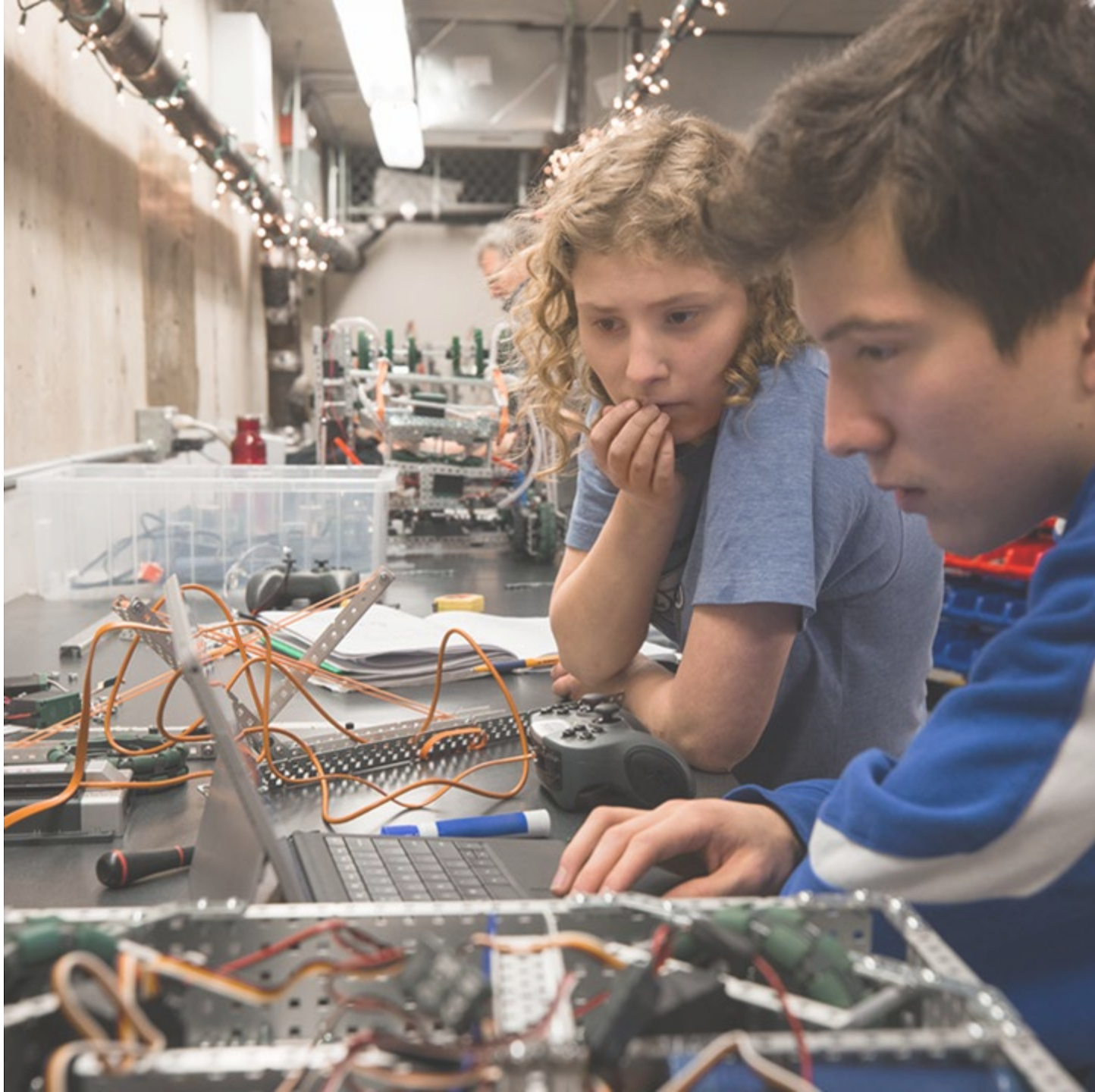
Mechanisms of a Makespace: Design Thinking and the Maker Movement Space

iSTEM @ NIC

Coeur d'Alene, ID



About Morgen Larsen

President, NCCE

Spokane, Washington

First computer was a Commodore 128

Two wonderful kids- Jackson & Lillian

Teacher-Librarian for over 15-years

@MsLibrarianLady

mlarsen@ncce.org

MsLibrarianLady

Microsoft

Day 1 Agenda

9:15 Introduction to the Maker Movement & Design Thinking (Lecture and Large Group Discussion)

9:45 Lab: Unplugged Design Thinking | Lesson Plan: How to make toast | Kit Materials: post-it notes, marker, pencils

10:45 Introduction to Micro:Bit (Hands on exploration with lecture)

12:00 Working Lunch Session (SUB – Driftwood Bay) - BBQ Hamburgers & Hotdogs

1:00 Lab: Installing a program on your Micro:Bit (Hands-on STEM activity)

2:00 Keynote Speaker: Kevin Young (Driftwood Bay)

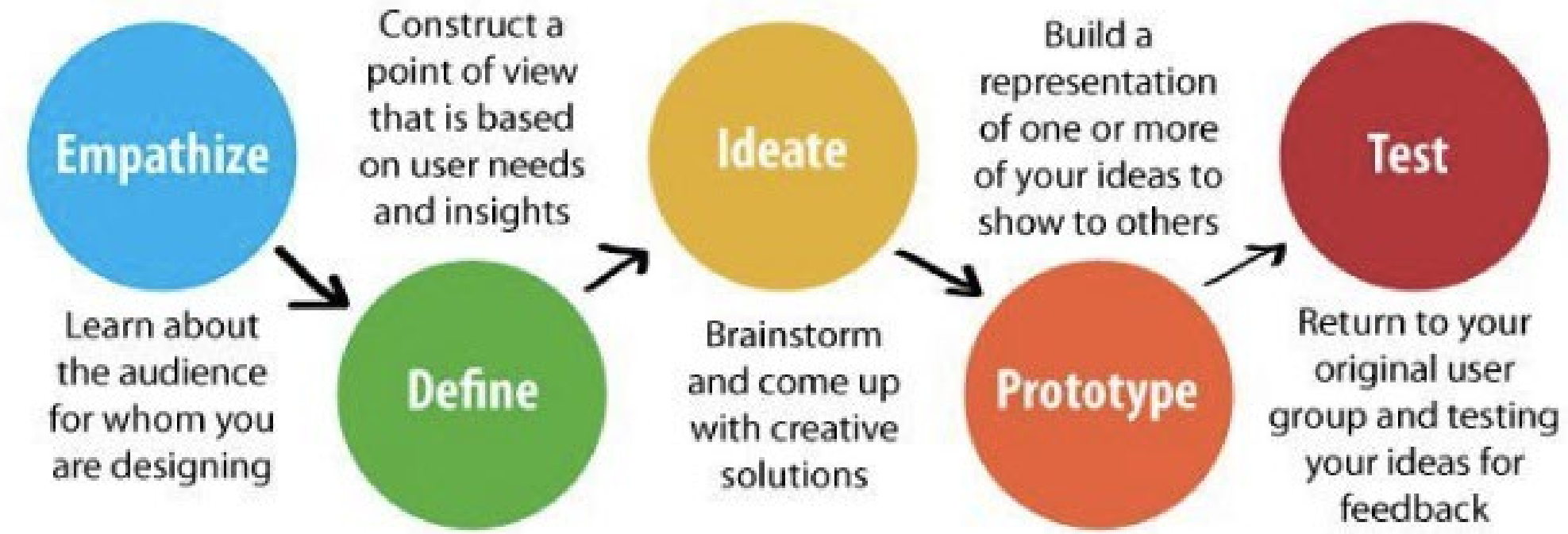
3:00 Lab: Project: Micro:pet | Kit Materials: Micro:Bit, micro-USB cable, laptop, battery pack, paper, tape, scissors, zip ties, anything participants can find in their environment to add character to their pet.

4:14 Maker Plan (Participant Work Time) Use this time to journal and organize your thinking. Reflect on what you have learned today. How you will share this learning with colleagues? Where can these activities fit into your instructional day? What allies do you have or need to make this successful in your school and district? What are three lessons idea you have from today?

4:30 Snack (SUB – Driftwood Bay)

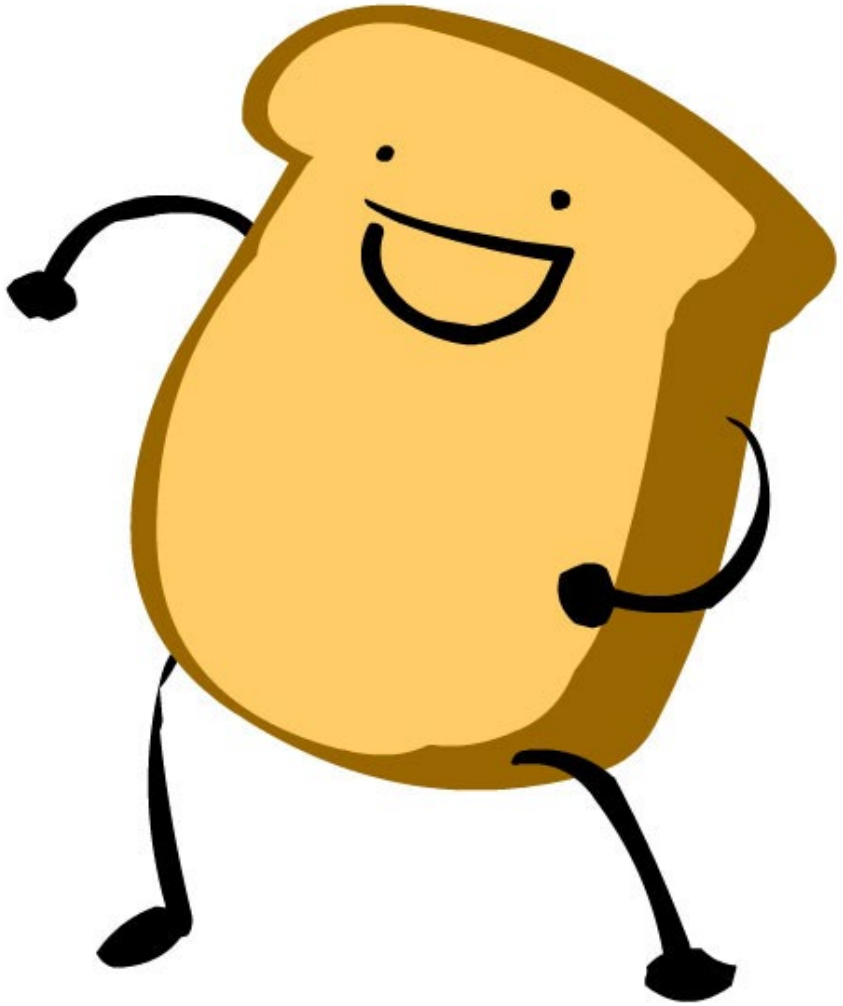
5:00 End of the Day Prize Drawing

DESIGN THINKING PROCESS



Design Thinking

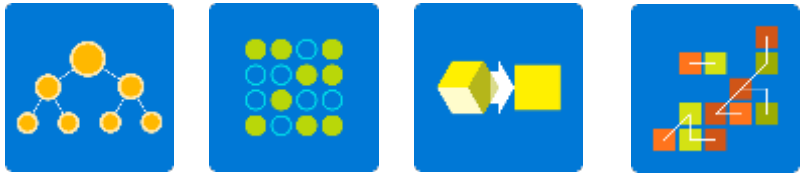
How to Make Toast



Fist to Five – Computational Thinking & Physical Computing

I haven't heard of this before	I have heard of this word before	I have seen this word before	I know what this word means	I can give a definition of this word	I can give an example of this word

Computational thinking



- Decomposition: The ability to break a larger problem down into smaller parts
- Pattern recognition: When you observe similarities and patterns within problems
- Abstraction: When you identify what defines the patterns you see and focus on the important information only
- Algorithmic thinking: When you develop a step-by-step plan or the rules to follow to solve a problem

Physical Computing

Physical Computing refers to interactive physical systems or devices that can be programmed through software.

Benefits of “Getting Physical”

- Holistic view of Computer Systems – across hardware and software
- Encourages Creativity & Personalization of projects (crafting, music & visual arts)
- Promotes learning by doing, trial & error, and collaboration
- Engages the Whole Learner – mind & body
- Growing Industry IoT trend
- Digital + Physical = Magic

Why Making + Coding?

Learning Activity Formats

deepest levels of learning

Do / Construct (Kinesthetic/Experiential)

Teach / Present

Talk / Discuss (Social)

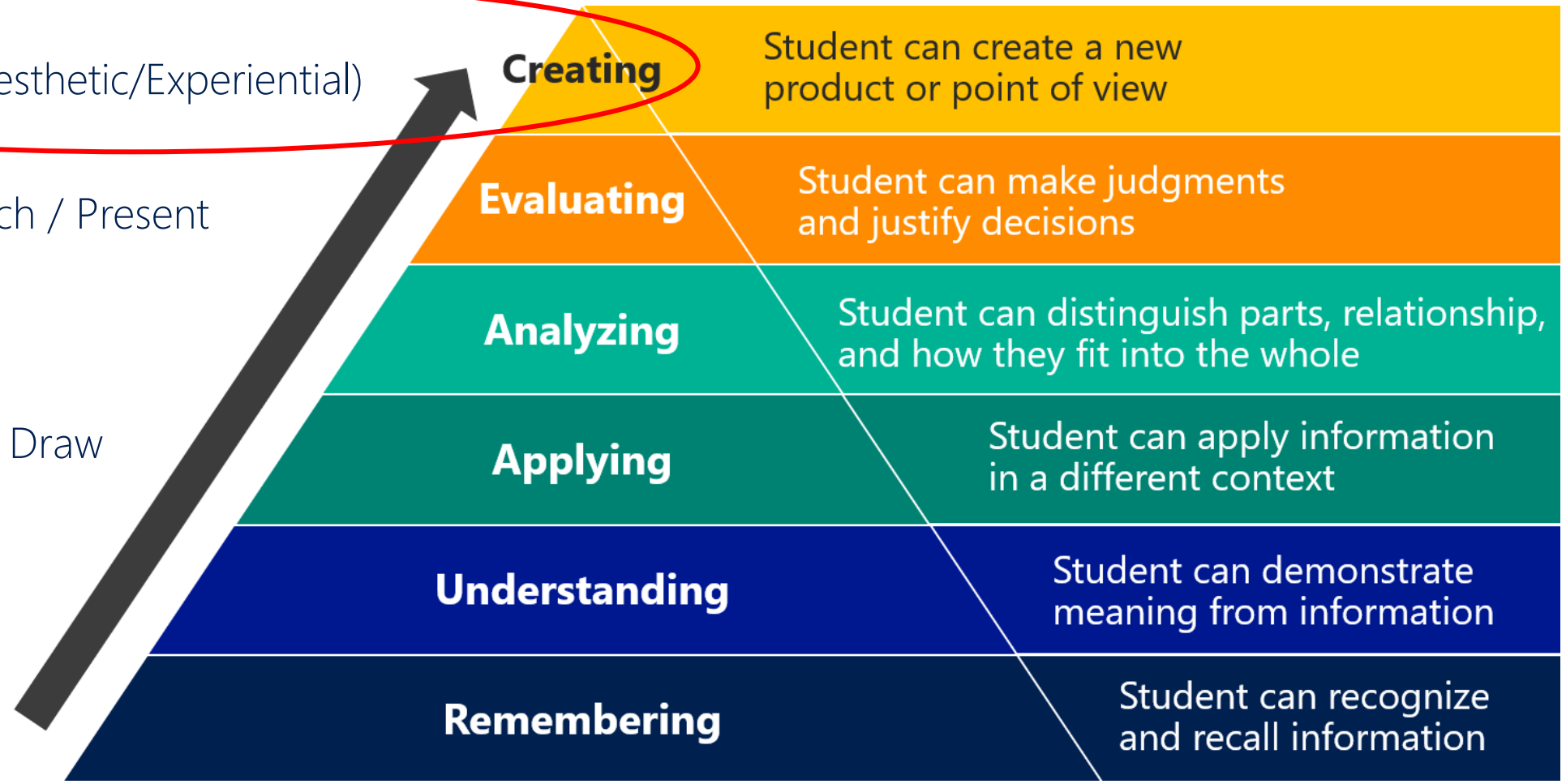
Write / Draw

Hear (Auditory)

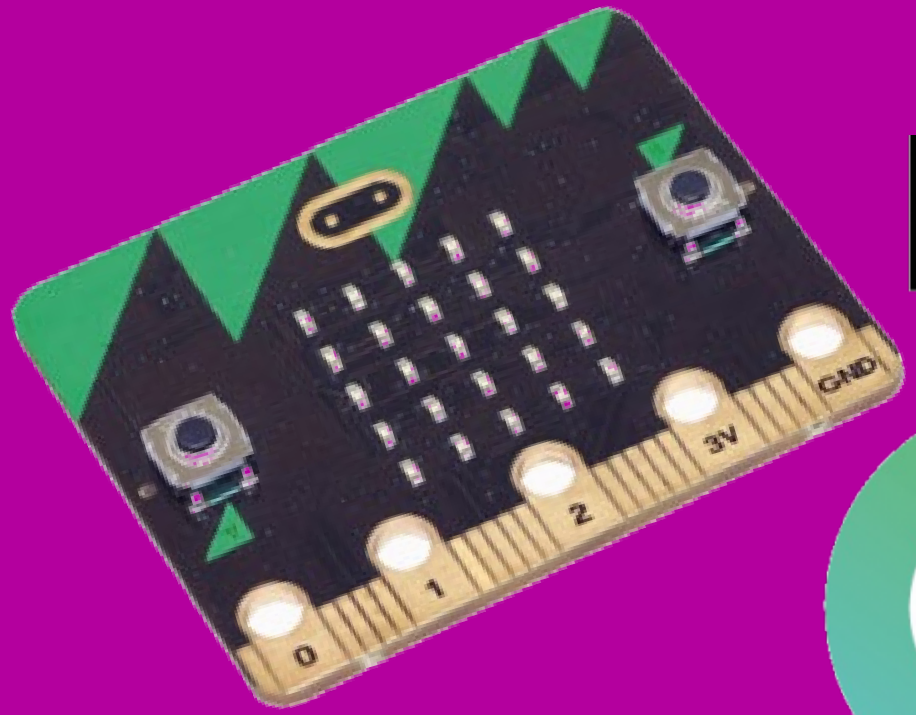
Read

Watch / See (Visual)

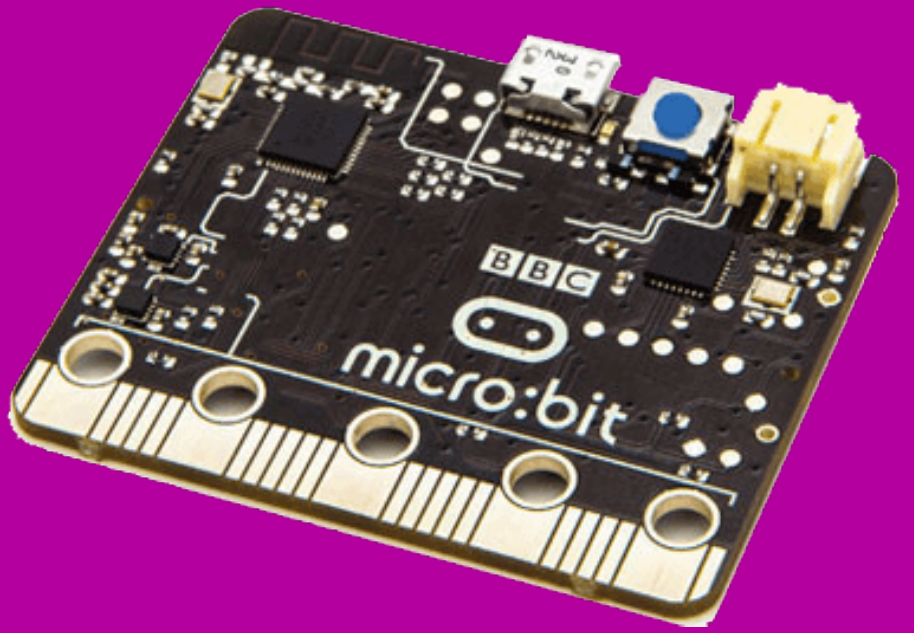
Bloom's Taxonomy of Learning



https://en.wikipedia.org/wiki/Bloom%27s_taxonomy



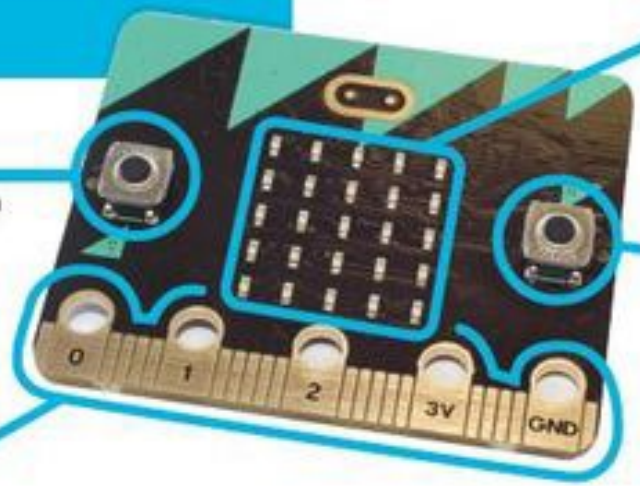
BBC



micro:bit

Micro:Bit - Overview of the board

FRONT



5x5 LED Matrix
The display for the Micro:Bit comprising 25 surface mounted red LEDs

Front Button A
Integrated push button

Front Button B
Integrated push button

I/O Connections
3 input/output 'pin' connections plus a power and ground connection

Program Reset Button
Hard reset control that restarts the board and program

Power Connector
Connection for providing battery power via the battery box or other source

Micro USB Connector
Used for power and programming when connected to a computer

Nordic Semiconductors nRF51822
Main brain of the board providing CPU, Bluetooth and memory functions

Compass & Accelerometer
Integral 3-axis components for direction and movement sensing

Freescale Kinetis KL26 Microcontroller (MCU)
Controls the USB connector

BACK

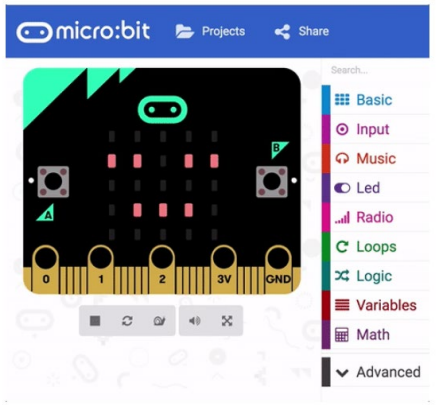

ITS TIME FOR LUNCH!!!
memes.com

Introducing Microsoft MakeCode

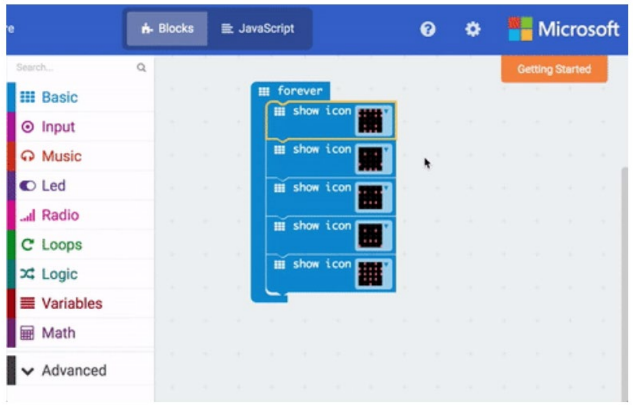
Hands-on Computing Education

Microsoft MakeCode

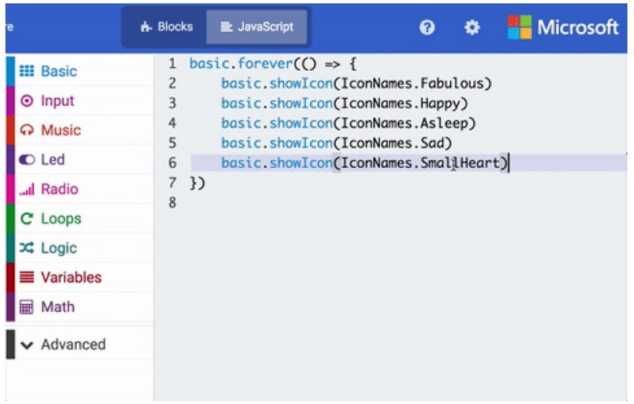
About Get Inspired Learn Hardware Resources Blog Labs



Simulator



Block Editor



JavaScript Editor

Microsoft MakeCode

Just works always, everywhere

- Free, open source, web-based
- Offline capabilities

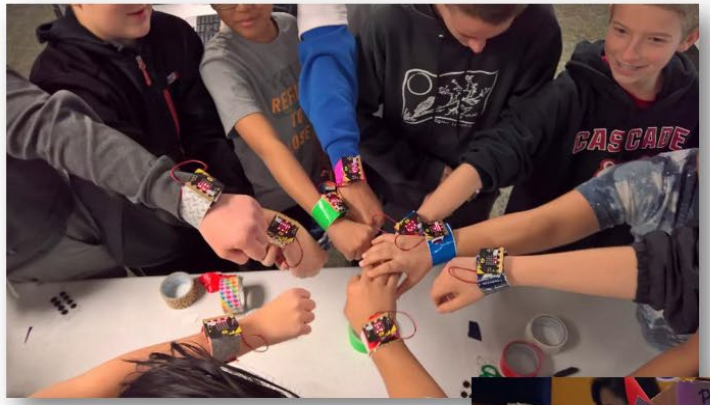
Real skills

- Block to Text editor progression
- JavaScript language
- VS Code editor

Make CS fun and tangible

- Support for a variety of products
- Simulator for quick iteration

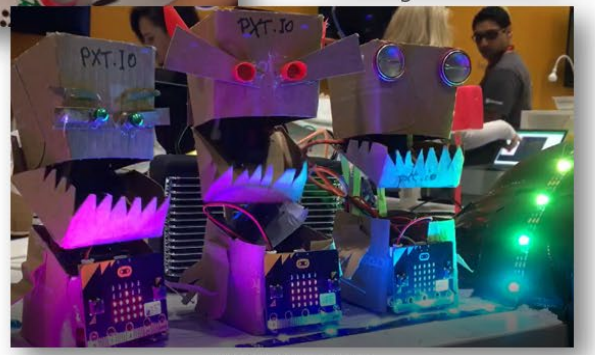
Example Projects


Wrist Cuffs


Magic Wands


Air Guitars

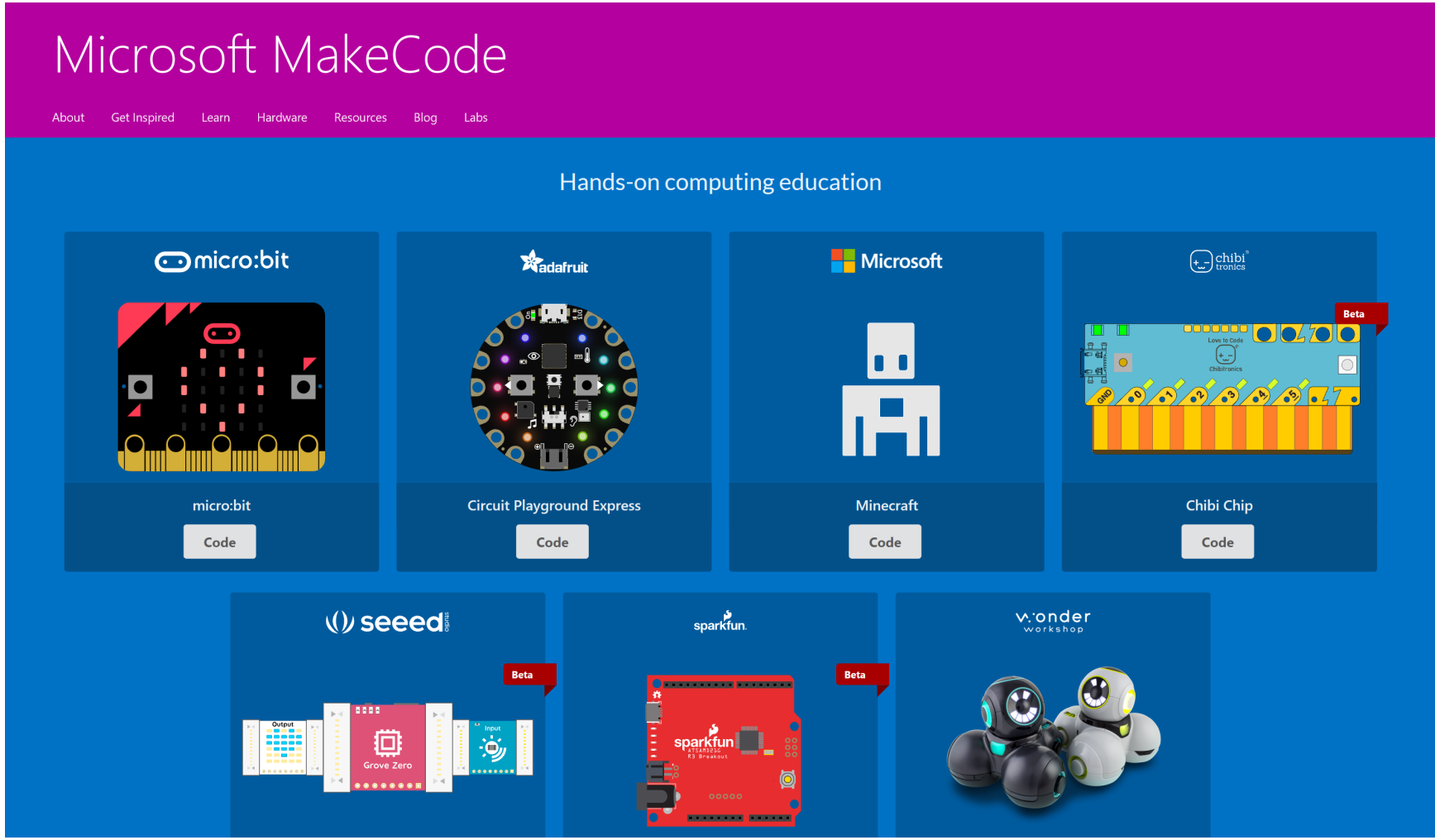

Wallet / Purse

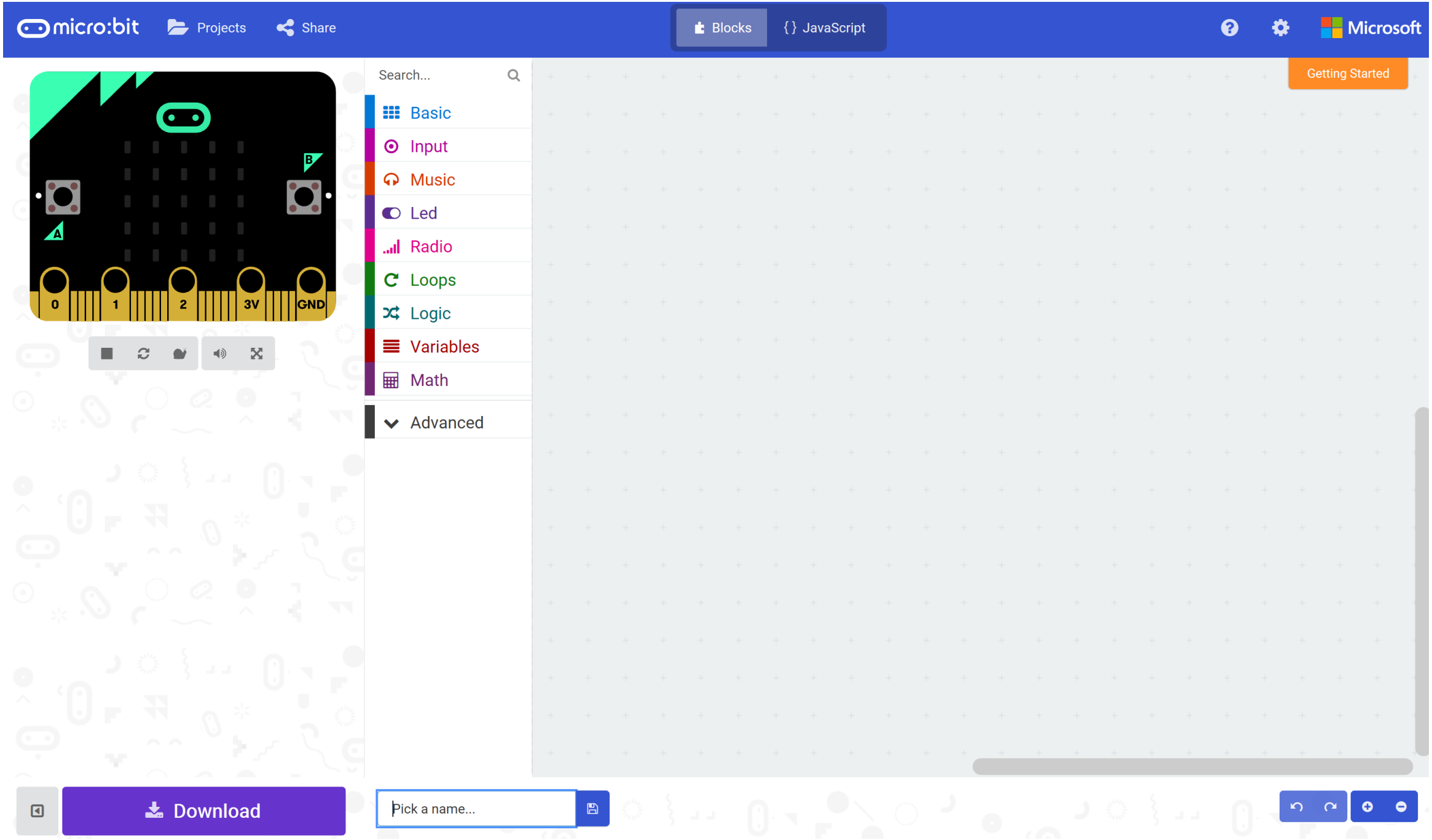


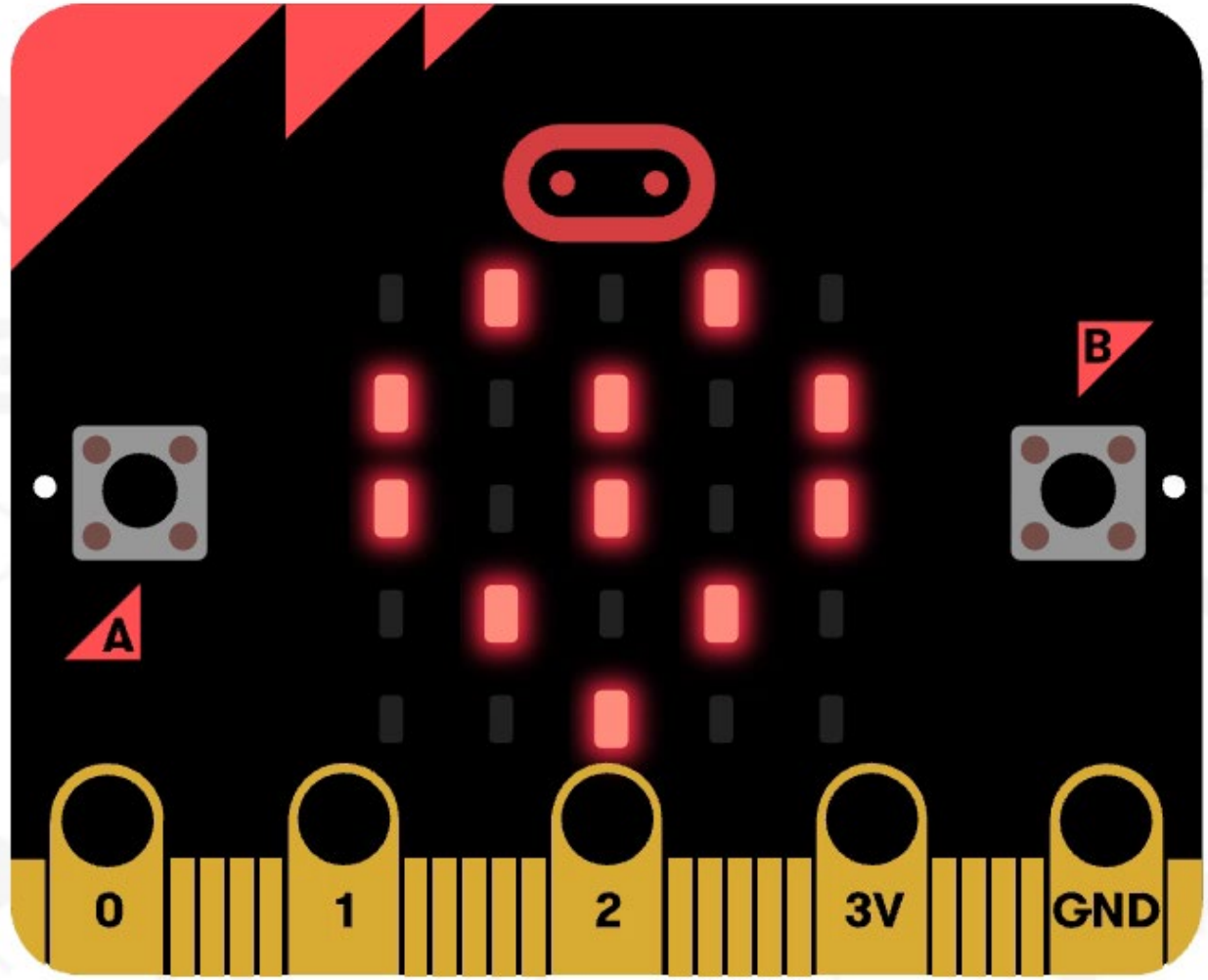
Light Monsters

MakeCode.com

MakeCode.com




micro:bit
Projects
Share
Blocks
{ } JavaScript
Microsoft
Search...
Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
Advanced
Getting Started
B
A
0
1
2
3V
GND
Download
Pick a name...


B
A
0
1
2
3V
GND

https://makecode.microbit.org/projects

Projects

Here are some cool projects that you can build with your micro:bit!

Games

Fun games to build with your micro:bit.

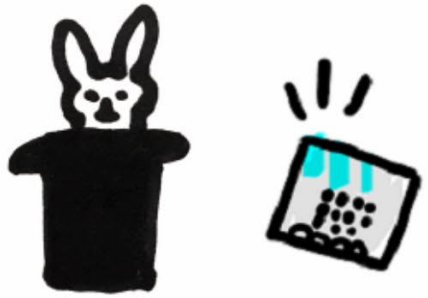
Flashing Heart

Smiley Buttons

Coin Flipper

Love Meter

Rock Paper Scissors



Magic Button Trick

Multiplayer Games

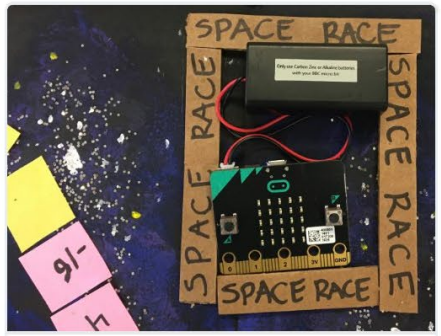
https://makecode.microbit.org/courses

Courses

A collection of courses and tutorials built for the micro:bit.

Classroom

Structured courses for teaching computer science in the classroom.

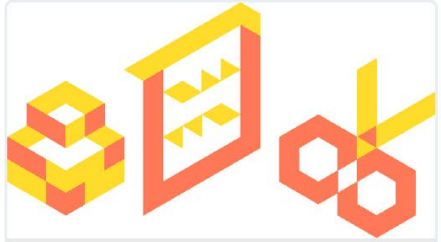


Intro to CS

14 week computer science course for middle school grades 6-8.

Computers and programming

Tutorials, lessons, and mini-courses about programming and computing.



Start Coding

11 lessons with five minute plans, teacher notes and program files.

Networking with the micr o:bit

SparkFun Videos

YouTube video tutorials produced by

Keynote Speaker: Kevin Young in Driftwood Bay

Make Your Own Micro:Pet

Micro:Pet Build Objective: Tomorrow, participants will evaluate each other's Mico:Pet.

Micro:Pets will be evaluated on:

- Micro:Bit has input and output
- Program properly downloaded to Micro:Bit
- Micro:Bit supported so the face is showing
- Micro:Bit can be turned on and off without taking critter apart
- Supports the Micro:Bit and its battery pack

Bring a Pair of Headphones tomorrow

Tuesday, June 19 - Day 2

8:15 **Micro:Pet Debrief***: Participants will evaluate each other's Mico:Pet. Micro:Pets will be evaluated on:

- Program properly downloaded to Micro:Bit
- Pet has input and output
- Micro:Bit supported so the face is showing
- Micro:Bit can be turned on and off without taking critter apart
- Supports the Micro:Bit and its battery pack

8:45 Squishy Circuits with a Buddy | Kit Materials: 9V battery, alligator clips, playdough, LED

9:30 Paper Circuits (simple circuit, 2-LED series circuit, and parallel circuit) | Kit Materials: button battery, copper wire, clip, LED, card stock)

10:00 Chibi Chip Paper Circuit Cat

10:45 Paper Circuit Greeting Card

12:00 Working Lunch Session – Chicken/Ground Beef Taco Bar

1:00 Guest Speaker (Angela Hemingway – STEM Action Center)

1:30 **Lab: Happy Face, Sad Face** | Lesson Resources: https://makecode.microbit.org/courses/csintro/algorithms/activity | Kit Materials: laptop, Micro:Bit, Battery pack, USB cord

2:15 **Lab: Rock-Paper-Scissors** |Lesson Resources: https://makecode.microbit.org/projects/rock-paper-scissors | Kit Materials: Micro:Bit, battery holder and 2 AA batteries, duct tape

3:00 **Lab: Hack your Headphone |** Lesson Resources: https://makecode.microbit.org/projects/hack-your-headphones | (Bring your own)

3:30 **Maker Plan** (Participant Work Time) Use this time to journal and organize your thinking. Reflect on what you have learned today. What do you want to learn more about? What barriers exist for you to be successful teaching students this content? How does what you learned today help you in the design of future lesson plan? Who could your reach out to in your community to speak to students about the careers where these skills are utilized?

4:30 Snack: Guest Speaker: Kelsey Brown from Idaho Office of Emergency Management

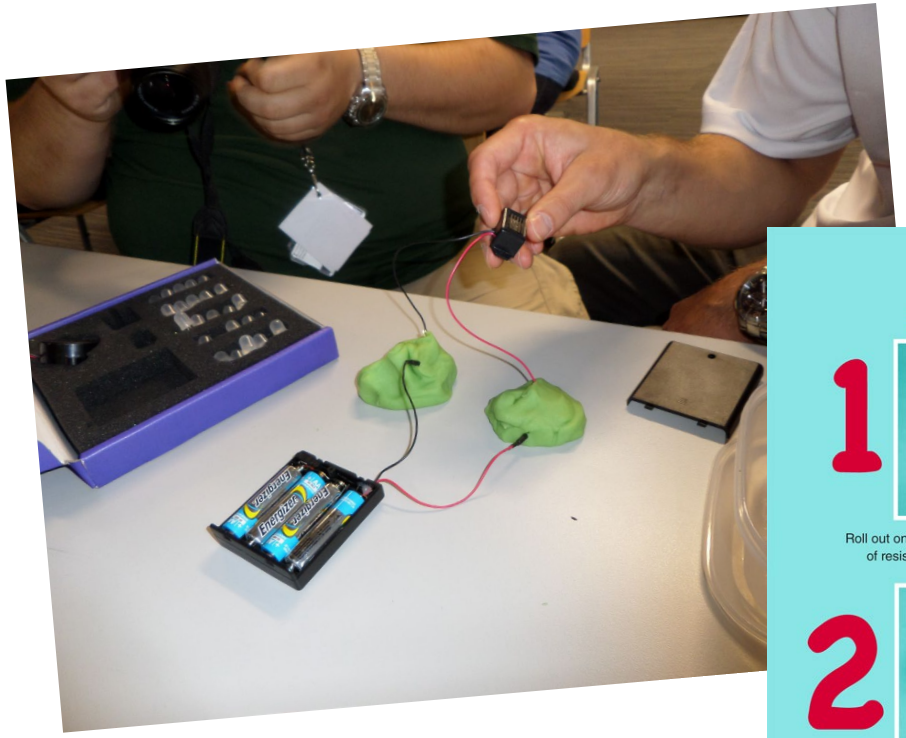
5:00 End of the Day Prize Drawing

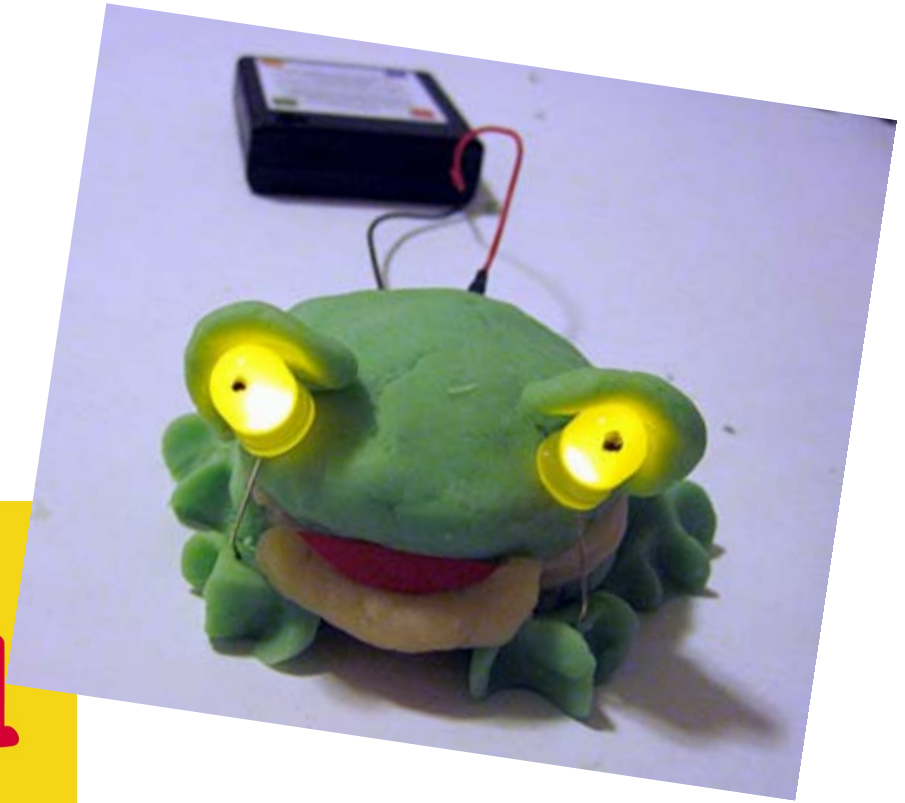
Micro:Pet Debrief

Micro:Pet evaluation:

- Program properly downloaded to Micro:Bit
- Pet has input and output
- Micro:Bit supported so the face is showing
- Micro:Bit can be turned on and off without taking critter apart
- Supports the Micro:Bit and its battery pack

Squishy Circuits with a Buddy





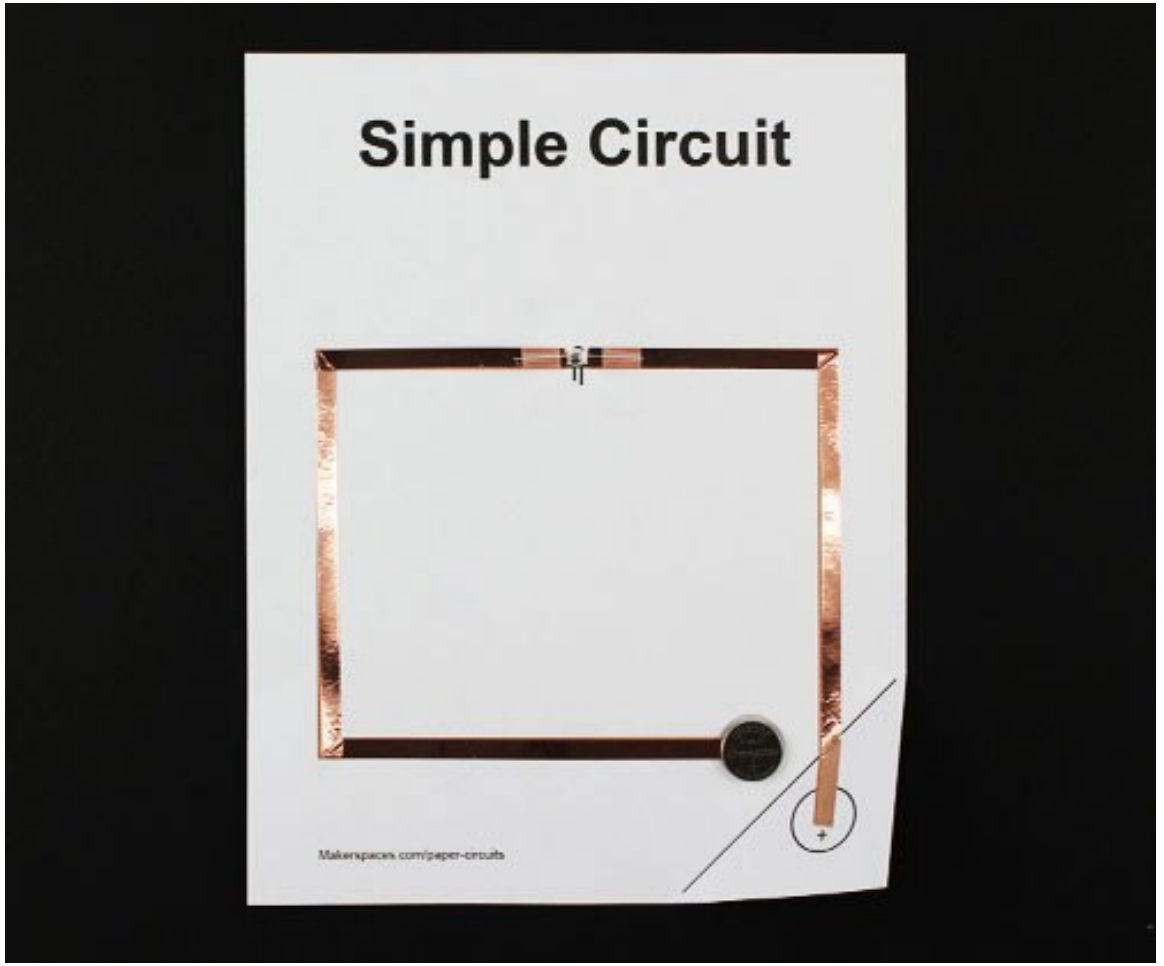
Materials:

2- wires w/Alligator Clips
Playdough
LED Diode(s)
9V Battery
Strip of Aluminum Foil

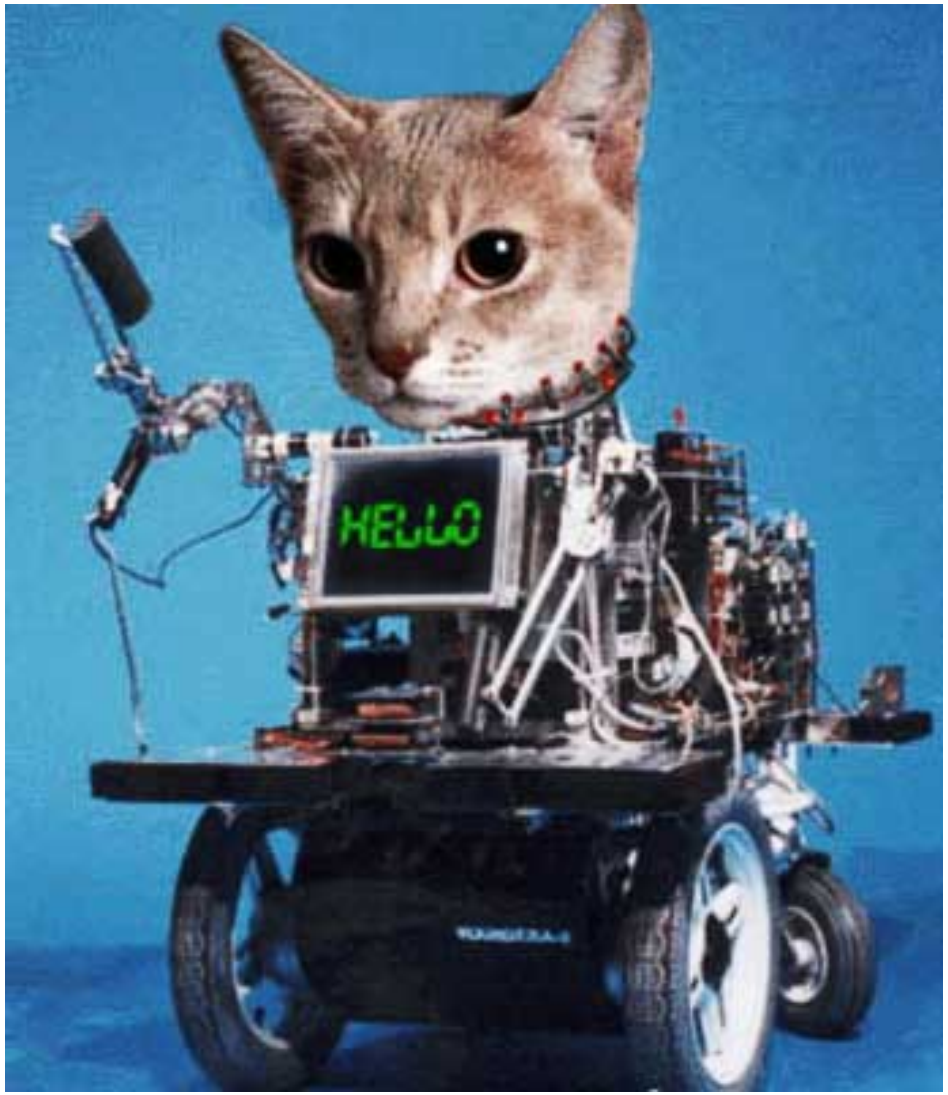
Paper Circuits

Types of Circuits:
- simple circuit
- 2-LED series circuit
- parallel circuit

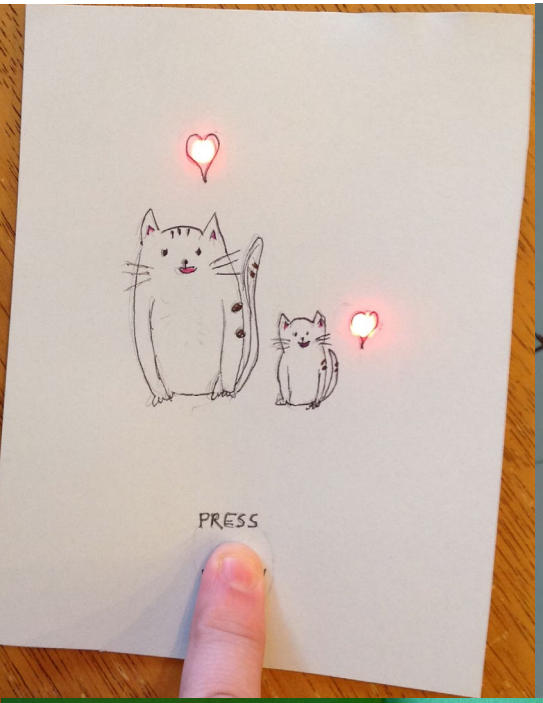
Kit Materials: button battery, copper wire, clip, LED, worksheets

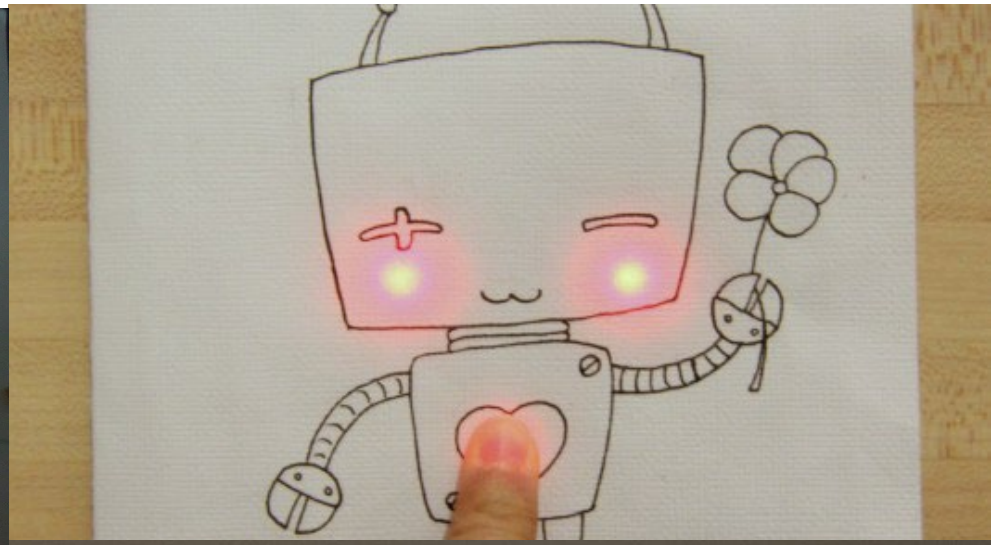


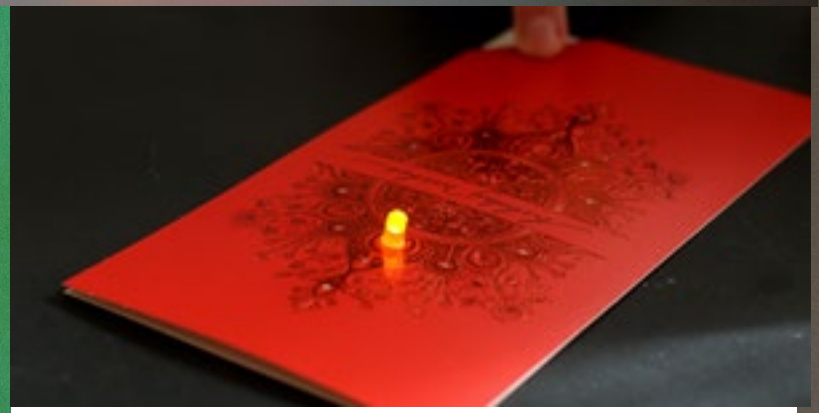
Chibi Chip Paper Circuit Cat



Paper Circuit Greeting Card

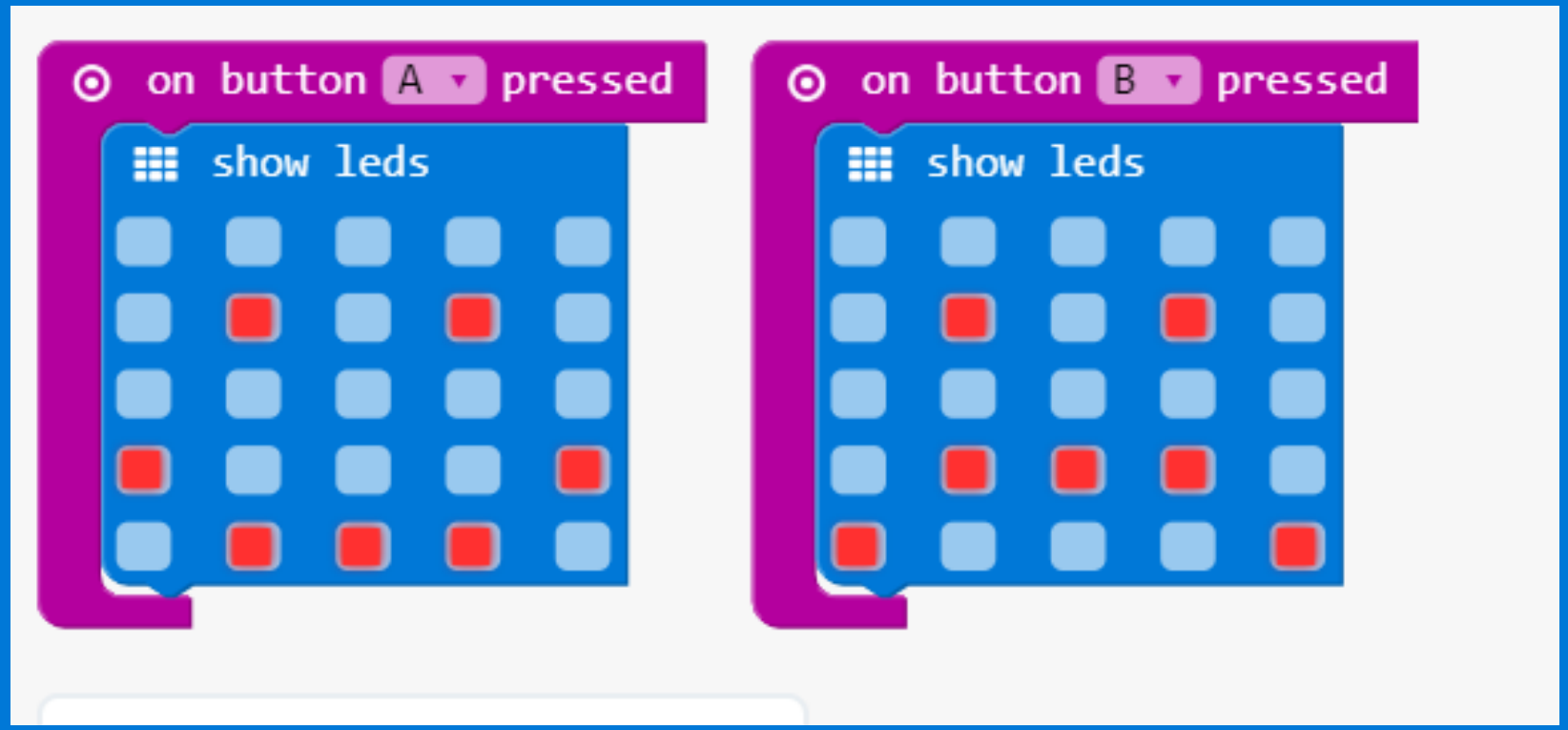







IS IT LUNCH TIME YET?
YES!
See you all
back at 1:30
makeameme.org

Happy Face-Sad Face



Kit Materials:

- Laptop
- Micro:Bit
- Battery pack
- USB cord

https://makecode.microbit.org/courses/csintro/algorithms/activity

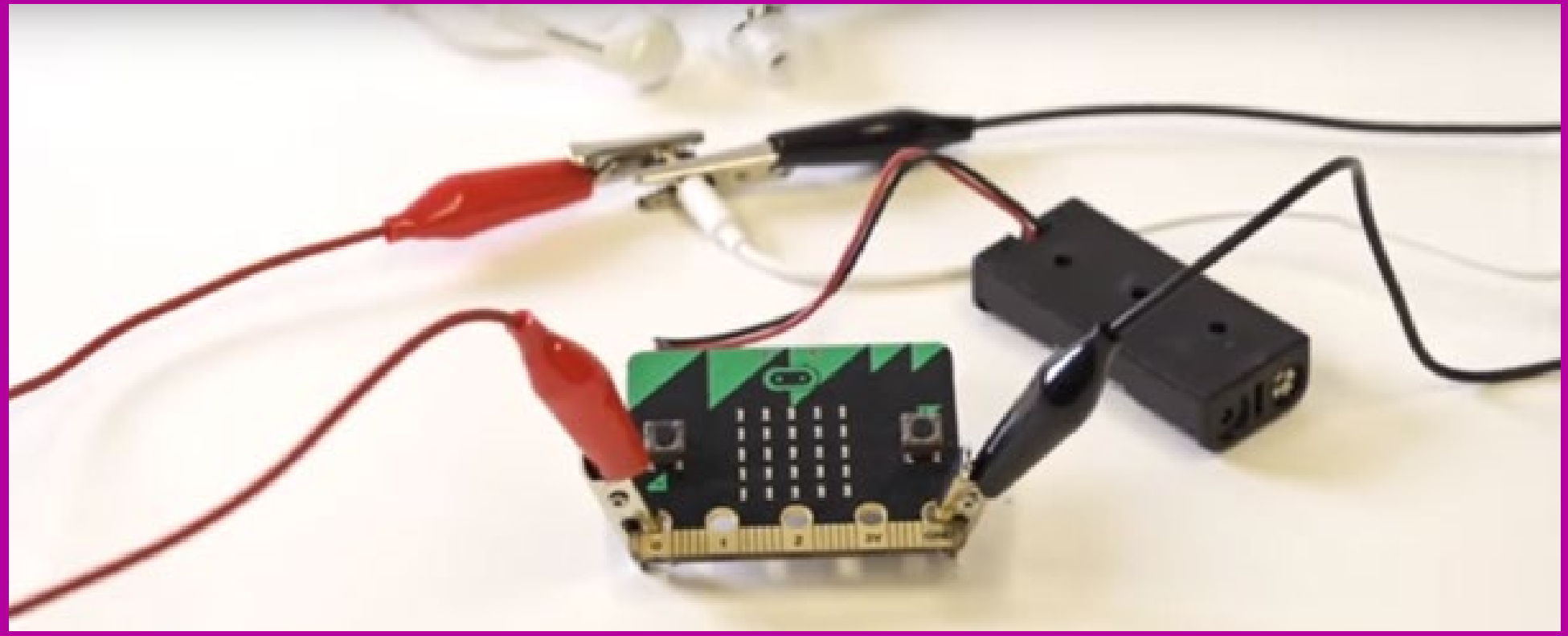
Rock-Paper-Scissors

Kit Materials:

- Micro:Bit
- battery holder
- 2 AA batteries
- duct tape

https://makecode.microbit.org/projects/rock-paper-scissors |

Hack your Headphone



Materials
- micro:bit,
- battery holder
- 2 AA batteries
- Headphones
- Crocodile clips

https://makecode.microbit.org/projects/hack-your-headphones

iSTEM18 Agenda for THURSDAY, June 21

10:00 **Strand Instruction**

- Access iSTEM Strand Resources in OneNote
- Join MEC
- Join STEM Action Center Mentor Portal
- Participant Work Time

12:00 Working Lunch Session

1:00 **Strand Instruction**

- iSTEM Participant Evaluation
- Participant Work Time
- Gallery Walk of Prototypes & Products

4:00 Snack (SUB – Driftwood Bay)

4:15 Closing Activities

5:00 Daily Wrap Up/ End of the Day Prize Drawing

iSTEM Participant Resources

tinyurl.com/NICiSTEM18

https://education.microsoft.com/

Microsoft | Store | Products | Support | Search Microsoft in Education

Education | School leaders | Educators | Students | Products | Training | News | How to buy

Community menu | Hi, how can I assist you today? | Messages | Community Support | Translate | SIGN IN | Not a Member? | JOIN NOW

- Microsoft Educator Community home
- Microsoft Innovative Educator (MIE) programs
- Badges, points, and certificates
- Courses and resources
- Skype in the Classroom
- Find, create, and share a lesson
- Connect and share with educators
- School Leaders Toolkit
- Higher Education

Home

Welcome to the Educator Community!

Connect and collaborate, find training and lessons, and earn badges and certificates on this personalized hub created for educators like you.

Skype

Immerse your students into Computer Science!

Join us on December 13th for a live event with Computer Science Professionals

Register Today

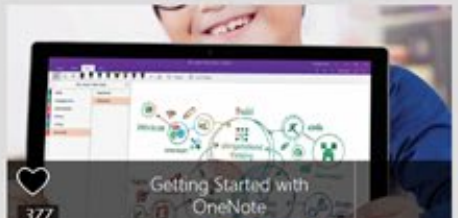
FILTER BY +

http://aka.ms/educatorcommunity

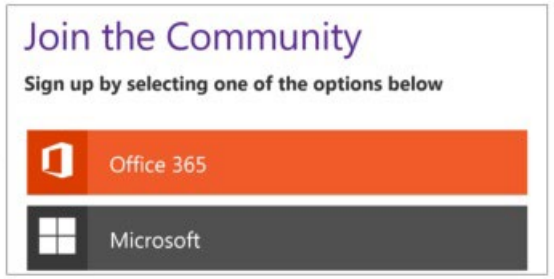
Overview | View All

Featured

More

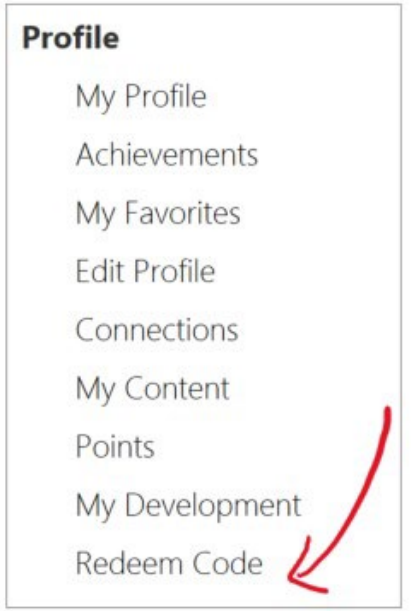


1. Join now
2. Office 365
3. Set up your profile
4. Promotional code:
5. Join the community!



and/or

1. Sign in
2. Office 365
3. Click your name
4. Redeem code:



Complete the registration process for Mentorship Portal (https://mentorship.stem.idaho.gov/)

Complete the post-institute survey via the Community Grants Portal (https://idahostem.force.com/gms/)

Resources

- Try any of the MakeCode editors at https://makecode.com
- Order hardware from https://makecode.com/#hardware
- Download micro:bit curriculum at https://aka.ms/intro2cs

Microsoft Educator Community Offerings