Electricity and Electronics

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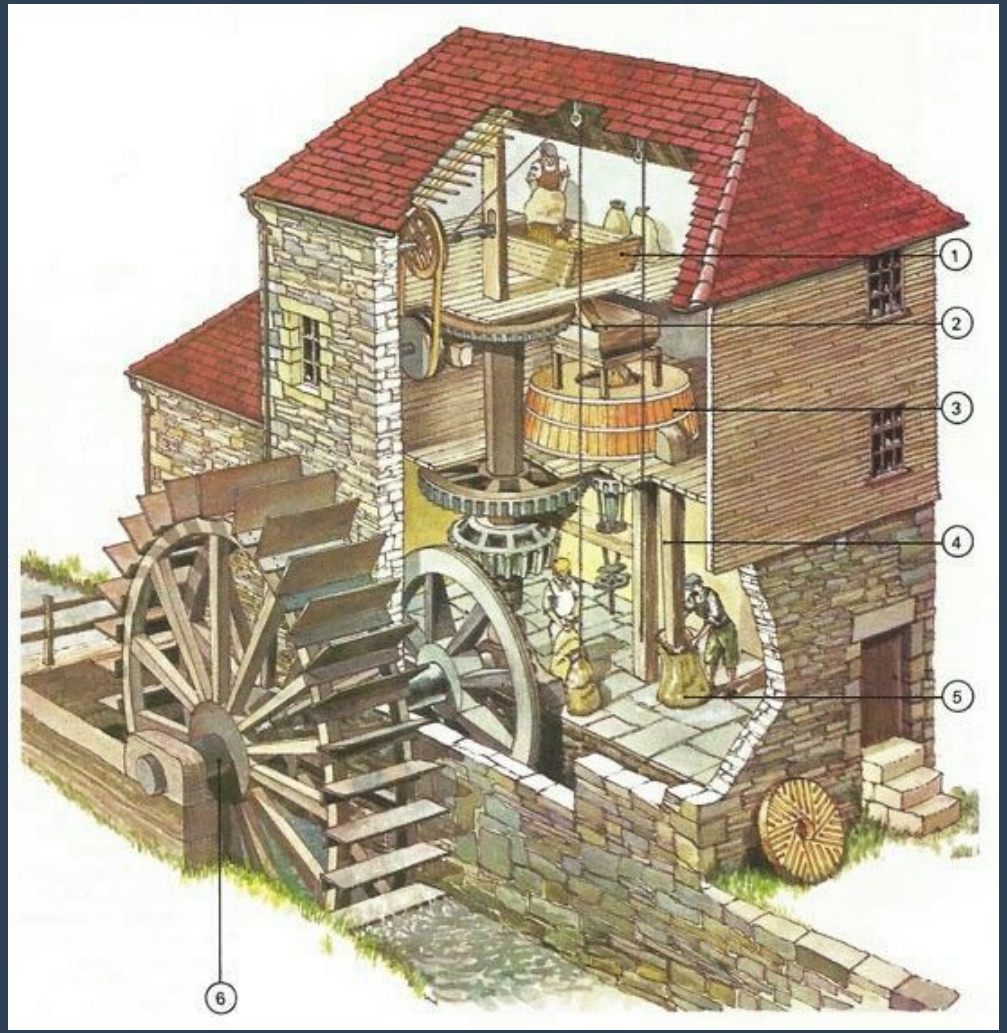
Prairie.Code() 2019

First… Physics!

"I am reminded of the professor, who when asked the question 'What is electricity?' replied 'It all depends what you mean by 'is.'"
- A. Gilchrist, ASLIB 1972

Charge vs Energy

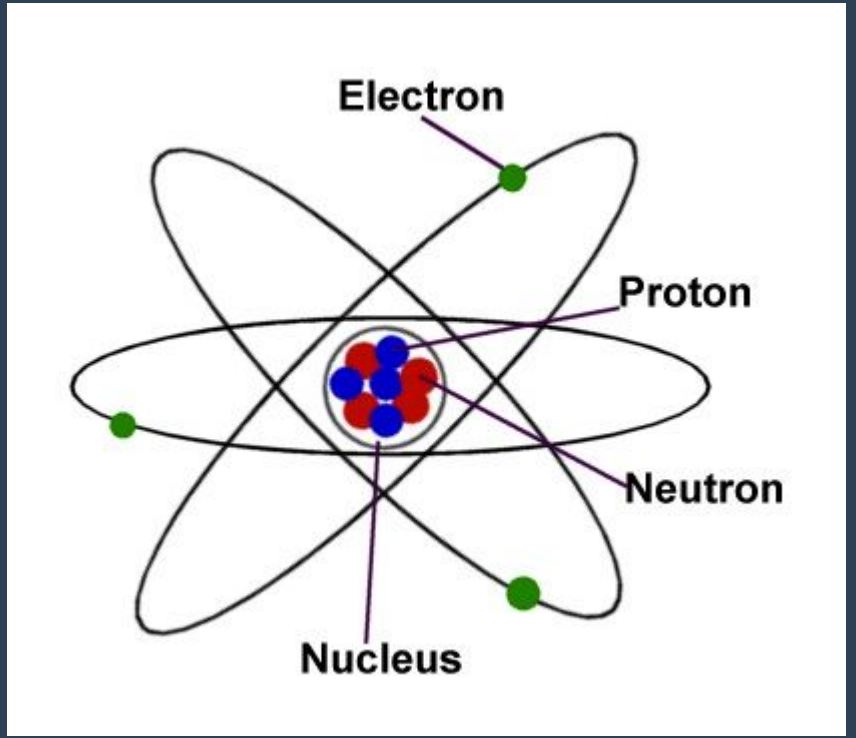


Picture from
https://i.pinimg.com/originals/1f/8f/00/1f8f00e2d35d1afc83daf58431bc7605.jpg

Ohmmmmmmmm.....

V = IR

- Voltage
  - Volts
- Current
  - Amperes
  - Intensity of Current
- Resistance
  - Ohms



Picture from https://alexlemayscience.wordpress.com

Questions about physics?

- No, lightning probably won’t send your DeLorean back to the future.
- Ok, on to Safety!

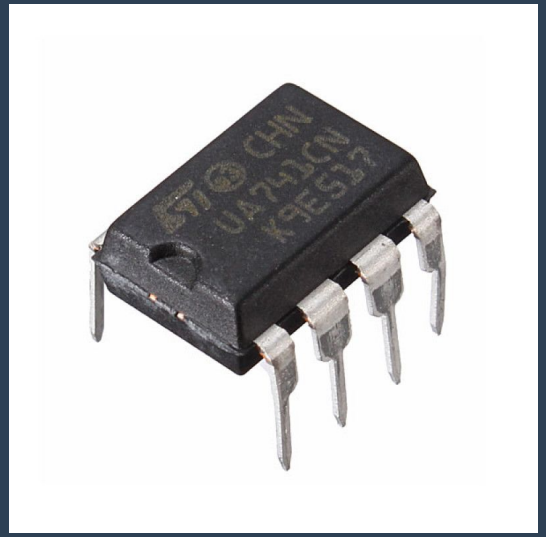
Safety

Mains Power

- Neutral
- Hot
- GFCI
- Ground

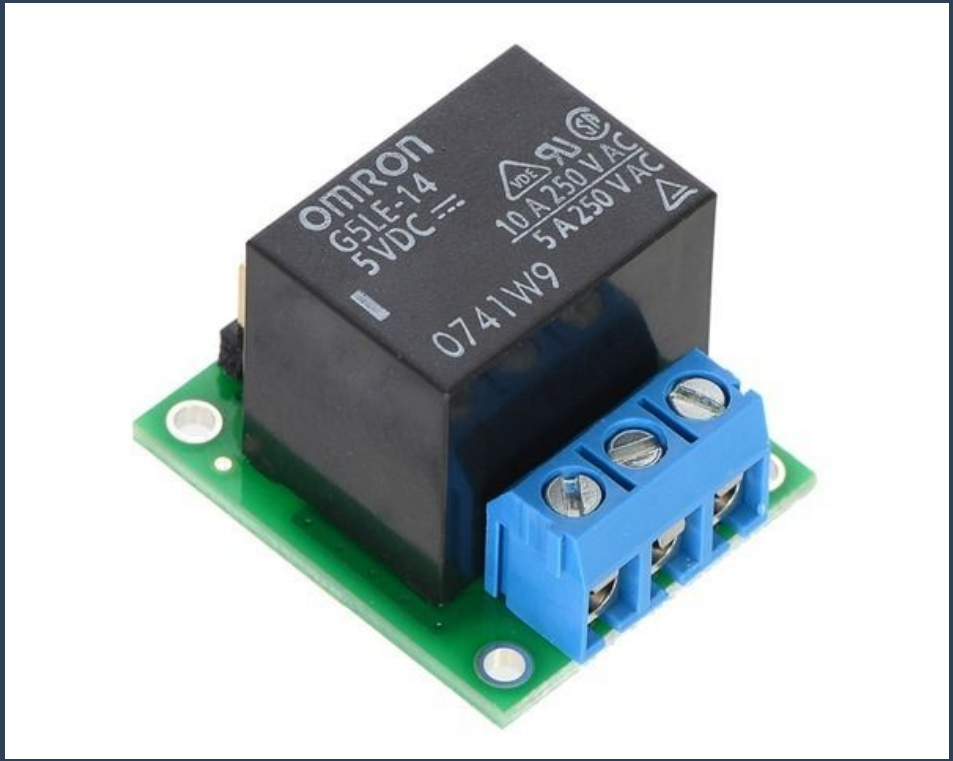
Project Safety

- Direction matters

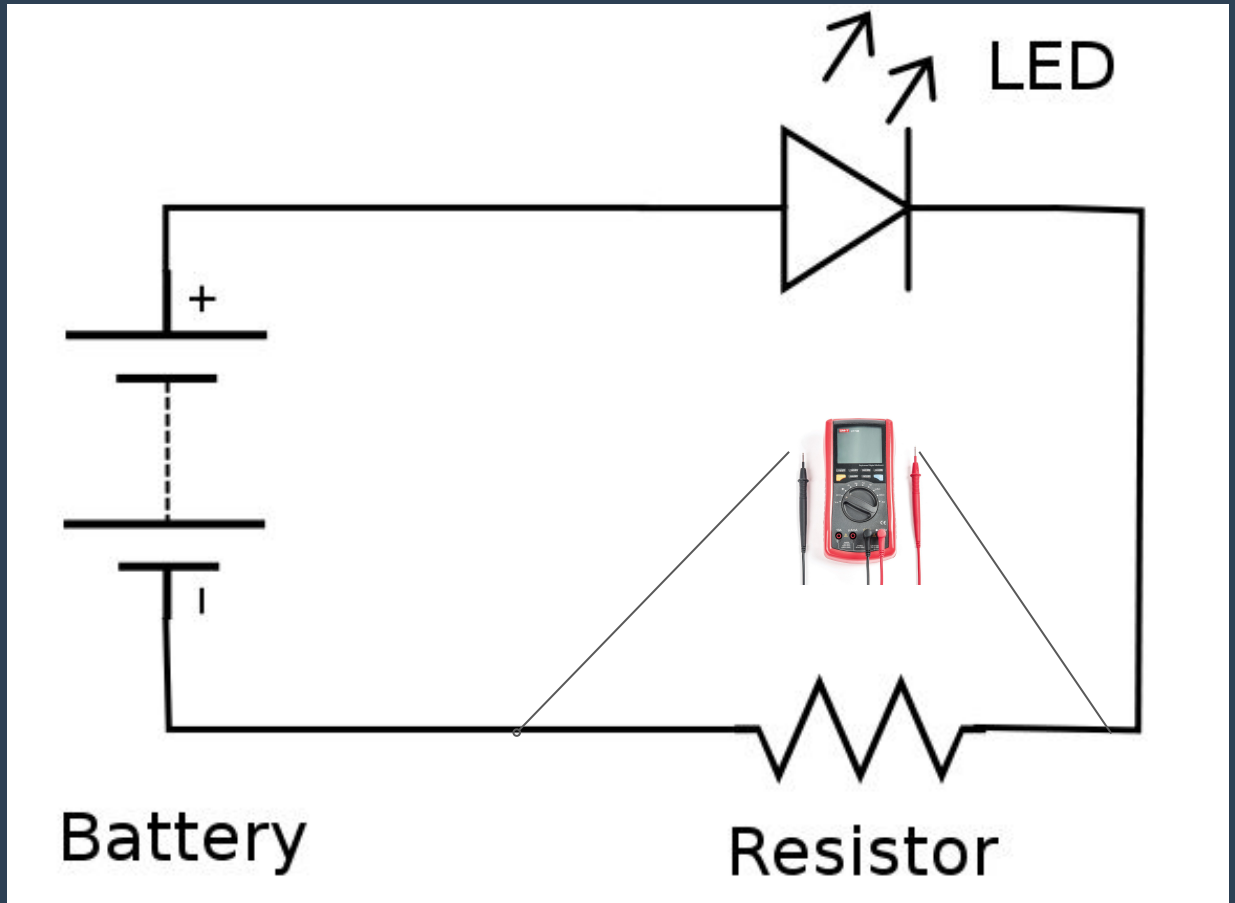


Project Safety

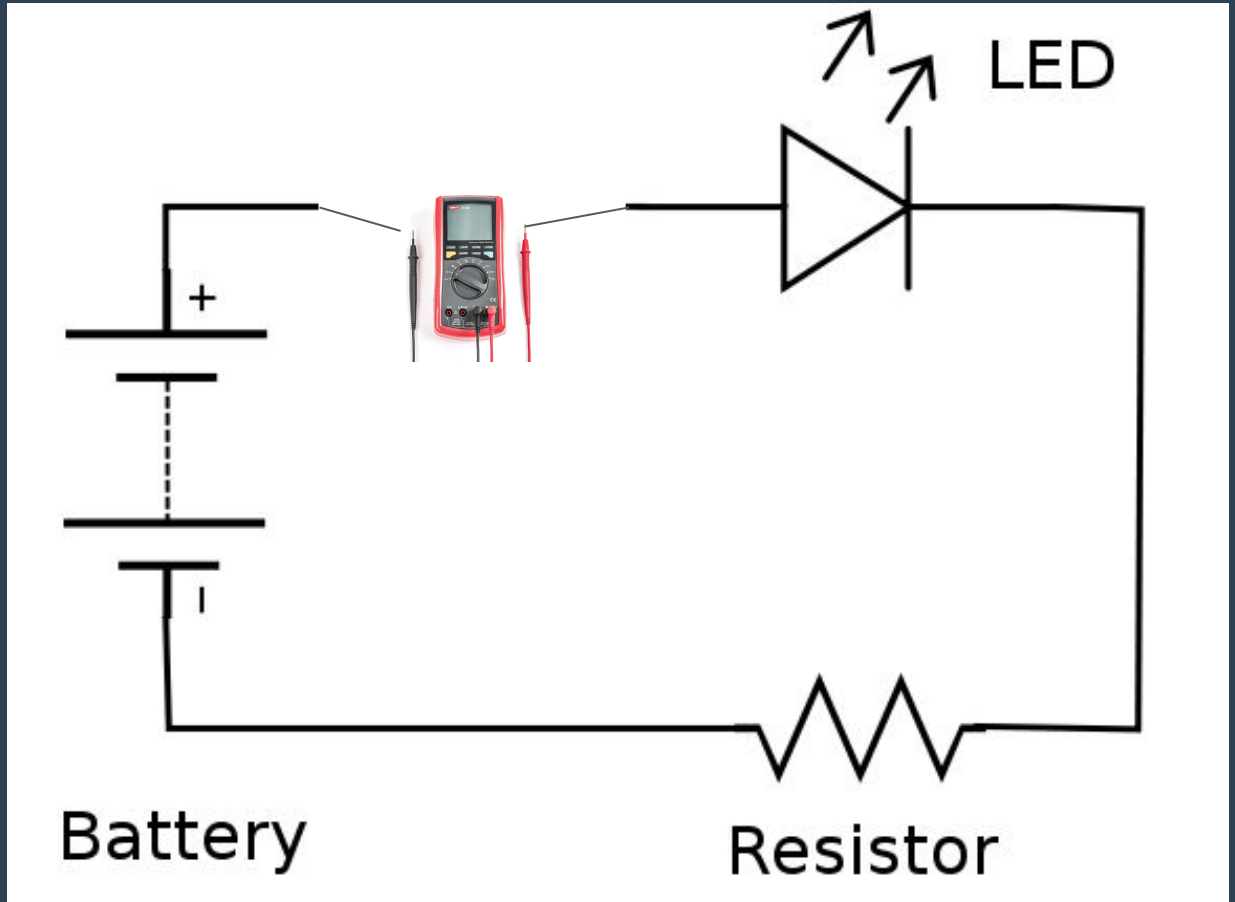
- Volts ==
- Amps >=



How to use a Multimeter - Voltage



How to use a Multimeter - Current



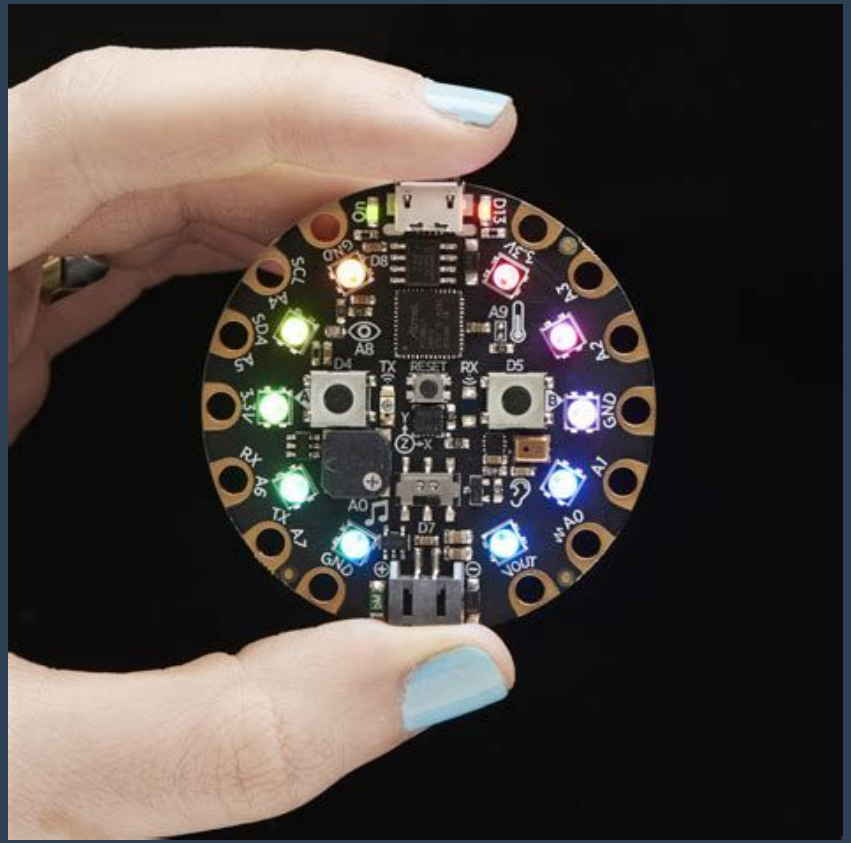
Questions about Safety?

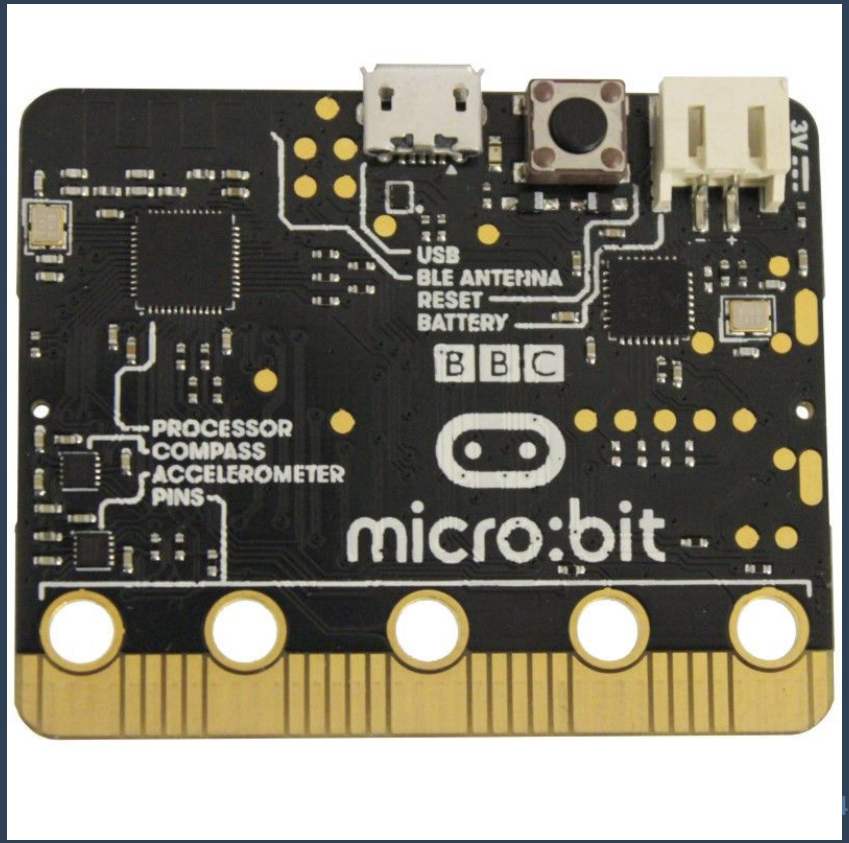
- Don’t tell your mom I said it was okay to lick batteries.
- Ok, on to the fun bit!

Electronics

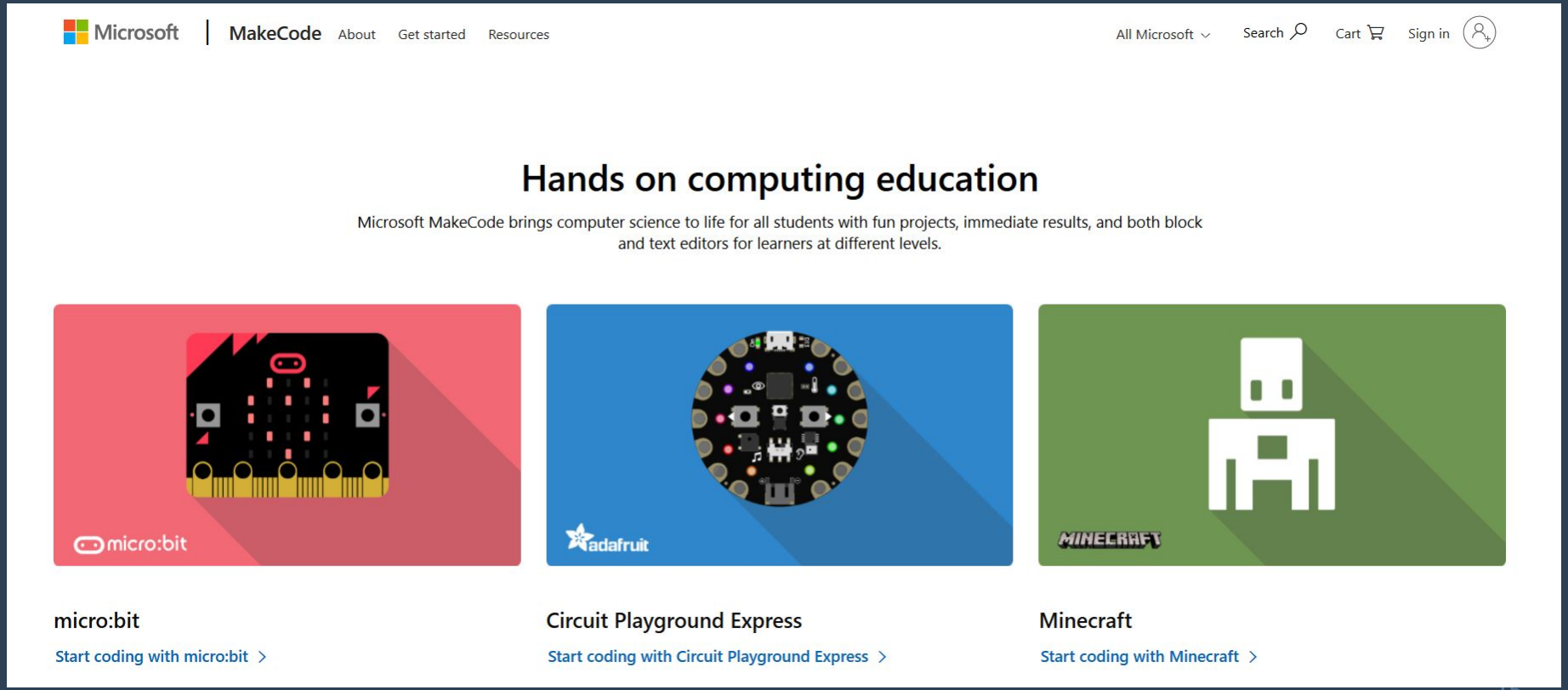
- Where do I start?

Beginner Boards



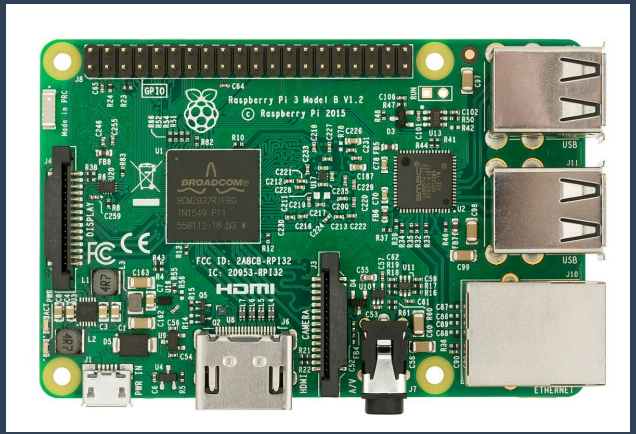


Code you know… on hardware.



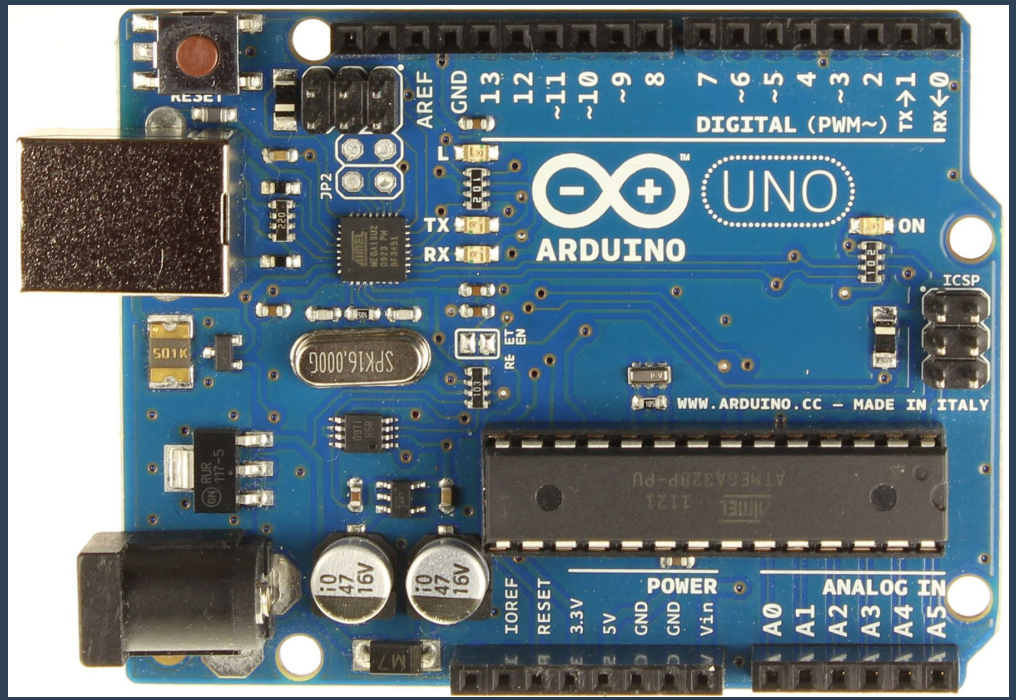
Where to start … with internet

- Particle Argon
  - Arduino compatible
  - FeatherWing compatible (for extending functionality)
  - Online IDE
  - Lots of IoT libraries tested
  - Mesh/BLE/WiFi chips available
- Raspberry Pi
  - Full Linux computer, but tiny and cheap
  - Less departure from familiar stacks
  - Lots of documentation
  - Strong community
  - pHATs for extending functionality
  - BLE and WiFi available

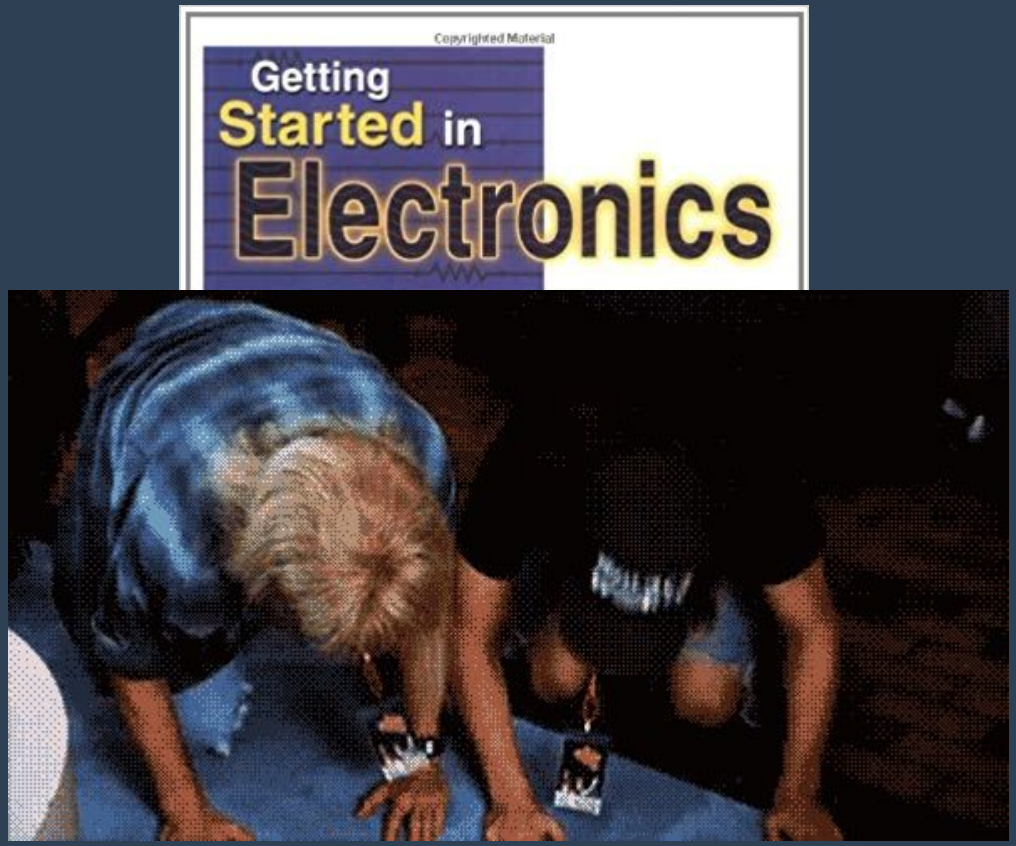


The “Classic” Place to Start

- Arduino
  - Huge community
  - LOADS of documentation
  - Libraries galore
  - Shields galore
  - IDE has examples built in
    - Well-commented
    - Links to wiring diagrams

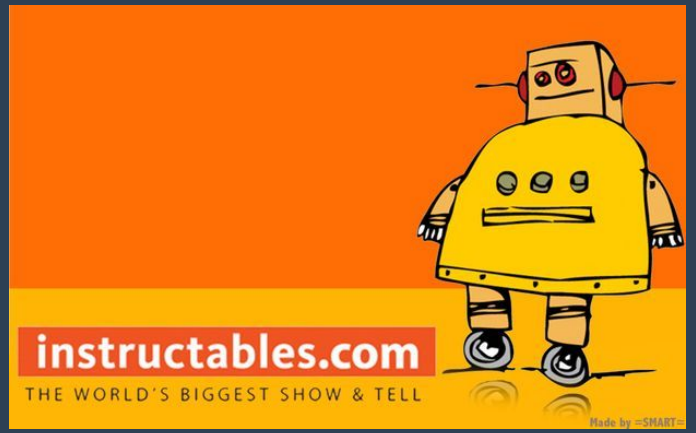


Super Classic



LEARN ALL THE THINGS!

adafruit INDUSTRIES



sparkfun® ELECTRONICS

Resources

Check out “Beyond Blinky” session by Adam Barney later today!

- Places to purchase good kits: Adafruit, Sparkfun, Evil Mad Scientists, SeeedStudio, Elegoo, Pololu
- Places to purchase ALL THE THINGS: DigiKey, Mouser, Arrow
- Places to learn: Adafruit, Sparkfun, Instructables, Arduino, Embedded Artistry, embedded.fm, Particle
- Electricity know how: http://amasci.com/ele-edu.html, http://www.forrestmims.org/

These slides will be available on github: @baileysage

EMBEDDED ARTISTRY

“Office Hours”

Area515 hosts a robot and electronics club at 7pm on second Thursdays. Come ask questions and share your progress. FREE!!

Upcoming Dates:

September 19th (I moved it this month so you could come!)

October 10th

Location: Area515, 108 Jefferson Ave, Des Moines

For more info on Area515 or Robot Night: education@area515.org