

Paper Circuits

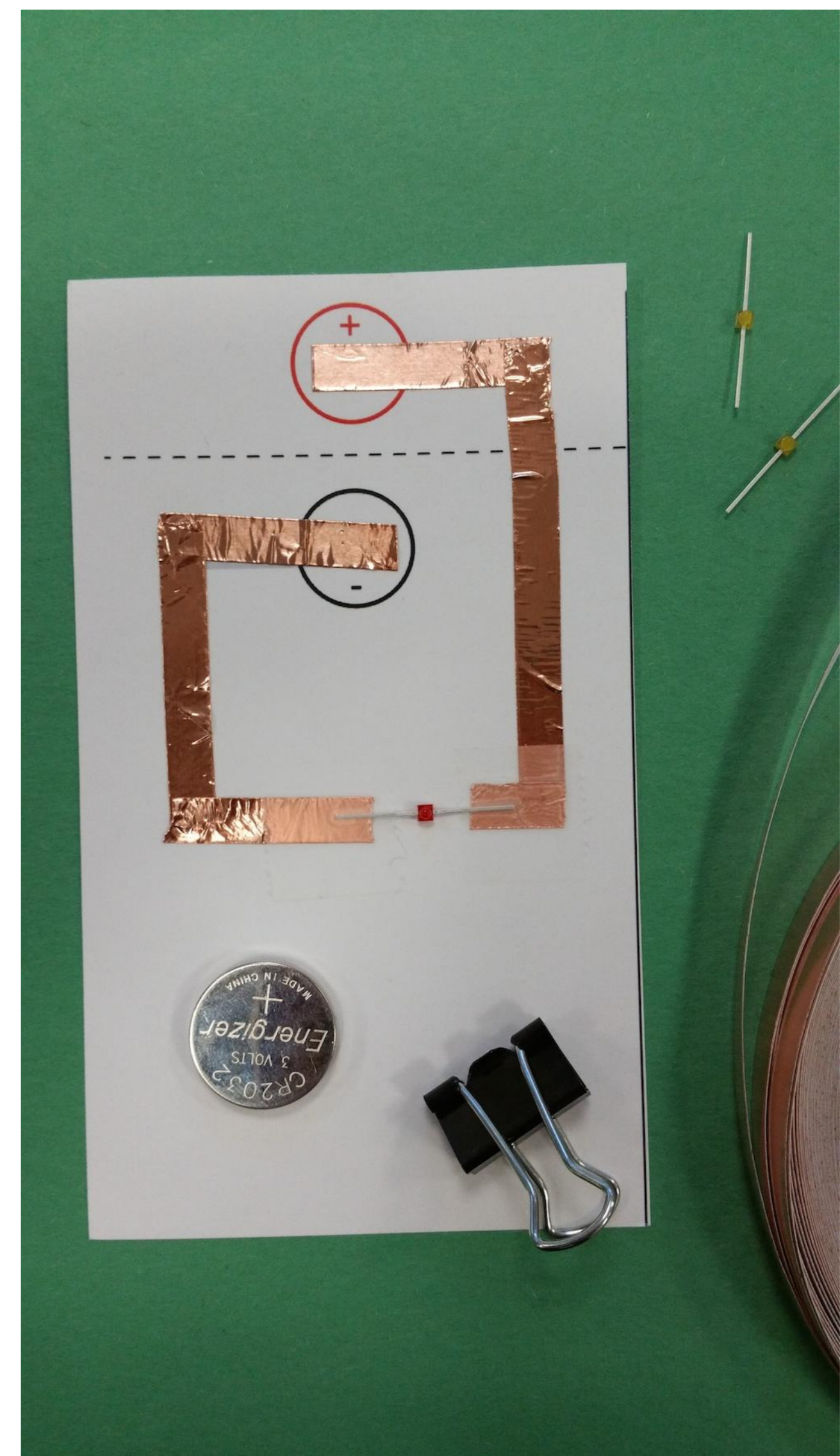
WHAT: Paper circuits are self-designed simple or complex circuits made of cardstock, copper tape, a 3V battery, and LEDs.

ELEMENTARY CHALLENGE:

Design a paper circuit using one (1) LEDs to help bring a poem or illustration to life.

CAN YOU BUILD:

- A circuit that can be used in more than one poem or illustration?
- A circuit that can be turned on and off using a different switch than the battery clip?



MIDDLE/HIGH SCHOOL CHALLENGE:

Design a paper circuit using more than one LED to help bring a poem or illustration to life.

CAN YOU BUILD:

- A parallel circuit with more than one LED?
- A series circuit with more than one LED?
- A parallel circuit by swapping out your 3v coin cell for 2 AA 1.5v batteries? What changes do you notice?

(Teacher Note: Ohms Law & a resistor are needed to solve this challenge.)

Green Screen

(Self-Directed Activity)



WHAT: Using the Green Screen app DoInk, you can transport yourself anywhere you want to be!

ELEMENTARY & HIGH SCHOOL CHALLENGE:

Picture yourself in Thoreau's cabin at Walden Pond, or peaking into the windows at Paul Revere's house, or looking up at Hogwarts as you dream about the adventures to come!

CAN YOU IMAGINE YOURSELF:

- Traveling through time!
- Inside your favorite book!
- Standing next to your favorite author!

WHERE TO START:

1. Think about "context" - launch Photos and browse the images in the Better Together Album.
2. Launch Green Screen by DoInk
3. Tap the "+" in the bottom row then tap on the "Image" icon and select your favorite picture from the Better Together album, then select "Use"
4. Now select the middle "+" then select the "Camera" icon *and get ready in front of the green screen!*
5. Have a friend take your picture by tapping the round circle by the play button and select Done
6. To share, tap "Show Export Options" - then Select "Twitter"
7. Type in your message, add **#btog16**

littleBits Robots

(Self-Directed Activity)

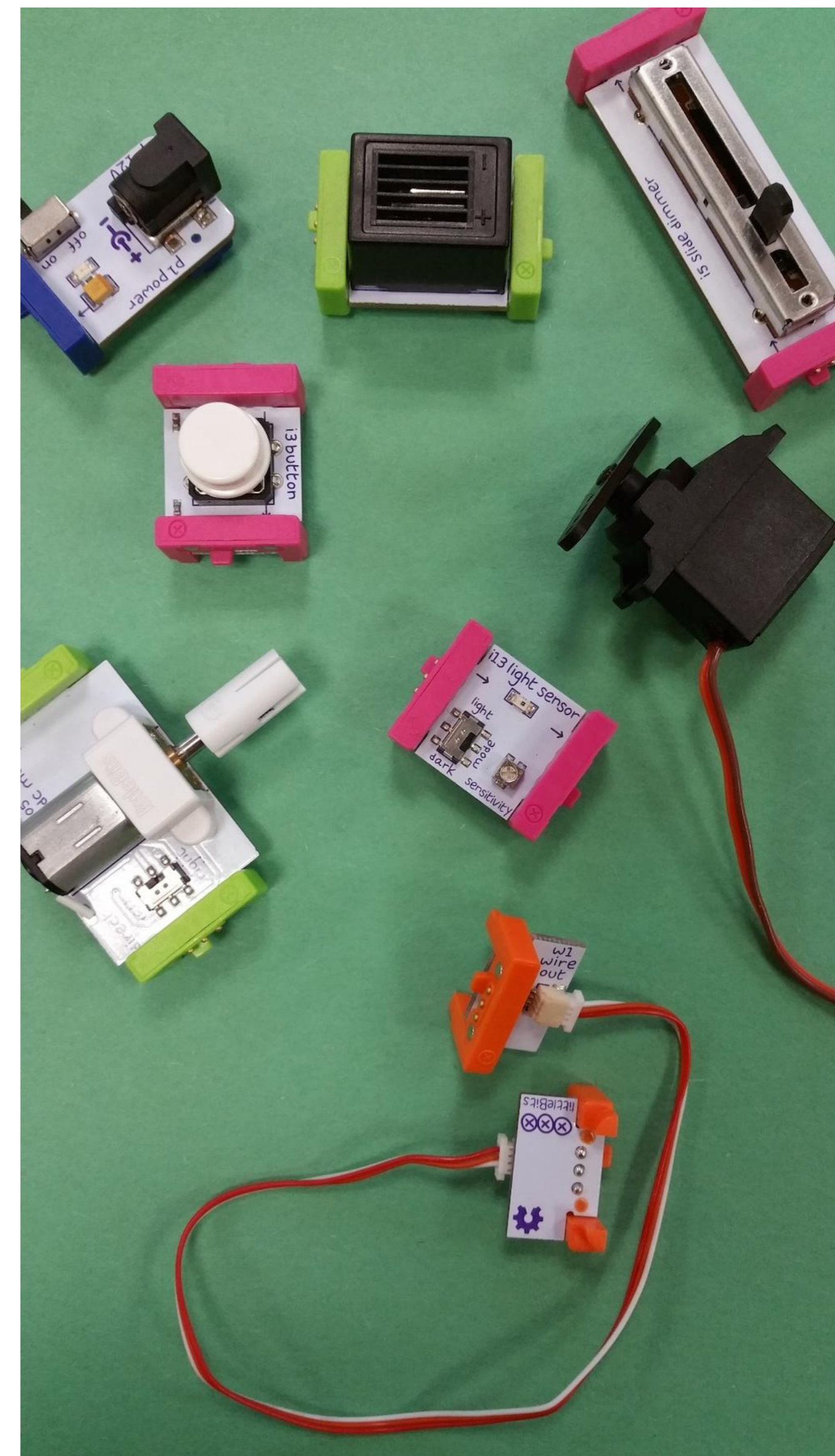
WHAT: littleBits are small electronic components that snap together with magnets to create a circuit. littleBits kits include components such as power, sensors (inputs), sound/lights/numbers (outputs) and a whole bunch more.

ELEMENTARY CHALLENGE:

Using recyclable materials & littleBits build a robot that moves and makes sound.

CAN YOU DESIGN A BOT THAT:

- Has a real world application?
- Creatively integrates a switch (on/off) function?
- What can you do to change the speed of your motion? Or the volume of your sound?



MIDDLE/HIGH SCHOOL CHALLENGE:

Using recyclable materials & littleBits build a robot that moves and makes sound.

CAN YOU DESIGN A BOT THAT:

- Solves a real world problem?
- Uses a laser (not natural light) to turn on/off remotely?
- Uses the Wireless Transmitter Bits to moderate speed and volume?

MaKey MaKey

(Self-Directed Activity)

WHAT: MaKey MaKey works by creating simple circuits connected to an input (space key, up arrow key). Control the computer by turning conductive objects like fruit, tin foil, and water into a touch pad, mouse or keyboard.

ELEMENTARY CHALLENGE:

Use conductive materials to design your own instruments and create an original piece of music.

(<http://makeymakey.com/piano/>)

CAN YOU:

- Make yourself into an instrument?
- Make a friend part of your instrument?
- Make an instrument using all of your friends?



MIDDLE/HIGH SCHOOL CHALLENGE:

Use Scratch and conductive materials to design your own instruments and create an original piece of music. (<https://scratch.mit.edu/>)

CAN YOU:

- Record your own sound?
- Use the repeat or forever blocks to create loops?
- Make your own block for the refrain?
- Test a few parameters with your new block?

Draw Bots

(Self-Directed Activity)

WHAT: Draw Bots are drawing robots made out of a DC hobby motor, battery pack and art supplies. The robot is brought to life by completing a simple circuit between the battery and the motor.

ELEMENTARY CHALLENGE:

Use the materials provided to design your own Draw Bot.

CAN YOUR BOT DRAW:

- Dotted lines?
- Straight lines?
- In circles?



MIDDLE/HIGH SCHOOL CHALLENGE:

Use the materials provided to design and redesign your own Draw Bot and chart the impact of the different variables.

UNDER WHAT CONDITIONS CAN YOUR BOT DRAW:

- Dotted lines?
- Straight lines?
- In circles?