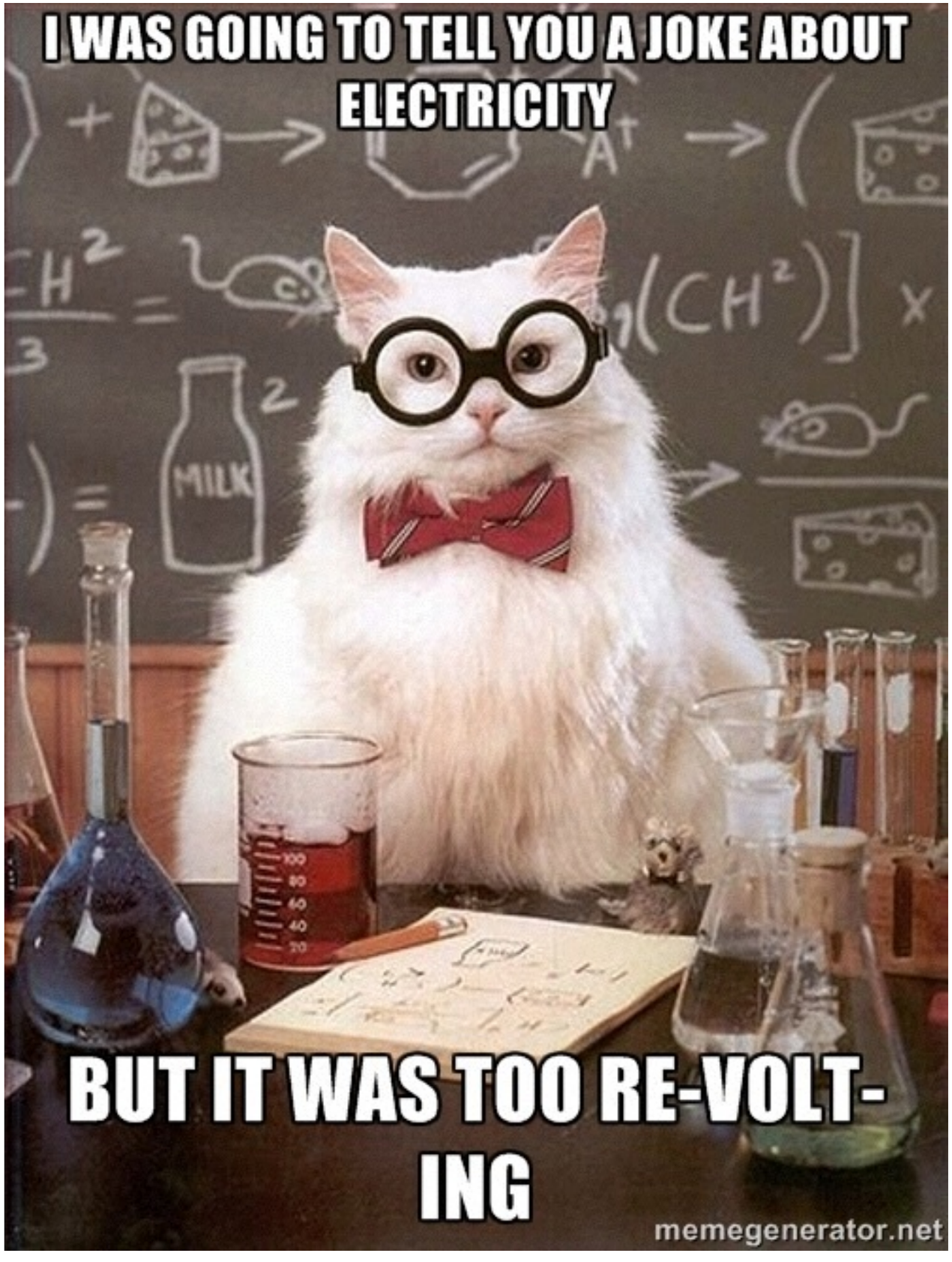
P = VI

power is referred to as watts W

The power goes into heat usually or sometimes mechanical work (like a robot motor)

this is why your laptop can get hot

mechanical work = **motor, speaker**
radiated energy = **lamps, speaker, transmitter**
stored energy = **battery, capacitors, inductors**


I WAS GOING TO TELL YOU A JOKE ABOUT ELECTRICITY
MILK
BUT IT WAS TOO RE-VOLT-ING
memegenerator.net

Really though it’s all about **sensors and knobs**

You will often just be changing the resistance and effecting the voltage of your circuit.

THINK OF EVERYTHING AS **DATA**
YOU CAN MEASURE

THINK OF YOUR WORLD AS AN

INTERFACE

ALL YOU NEED IS A WAY TO ACCESS THAT DATA

AND THAT'S WHAT YOU CAN DO WITH A MICRO CONTROLLER.

And now on to the

microcontroller

Usually you'll be prototyping on a **breadboard**

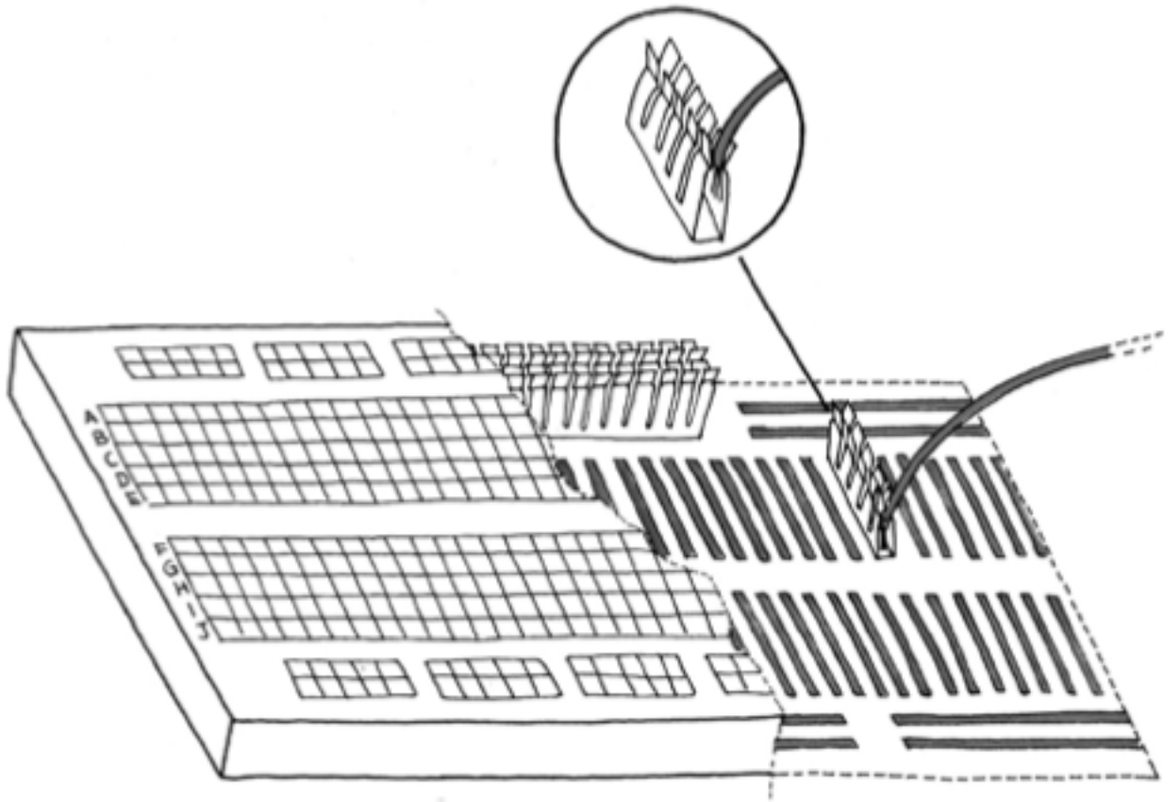
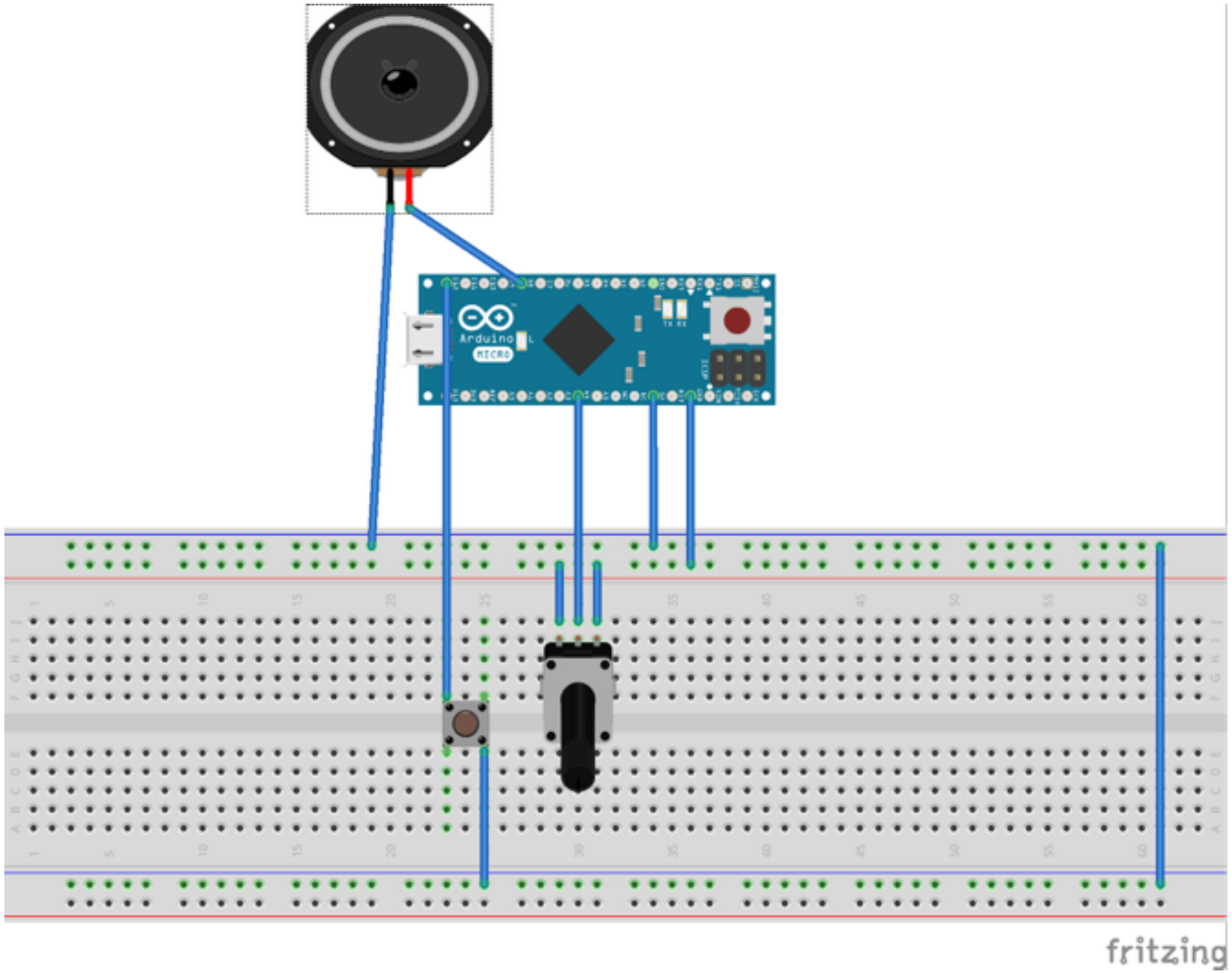


Figure A-1.
The solderless breadboard

You will be looking to connect your sensors to the **arduino pins**



THE TWO MOST COMMON USE OF PINS

Digital & Analog* (PWM)

Get the data in

Send the data out

DIGITAL

ON/OFF

PWM / ANALOG

0-255

Programming IDE options:

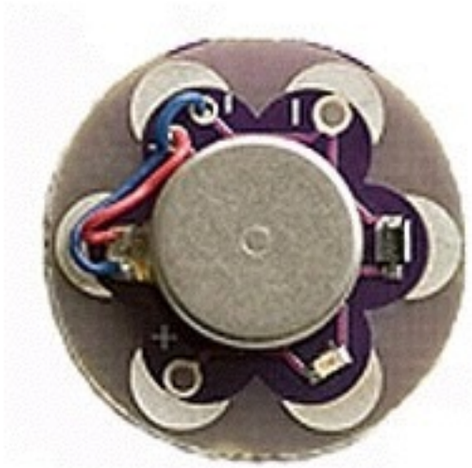
1. Arduino
2. Sublime with the use external editor box checked in the Ardunio preference

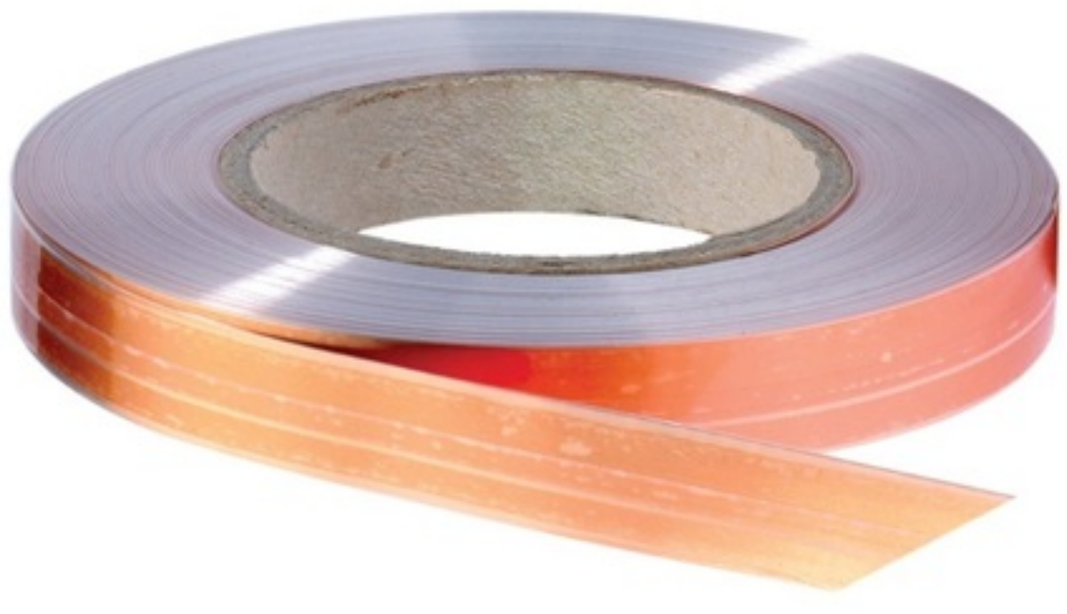
Languages C & Java

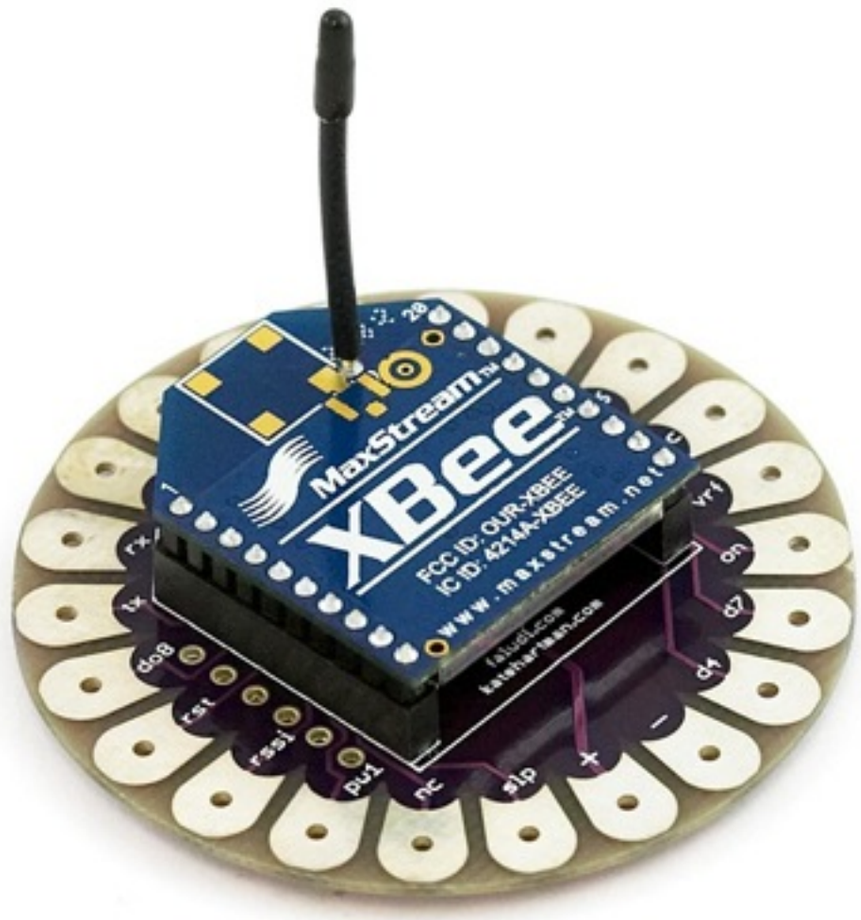
Standard Firmata vs

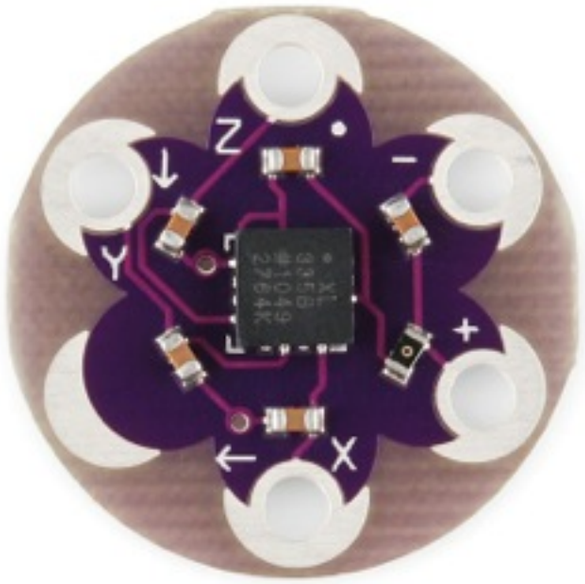
Serial data

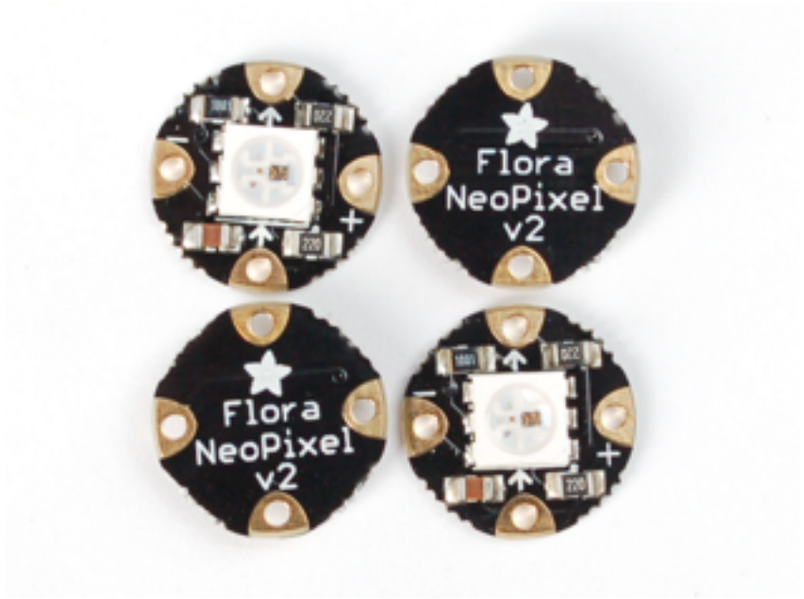

BARE
CONDUCTIVE
ELECTRIC
PAINT
bareconductive.com

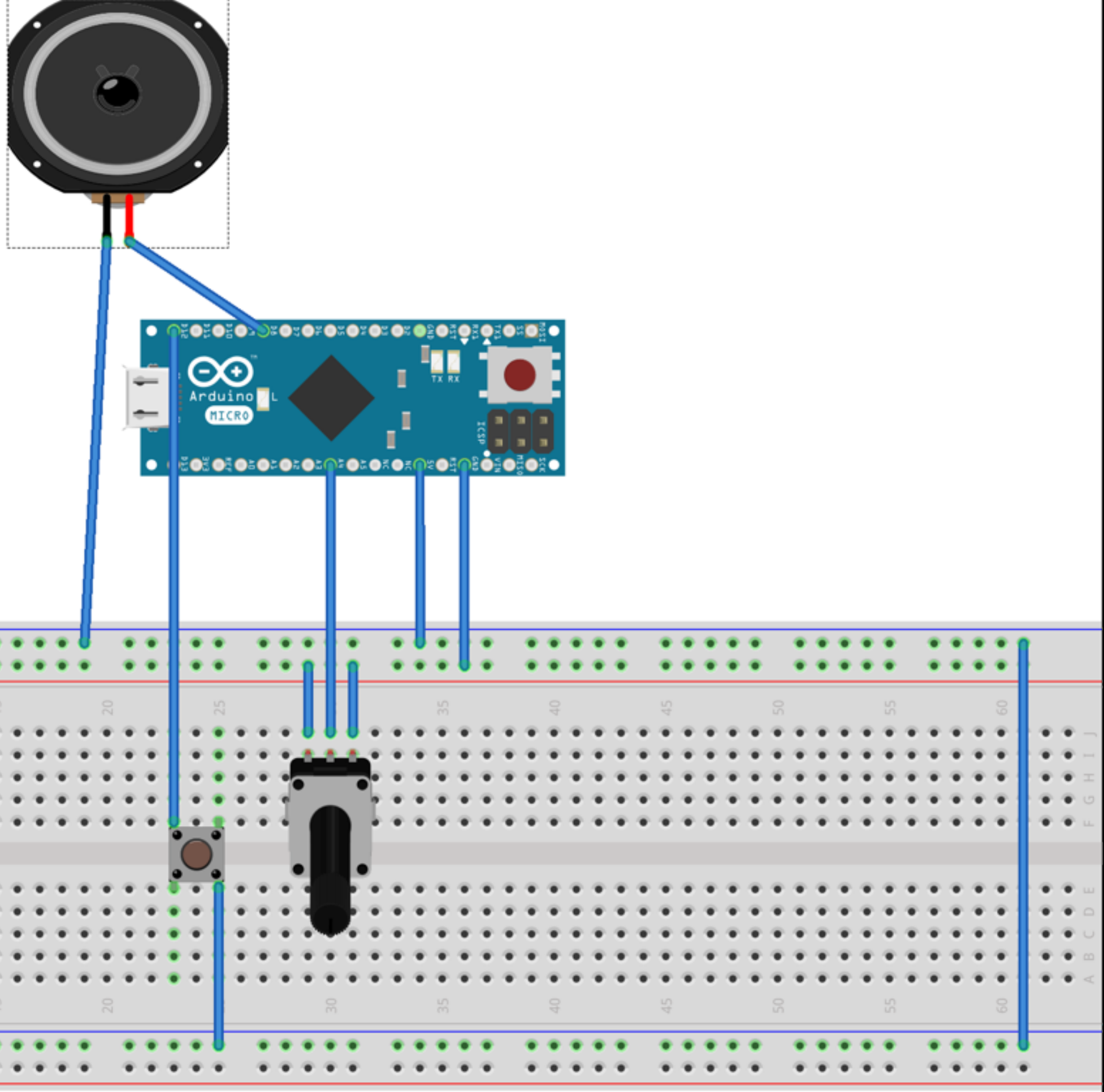





MaxStream
XBee
FCC ID: OUR-XBEE
IC ID: 4214A-XBEE
www.maxstream.net
dio8
rst
rssi
pwm1
nc
slp
vref
on
d7
d4


Z
Y
X
+
−


Flora
NeoPixel
v2
Flora
NeoPixel
v2


Arduino
MICRO
TX RX
ICSP

Variables

Everything changes

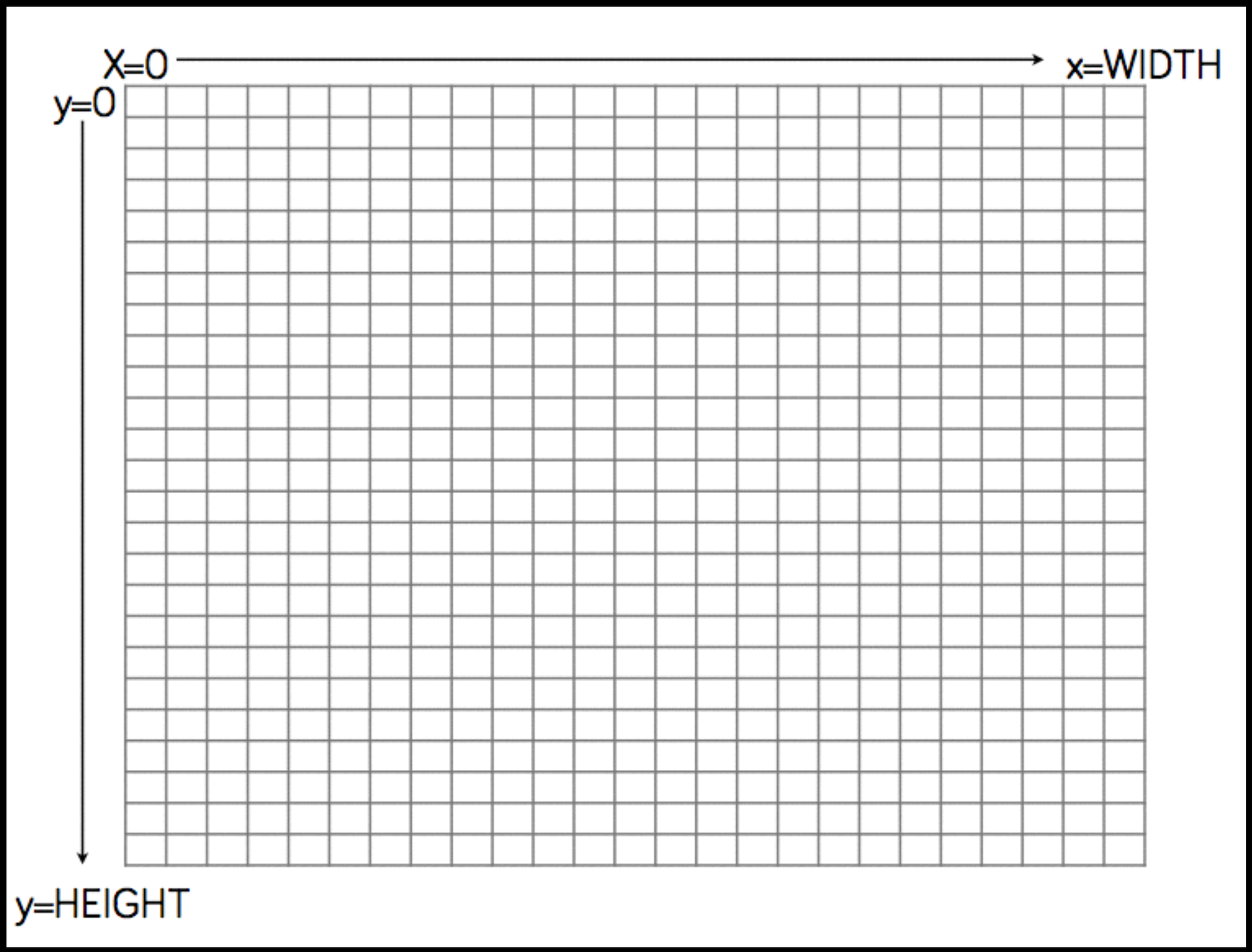
things in life are usually some type

Often things repeat

but it’s never the same the second time around…. because things vary.

often if one thing happens something else changes….

this is called a control structure....


X=0
x=WIDTH
y=0
y=HEIGHT