Lowe's Tech STEAMKit
Facilitator Instructions and Overview

Materials
- **Lowe's Tech STEAMKits**
- **Facilitator/Student Computers**
- **Scissors**
- **Tape/Glue**
- **Color Pencils/Crayon (optional)**
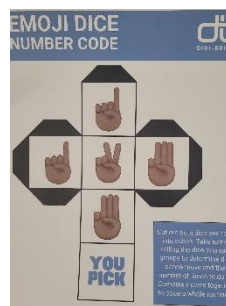- **Scrap Paper**
- **Recording Device (optional)**

Activities Overview

30-45 Minutes	Coding Dance Dice (will need class set of scissors and tape/glue)
20-30 Minutes	Paper Circuit Art
60-90 Minutes	Raspberry Pi Pico- Play Piper

Activity Breakdown: Coding Dance Dice

This activity allows scholars a fun way to explore off-screen coding. The concepts are very simple but emphasizes sequencing. (When using algorithms in codes, the right order matters for the overall code or algorithm to work).

Dice Build
1. Each scholar will take the time to cut out each dice sheet provide in their STEAMkit.
2. Have scholars fold each black tab and connected sides back.
3. Tape tabs on the inside and corners (for extra security).
4. Emoji Pictures: will represent the dance or moves scholars will complete
5. Hand Pictures: will represent the number of times scholars will repeat the movement in each sequence

6. Refer to the dance tutorial video provided to see the representation of dance or have scholars come up with their own representation of each dance sequence.

Video Link: https://youtu.be/kcTlFvAR33I

Game Overview: Group Option
1. Pass out a scrap piece of paper and writing tool to each scholar.
2. Divide scholars into groups of 2-4.
3. Each scholar will roll their pair of dice and record/write down the sequence of dance moves and number of times they should repeat it.
4. Scholars will work with teammate(s) to create a unique dance sequence based on their combination of emojis written down.
   a. [**Note**: The order matters in the manner of how each scholar rolled their pair of dice. ***Example:*** *If a scholar rolls a "Hit The Whoa" and a "Three" emoji, the group must complete the "Hit The Whoa" move three times consecutively throughout the dance sequence. They can choose how many times that specific sequence is done.*]

5. Encourage scholars to do variations on a step and to include spatial movements. Require a beginning and ending frozen pose.
6. Once a group has their sequence, allow each group time to practice and record their dance sequences as a group.
7. Use glowsticks as accessories for the dance. Incentives are encouraged!
8. HAVE FUN!

Game Overview: Individual Option
1. Pass out a scrap piece of paper and writing tool to each scholar.
2. Each scholar will roll their pair of dice and record/write down the sequence of dance moves and number of times they should repeat it.
3. Have each scholar complete previous step about 3-5 times, documenting each emoji dance and the number of times it should be completed.
4. Scholars will work to create a unique dance sequence based on their combination of emojis written down. [**Note**: The order only matters in the manner of how each scholar rolled their pair of dice. ***Example:*** *If a scholar rolls a "Hit The Whoa" and a "Three" emoji, the scholar must complete the "Hit The Whoa" move three times consecutively throughout the dance sequence. They can choose how many times that specific sequence is done.*]

5. Encourage scholars to do variations on a step and to include spatial movements. Require a beginning and ending frozen pose.
6. Once an individual has their sequence, allow time to practice and record their dance sequences.
7. Use glowsticks as accessories for the dance. Incentives are encouraged!
8. HAVE FUN!

Activity Breakdown: Paper Circuit Art

This activity explores simple circuitry with basic materials. The circuit has two ways of being assembled and can be modified accordingly based on grade levels completing the activity.

"When you connect an LED to the battery using copper tape, you complete a *closed circuit*. In a closed circuit, electricity can flow through a loop, from the battery, to the LED, and back again, causing the LED to light up. If one or more of the connections is broken (for example, one LED lead is not touching the copper tape or correct battery wires), this creates an open circuit. Electricity cannot flow in an open circuit, so the LED goes out. Finally, if your two segments of copper tape touch each other, this creates a short circuit, which would also cause the LED to go out." (Source: https://www.sciencebuddies.org/stem-activities/paper-circuit)

With Copper Tape
1. Each scholar will take the time to color their paper art sheet provide in their STEAMkit.
2. Have scholars locate their battery, copper tape, LED light, and glue dots from their STEAMkit.
3. Cut one glue dot into 3 pieces (First, cut in half. Second, cut on of the halves in half again.)
4. Place glue dot in position where battery placement is indicated and then attach battery to paper card.

5. Place other two glue dots on either side of the dot that indicates the placement of the LED light. (This will hold the legs of the LED light in place so it does not move around)
6. Look closely at the legs of the LED light. The slightly longer leg represents the positive (+) flow and the shorter leg represents negative (-) flow.
7. Bend the legs of the LED light and push the light through the hole indicated. Align the positive and negative legs of the LED light as indicated on card.
8. Create paths for the positive and negative sides of the battery using the copper tape. (Note: Have scholars place a small piece of copper tape aside to 'sandwich' the ends of the battery wires between so they are secured in place. Refer to image below for visual aid).


PUT YOUR BATTERY HERE!

POKE YOUR LED THROUGH HERE!
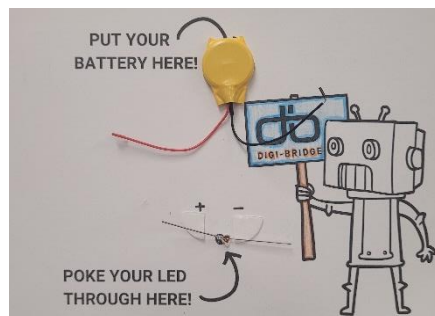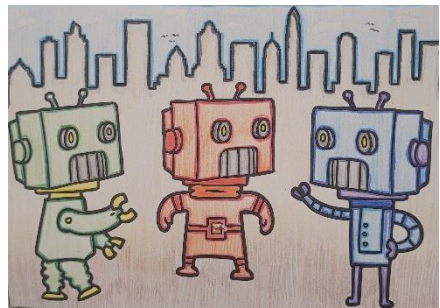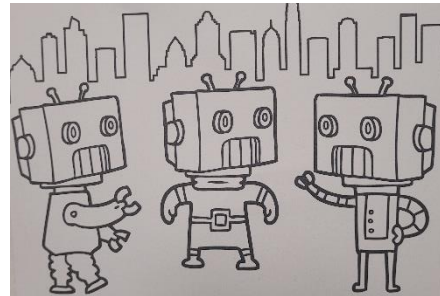
9. Adjust so the light stays lit in the circuit. [Note: If light does not turn on, switch legs of LED light to correct paths and make sure the paths are not touching. Reference visual aid found below.]
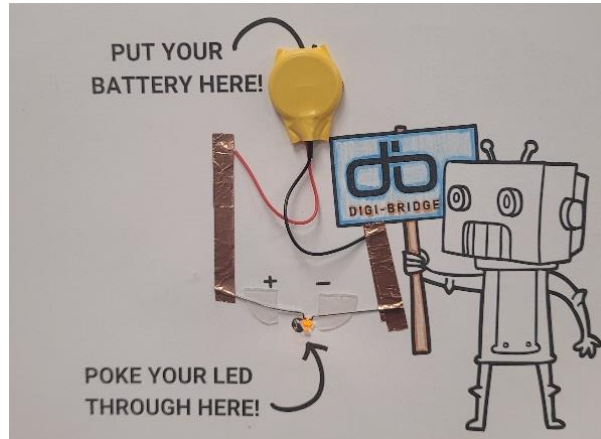
Without Copper Tape
1. Place glue dot in position where battery placement is indicated and then attach battery to paper card.

2. Place other two glue dots on either side of the dot that indicates the placement of the LED light. (This will hold the legs of the LED light in place so it does not move around)
3. Look closely at the legs of the LED light. The slightly longer leg represents the positive (+) flow and the shorter leg represents negative (-) flow.
4. Bend the legs of the LED light and push the light through the hole indicated. Align the positive and negative legs of the LED light as indicated on card.
5. Simply connect the wires of the battery to the correct legs of the LED light and secure on the glue dots provided. (Refer to image below for visual aid).
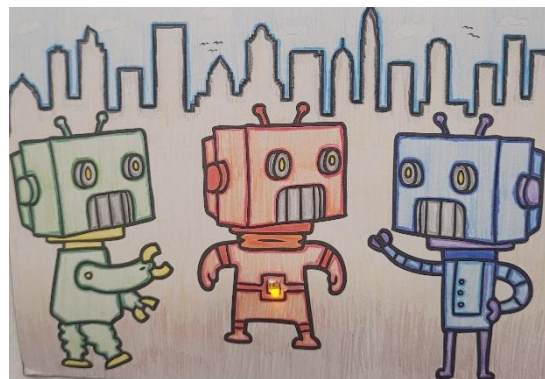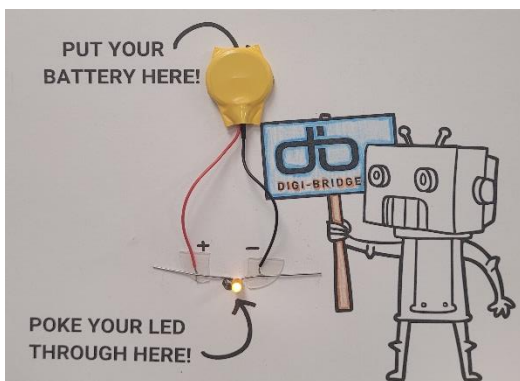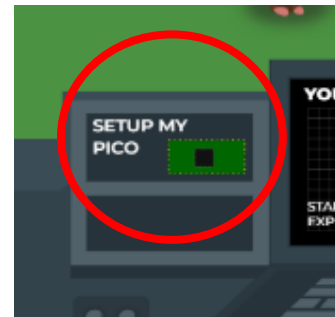
Activity Breakdown: Raspberry Pi Pico with Make Piper

Pico Setup
(*recommended to try steps ahead of time before facilitating***)**

1. Plug in USB from Pico kit to computer. **DO NOT** plug in the Pico, yet.
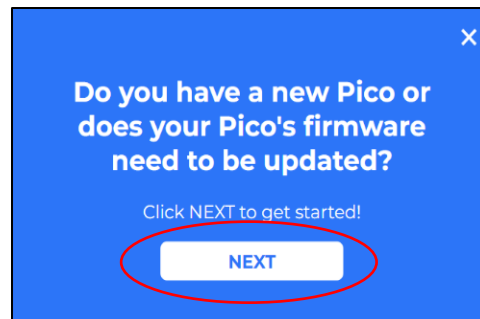2. Open a web browser to: **https://make.playpiper.com/**

3. At the bottom left corner of the screen, click the icon that says, '**SETUP MY PICO**'

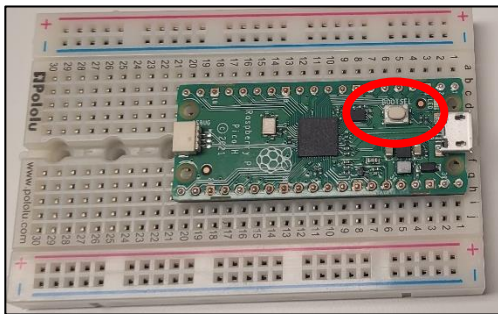4. Follow instructions, provided on screen carefully.

    a. **Step 1:** Click 'Next'

    b. **Step 2:** Click 'Next'
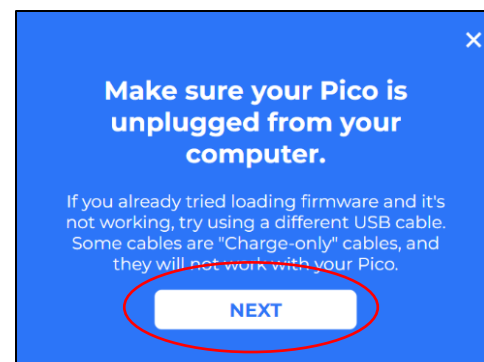
c. **Step 3:** Be sure to hold down the BOOTSEL button (little off-white button on the Pico) and THEN plug in the USB cord WHILE holding it down. Once plugged in, let go of the button.

Hold down the BOOTSEL button on your Pico, then plug it into your computer while holding it down.

You can let go of the button once it's plugged in.

If this is the first time you have plugged your Pico into this computer:
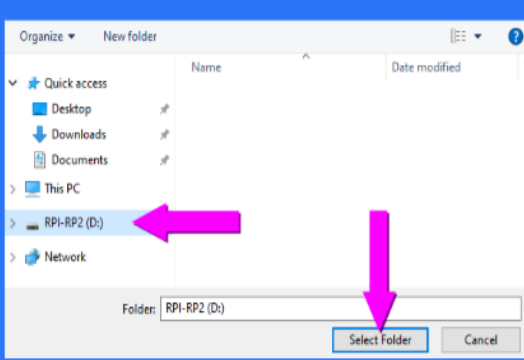
It may take a minute or so for your computer to recognize and install drivers for your Pico. There will be system messages in the lower-right corner of your screen letting you know when the installation is finished.

Then, click NEXT.

PREVIOUS   NEXT

d. **Step 4:** If Files Folder pops up, exit out and continue to follow prompts provided by webpage. Read directions and small print carefully.
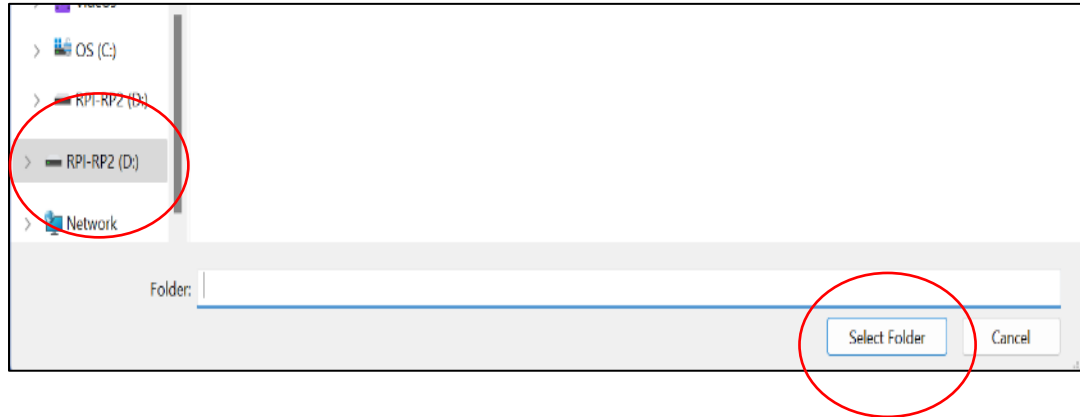
e. **Step 5:** Click 'Next' when this screen shows up.
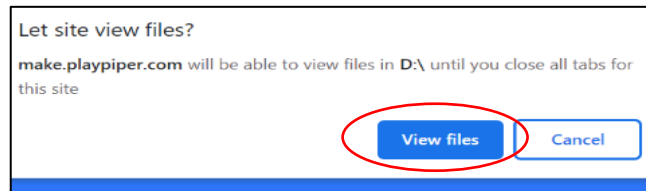

When you click NEXT below, a window will open up.

Choose the "RPI-RP2" drive, and then click "Select":

If your computer asks you for permission to save or write to the RPI-RP2 diretory, be sure to click "Yes", "Ok", "Allow", "View Files", or "Edit Files".
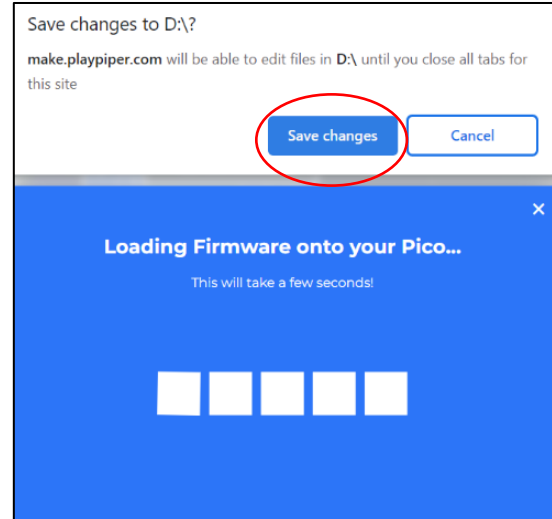
PREVIOUS   NEXT

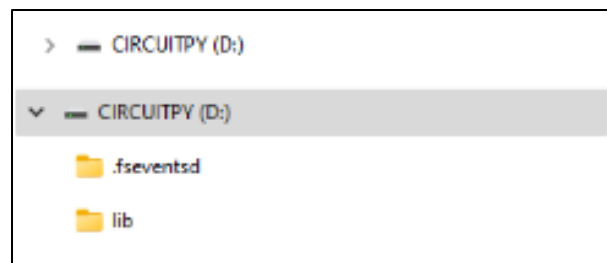f. **Step 6**: When Files Folder pops up on screen, click 'Select Folder" for "RPI-RP2 (D:)"*
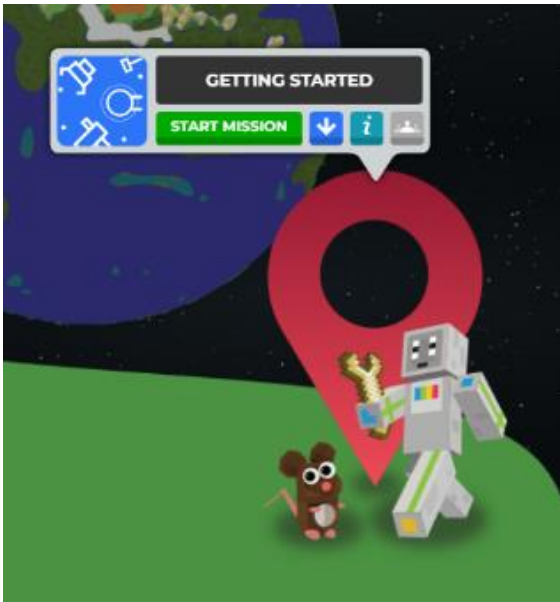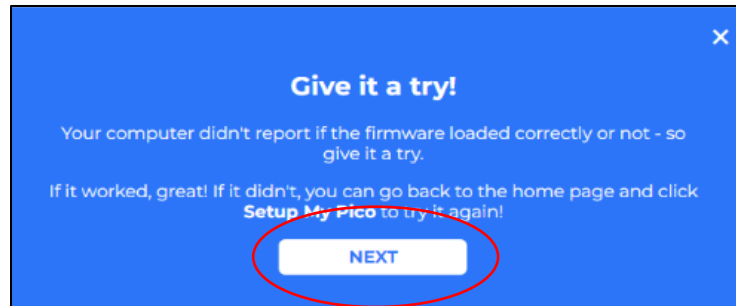

g. **Step 7:** Click 'View Files'

h. **Step 8:** Click 'Save Changes'

i. **Step 9:** Once Firmware has been loaded, double check that either 'CIRCUITPY' OR 'RPI-RP2' is a file folder available to select. Exit out of Files Folder pop up, and click 'Next'

j. **Step 10:** Test if Pico works, by completing the "GETTING STARTED" Mission.

Give it a try!

Your computer didn't report if the firmware loaded correctly or not - so give it a try.

If it worked, great! If it didn't, you can go back to the home page and click **Setup My Pico** to try it again!

NEXT

Pico Setup Troubleshooting

• *If initial connection does not work, switch USB port connection, and start process for beginning.

• *If above step does not work, the USB may be faulty and will need to be switched out for appropriate USB cable. (Make sure it is not a CHARGE-ONLY USB cord)

• It is important that the BOOTSEL button is pressed and held down at the same time of inserting the USB into the Pico. (Refer to visual below)
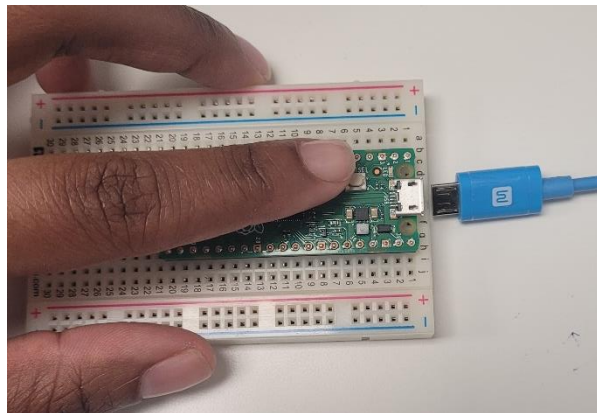
Piper Make Teacher Resources & Lesson Outlines

These links will provide you with the breakdown of each mission, objectives, final codes, hardware setup and answer key for in app quizzes. This is a FREE source and does not require an account for yourself or students. STEAMkits have enough supplies up until the third mission (Traffic Light).

- **'Getting Started'**

   Link: https://www.playpiper.com/pages/getting-started-educator-resource

- **'Blink'**

   Link: https://www.playpiper.com/pages/blink-educator-resource

- **'Traffic Light'**

   Link: https://www.playpiper.com/pages/traffic-light-educator-resource

THANK YOU!

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