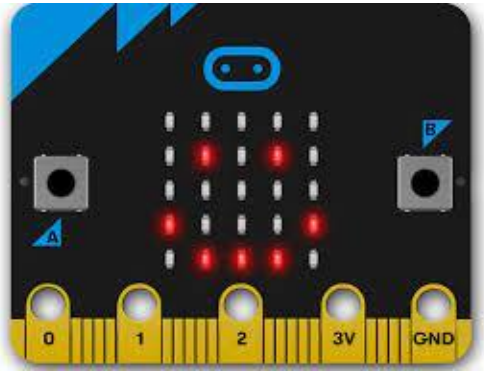
SCIENCE NORTH

SCIENCE NORD

Grade 4 Science - Matter and Energy - Light and Sound

Sound Shield Design Challenge

Materials



Here is what you will need:

1. 1 Micro:bit + USB cord
2. Building Materials - explore your recycling bins or cupboards at home and bring in news paper, cardboard, paper tubes, plastic containers, fabric, or any other clean supplies that potentially insulate from sound
3. Fasteners and adhesives - hot glue (CAUTION!), white glue, masking tape etc.

CAUTION!
HOT!

Introduction - Sound Waves

Sound - For Teachers

Science North
31 k abonnés
S'abonner
7
Partager
Télécharger

DISCUSSION

How does sound travel?

What sounds are really loud to you?

Do you ever find it too loud? What can you do to protect your ears from noise?

What if you can't cover your ears? Could you build something larger?

Watch This Video!

Sound - For Teachers

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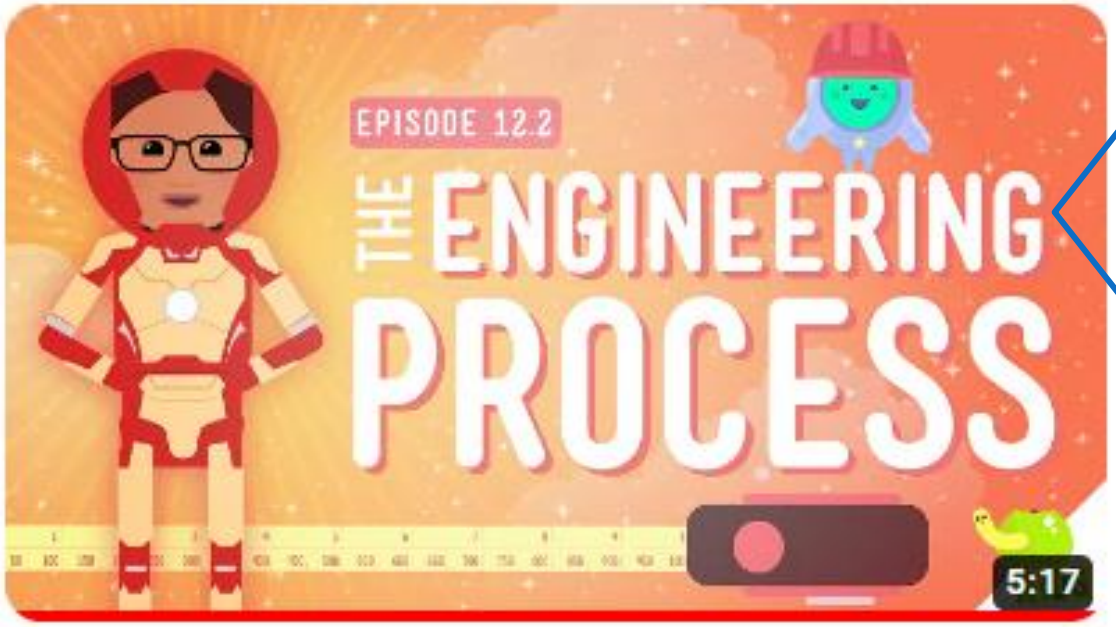
Intro - Engineering design process



Discussion

It's time for you to be an engineer!

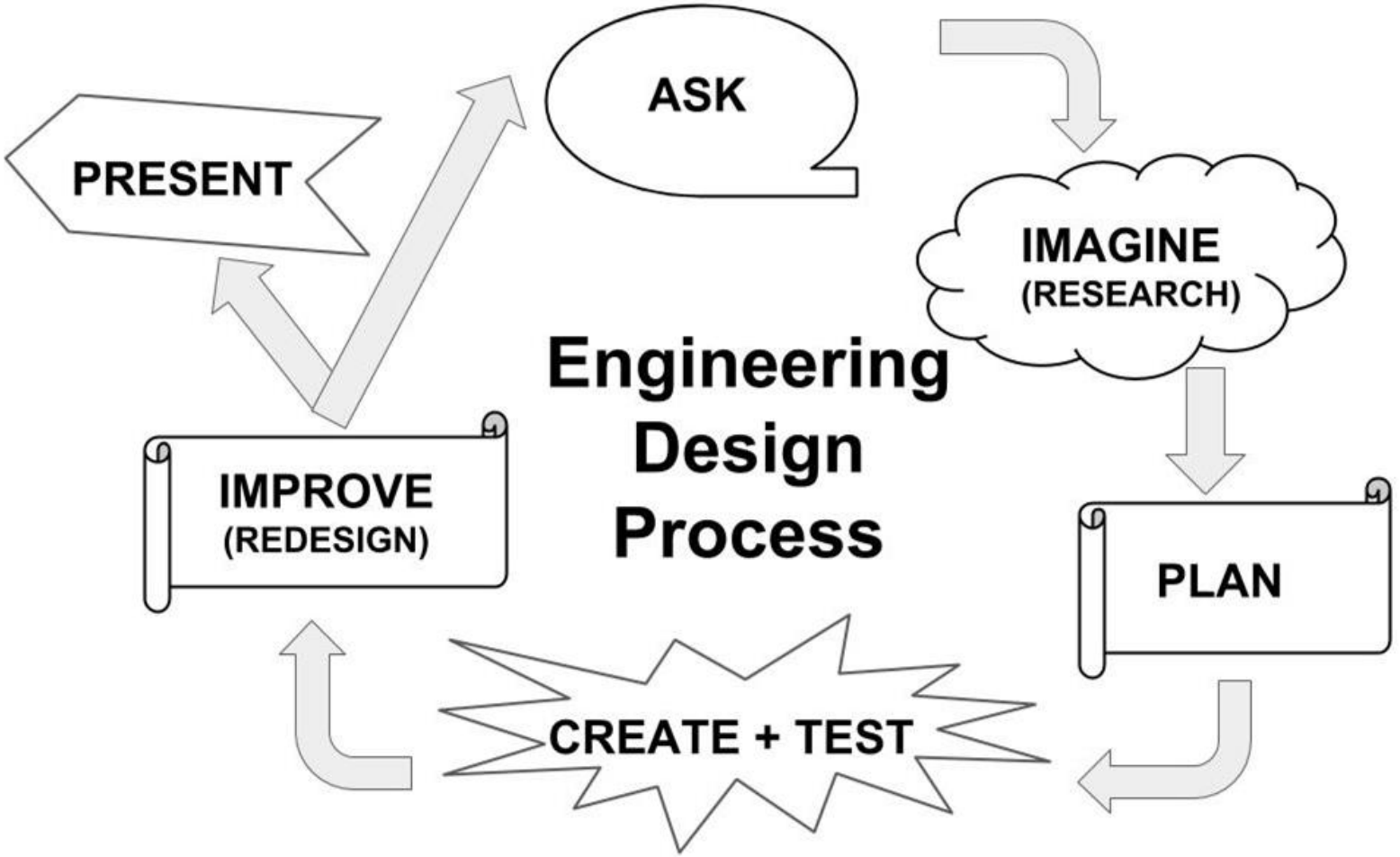
How can you design and build a model of a sound shield to protect your classroom from outside noise?

How can you test that it works?

Watch This Video!

[The Engineering Process: Crash Course Kids #12.2]

Action: Sound Shield Design Challenge



Follow the Engineering design process using this template and handout to guide you.

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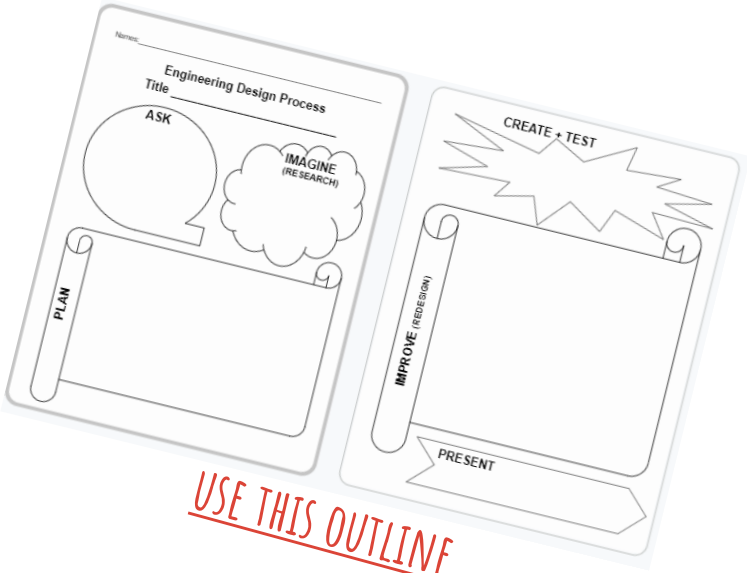
SOUND SHIELD DESIGN CHALLENGE

ASK

How can we build a sound shield that will reduce noise by at least 50%?

Make sure you consider that the sound shield must be big enough to hold a micro:bit and battery pack.

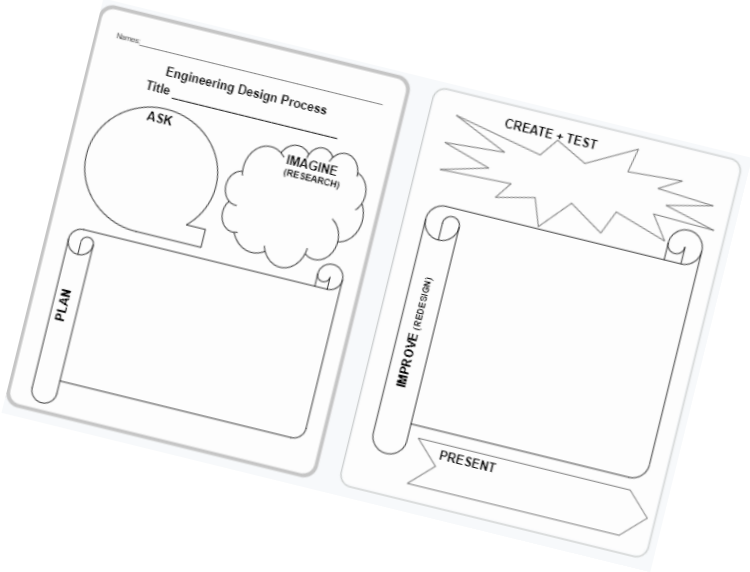


USE THIS OUTLINE

SOUND SHIELD DESIGN CHALLENGE

IMAGINE
(RESEARCH)

WHAT ITEMS FROM THE RECYCLING WILL YOU USE?
WHICH ARE GOOD INSULATORS?
WHAT SHAPE WILL IT BE?
LOOK UP IDEAS ONLINE.



SOUND SHIELD DESIGN CHALLENGE

PLAN

Draw a design of your idea here.
Before you do, remember how we are testing our sound meters with micro:bits

SOUND SHIELD DESIGN CHALLENGE

CREATE + TEST

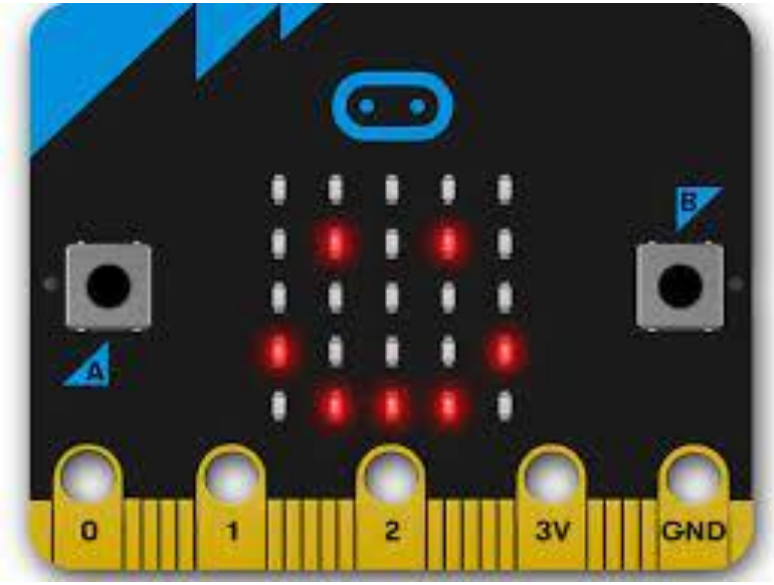
BUILD YOUR SOUND SHIELD! YOU WILL HAVE 25 MINUTES TO COMPLETE IT.

HOW WILL YOU TEST IT OUT? SEE THE NEXT SERIES OF SLIDES

Introducing Micro:bits

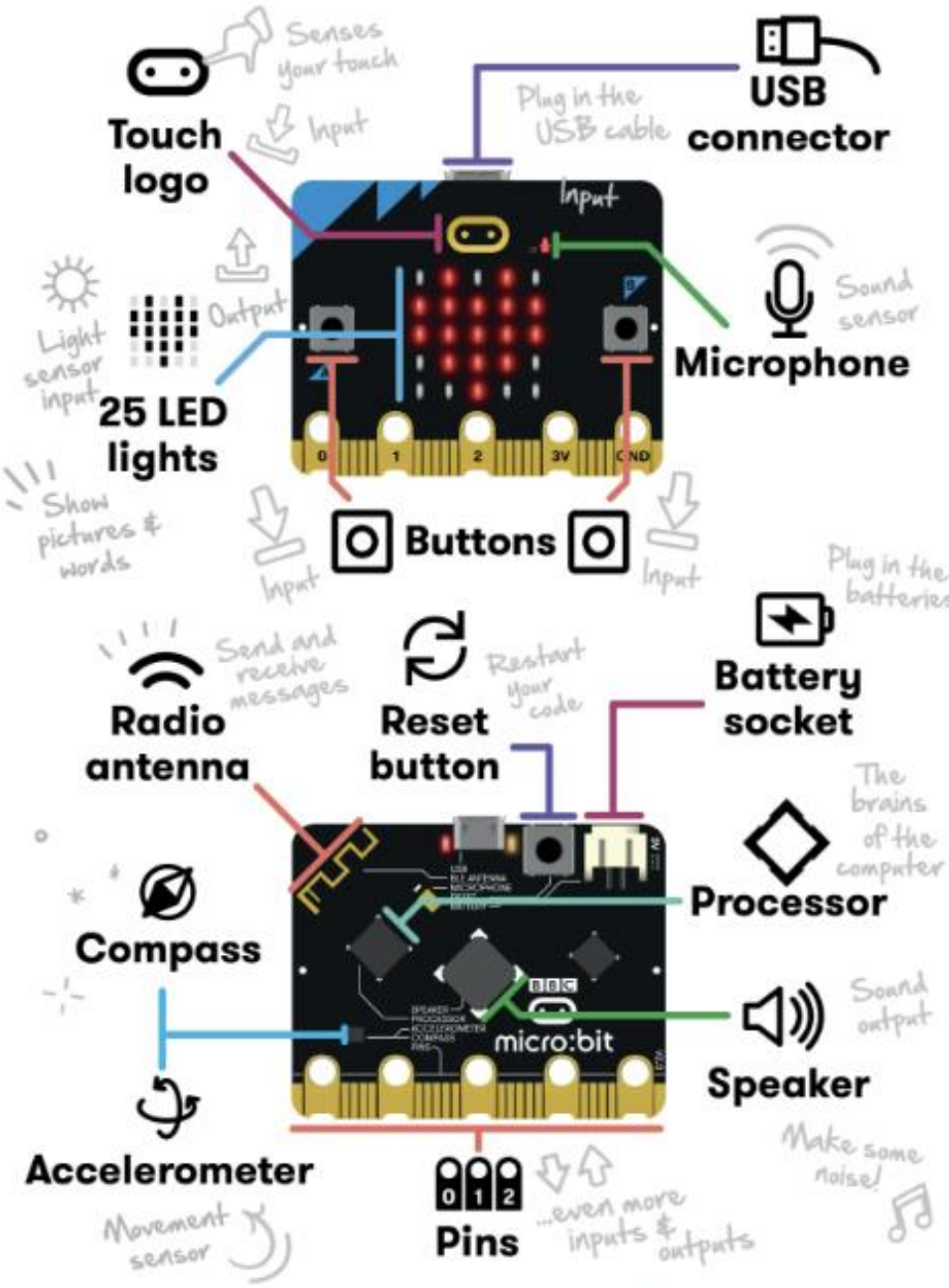
Want to learn more?

1. Micro:bit introductory lessons "First Steps"
2. Teacher-Made Micro:bit guide & science lessons
3. Make Code - try out a few tutorials!



Watch This Video!

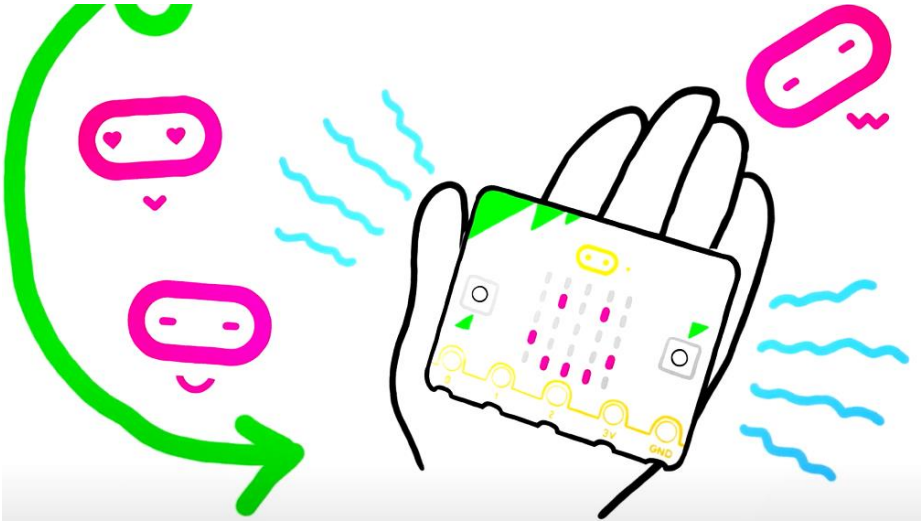
Computational thinking - Inputs & outputs

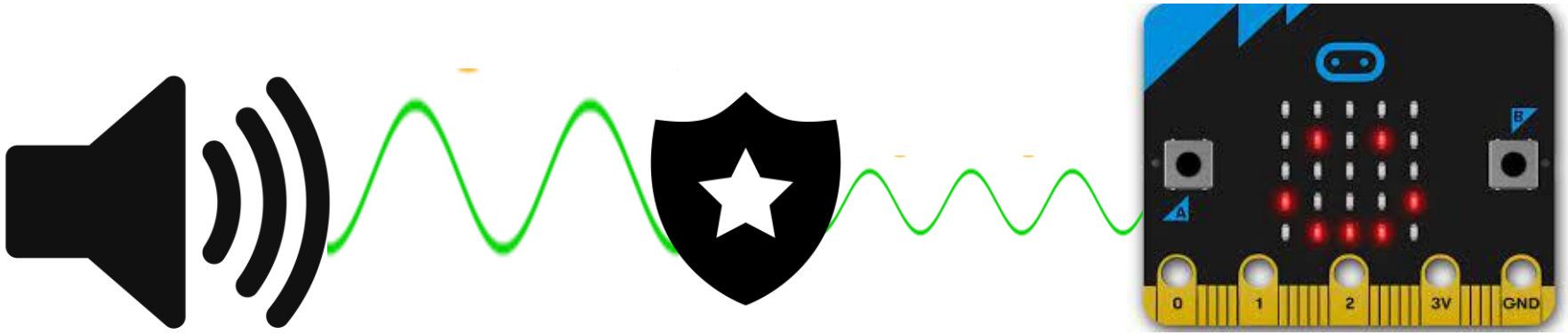


Watch This Video!

Micro:bits Inputs and Outputs
Micro:bits - Features (optional)

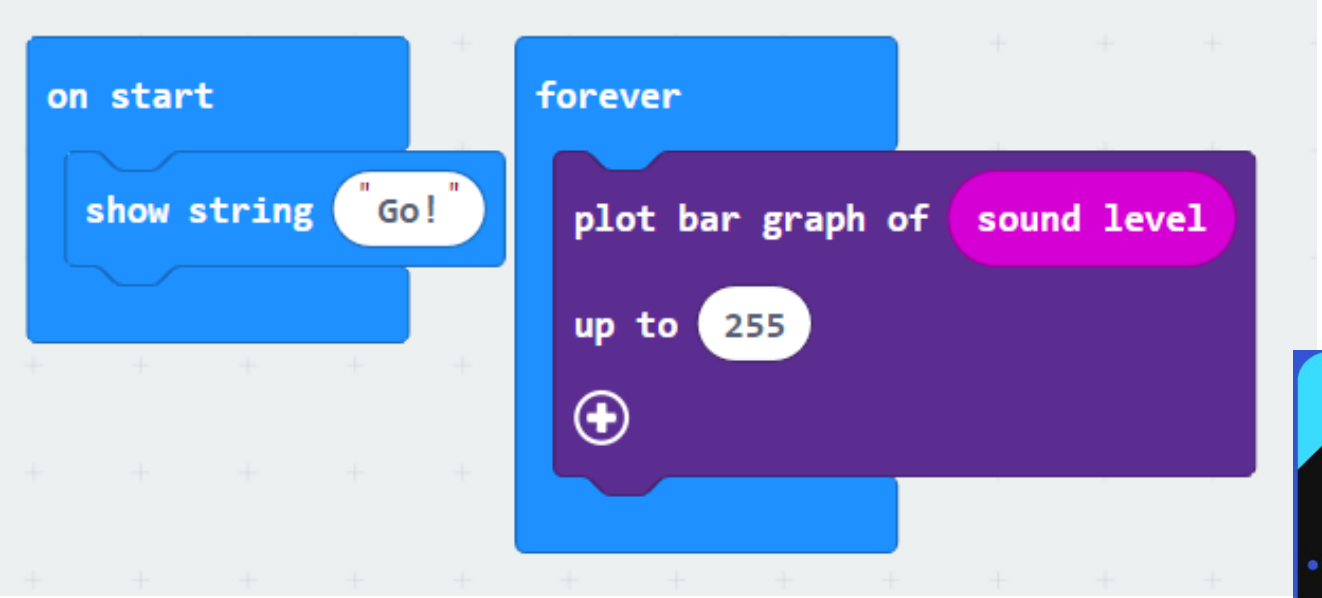
How will we test our shields?

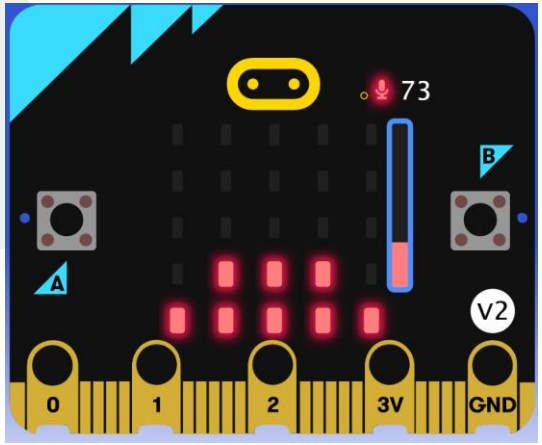




[Sensing and making sound on the BBC Micro:bit]

Action: Coding a sound sensor





Try out this simple code in MAKECODE!

Action: testing your shield

CREATE + TEST

Test your sound shield!

Play some music in class and measure the sound with and without the shield.

Action: Improving your design

IMPROVE
(REDESIGN)

Now that you have tested your sound shield, how can you improve it? You have ten minutes and can get a few more supplies

Action: Re-testing your shield

RE-TEST

Test your sound shield again.

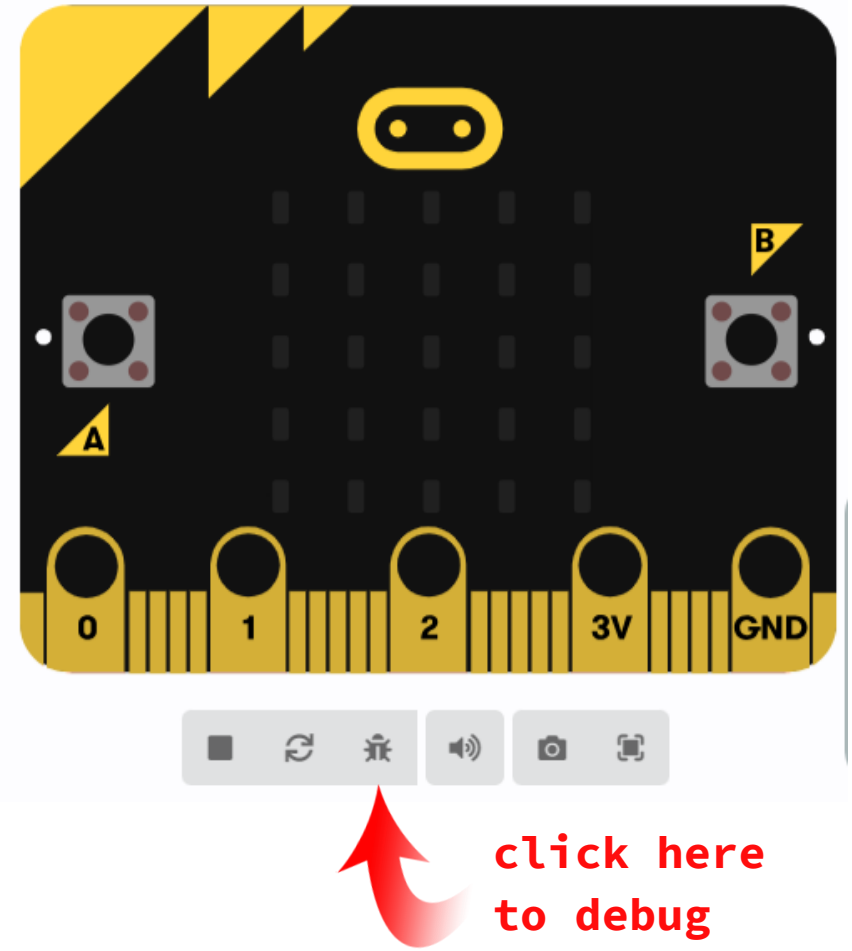
Is it any better?!

PRESENT

Share your designs with another classmate.

What do you notice about their designs?

DEBUGGING



IT DOESN'T WORK!

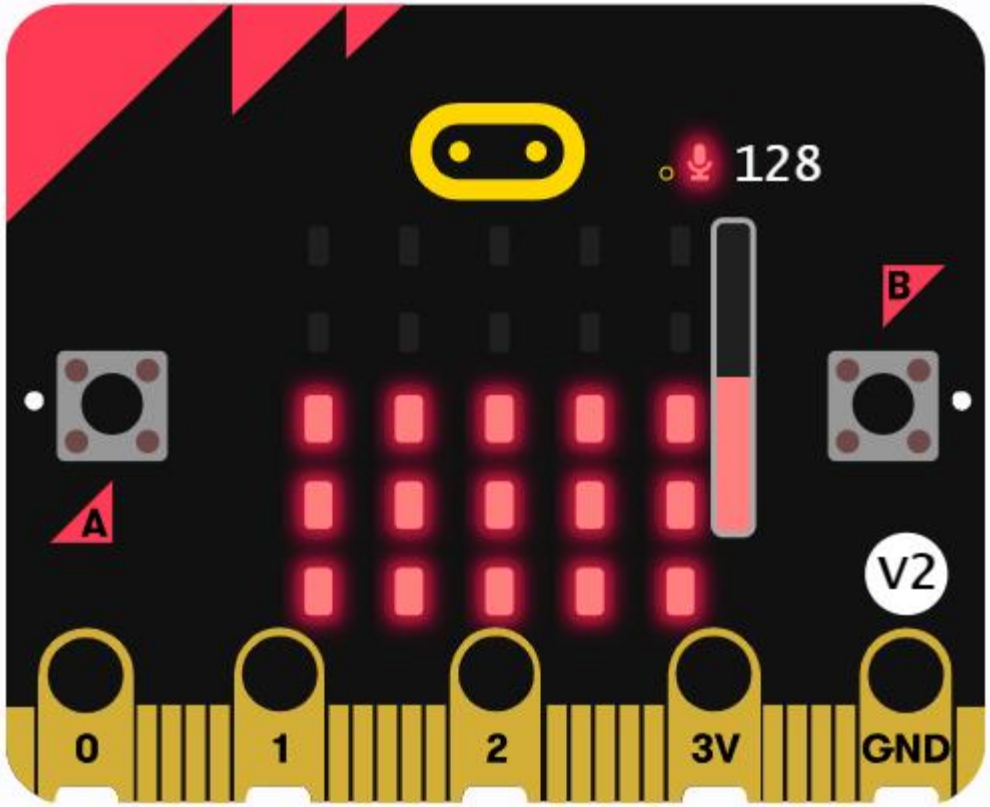
- A Micro:bit is only as good as the code! Go through it carefully and even restart from scratch if you have to.
- Think like a machine. Take it one step at a time and test out each step separately as you go
- Ask a classmate or teacher for help.
- When it doubt, look it up online!

Consolidation

Reflection

- What were some of the challenges in your design process?
- What would you change if you had to do this over again?
- What was the biggest challenge with coding a mocribit?
- Why did we use items from te recycling instead of new craft supplies?

Extension - Sound Logger



Make a sound level logger to monitor how loud or quiet different places around you get over time

https://microbit.org/projects/make-it-code-it/sound-logger/

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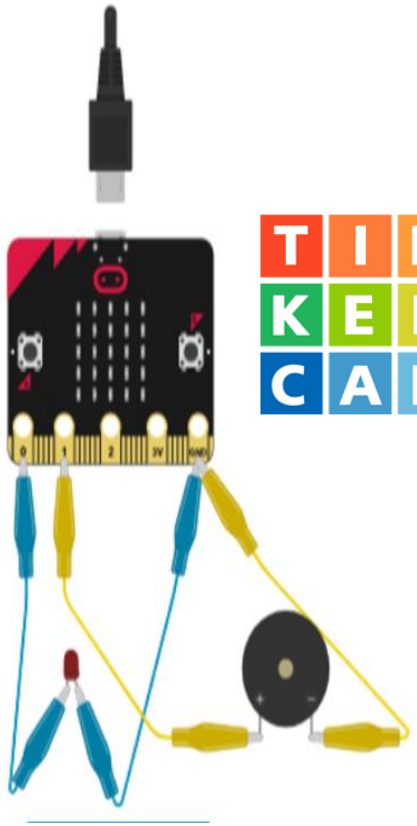
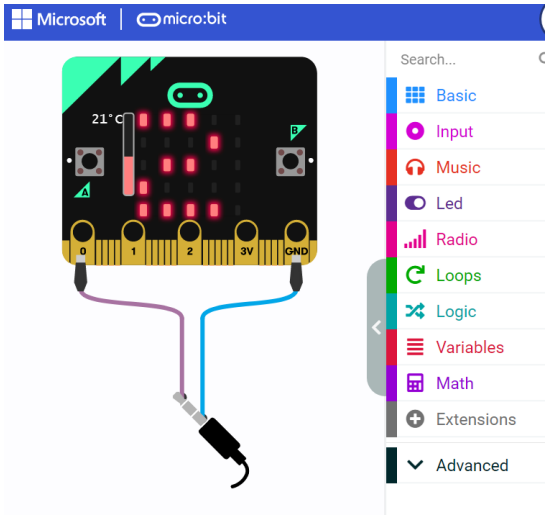
Accomodations





No micro:bit? No problem!

- You can still build, test, and debug using MakeCode!
- You can also build virtual Micro:bits in Tinkercad too!

Additional Resources

Black Gold School District micro:bits!

the Engineering Design Process

TeachEngineering.org

TeachEngineering.org

micro:bit do your :bit

UN Sustainable Development Goals