littleBits & elevate science

Experience IT!

It's the Science of Doing.
Elevate Science and littleBits™ have partnered to empower students to invent new possibilities. Your students can engineer and design anything with a collection of easy-to-use, color-coded “bits” to power new ideas.

**STEM Invention Toolbox**

Students fully explore the design process and test their solutions by using electronic “bits” that snap together to create an endless array of inventions. Individual grade-level kits for Grades 3-8.
Elevate Innovation and Design

Encourage experimentation and innovative thinking. *littleBits™* promotes:

- **Confidence to create models**
- **Collaboration and communication**
- **Problem-solving skills using Science, Engineering, and Design Practices**
- **Integration of all three dimensions of a performance expectation**

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**Quick Tip**

Add littleBits to expand your Makerspace!
Set the stage.

Students will:
• Engineer a machine to communicate a code.
• Troubleshoot and expand on original design.
• Explore (10 min)
• Build (15 min)
• Reflect (20 min)

FACILITATOR TIPS

WHAT'S THE SCENARIO?
Students learned about different ciphers, like Morse and Braille, which are used to break codes. Now, let’s have students make a machine with littleBits to communicate secret messages!

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MORSE CODE MACHINE
CRACK THAT CODE!

OVERVIEW
LEON OBJECTIVES
Students will:
• Engineer a machine to communicate a code.
• Troubleshoot and expand on original design.

SUGGESTED ACTIVITY TIME (45 MIN)
• Explore (10 min)
• Build (15 min)
• Reflect (20 min)

GETTING READY

MATERIALS NEEDED PER GROUP

STEM INVENTION MATERIALS

PROPERTIES OF WAVES

Activity management ideas.

Expanding student learning with ready-made lesson plans. littleBits™ lessons align with topics and lessons in Elevate Science. The extension activities provide student interaction with the engineering and design process.
GUIDED OR OPEN? YOU KNOW YOUR CLASSROOM BEST!

Which should I choose:

• In the guided challenge, students will be guided through how to build a machine that communicates Morse Code. You may choose this pathway if your students are newer to the Bits, or if your time for this challenge is limited.

• In the open challenge, students will have access to all the Bits and accessories in their kit and are challenged to build a machine on their own, using any kind of code. This pathway may be best suited for students who are already comfortable with the Bits and require less structure.

• If you choose the open pathway, refer to the dotted boxes throughout the challenge for special instructions. You may also want to use steps in the guided challenge to provide hints and scaffolding for students that need support.

• Student handout: With the open pathway, you may wish to use the Invention Log rather than the guided handout. If your class engages in a hybrid of guided and open, feel free to adjust your handout accordingly.

EXPLORING THE CHALLENGE (10 MIN)

Elicit student responses to gauge understanding and warm-up for the activity.

OPTIONAL—OPEN

• Students will engage in the entire “Exploring the Challenge” portion.

• If you choose to use the Invention Log, simply instruct students to discuss Writing Box #1 aloud within their groups rather than writing it down.

1. **Writing Box #1:** Ask students, “Name all of the reasons that you can think of for using a ‘code’ to communicate.”
   
   Some answers might include to communicate in secret; to communicate before there was technology; to talk to computers who don’t understand human speech; to communicate at all since all language is a type of code!

2. **Discussion:** Ask students to share their responses, asking them to imagine how Morse code messages are sent. Guide students to articulate that they can use sound, light, or actions.
DESIGN CHALLENGE
Design a littleBits Morse Code Machine to communicate with another group.

EXPLORE
• Complete Writing Box #1 in your guided handout.

CREATE
1. Gather your invention tools.
2. Attach the battery cable to the battery.

MORSE CODE MACHINE
CRACK THAT CODE!

GUIDED
Materials needed are identified with visuals to guide students.

Step-by-step instructions direct students through the inquiry.
EXPLORE
• With your group, discuss reasons why you would use a ‘code’ to communicate.

CREATE
• Design your own littleBits Code Machine using available Bits and materials.
• Discuss and record your ideas for your machine in the “Create” section of the Invention Log. Consider how different output Bits could be used to communicate your message.
• Create your circuit first, then add materials to make your invention unique.

PLAY
• Power on your circuit and test how your prototype works.
• Create a drawing of your prototype in the top half of the “Play” section of the Invention Log. Document how your coding system works.
• Pair up with another group and try communicating and de-coding a simple message.

Design Challenge scenario presents students with a problem to solve.

Encourages students to make a plan and design a model.

Students must document their thoughts and ideas in the Invention Log.

Leveled Inquiry Activities
It’s the Science of Doing.

Learn more at PearsonSchool.com/ExperienceIT

Contact your Account General Manager to learn more.

PearsonSchool.com/find-my-rep

CHOKING HAZARD. Small Parts. Not for children under 3 years.