MISSION 2: Introducing CodeBot Lesson 1 (Objectives 1-5)	**Time Frame: 30-40 minutes**
Project Goal: Students will learn about the peripherals of CodeBot and identify them as input or output. **Learning Targets** • I can identify the main components of the CodeBot. • I can identify CodeBot inputs and outputs.	**Key Concepts** • There are a lot of hardware peripherals on the CodeBot, including sensors, LEDs, motors, buttons, and a speaker. • Some of the peripherals are used for input, and others are used for output.
Assessment Opportunities • Quiz after Objective 5. • Mission 2 Lesson 1 Log (digital) • Mission 2 Obj 1-5 Kahoot! Review	**Success Criteria** ☐ Identify the parts of the CodeBot ☐ Identify a peripheral as input or output
Teacher Materials in Learning Portal • Mission 2 Lesson 1 Slides • Mission 2 Lesson 1 Log • Mission 2 Lesson 1 Answer Key	**Additional Resources** • Mission 2 Obj 1-5 Kahoot! Review • Code.org video on how computers are changing everything

Vocabulary

- **CodeBot:** A computer on wheels with lots of sensors and controls built-in
- **Peripherals:** Devices that give input or output to the CodeBot; they include LED lights, speaker, motors, line sensors, proximity sensors, an accelerometer and push buttons
- **Motors:** Programmable electric engines; powers the wheels
- **LEDs:** Light emitting diodes; tiny and efficient electronic components that produce light
- **Wheel encoders:** Discs that rotate, counting the invisible IR light beam pulses through its slots
- **Static electricity:** A charge that can build up and causes a jolt and spark when grounded

New Python Code

- No code or programming in this lesson

Real World Applications

Make sure each student takes the time to personally inspect their ‘bot. Discuss the fact that all the electronic devices they use have similar circuit boards inside. The tools and techniques they’re learning apply to all the electronic devices they use every day! Challenge students to name a few devices they use every day that might contain computer chips or “microcontrollers” such as the one on the ‘bot. How many of the following do they think of? There are so many more!

Microwave oven	Cell phone	Automobile	Watch or fitness tracker
Video game controller	Refrigerator	Home thermostat	Coffee maker
Bread machine	Alarm system	Automatic garage doors	Electronic locks

Challenge students to describe how our lives are impacted by the above technology, and to compare how related tasks were done before computer technology was invented.

Teacher Notes:	**Extensions / Cross-Curricular:**
• The first pre-mission warm-up question asks students about peripherals. You might want to review what a peripheral is and have students become familiar with the term. • The mission log assignment is created as a digital document. You can print it for students as an alternative by giving more space for answering questions by hand.	• Make a list of common input and output devices. • **LANGUAGE ARTS:** Students write about technology today and its impact. • **SCIENCE:** Students research a microcontroller or another every day technology device. • Supports **language arts** through reading instructions and reflection writing.

Preparing for the lesson:

Students do not need the CodeBot for this lesson, but it could be useful to look at during the lesson or the wrap-up.

- Look through the slides and workbook. Decide what materials you want to use for presenting the lesson. The slides can be converted to Google Slides. They can be projected on a large screen. The workbook (if used) can be printed or remain digital through your LMS and given to students.
- Be familiar with the mission log assignment and the questions they will answer. Prepare the assignment to give through your LMS (or print it for each student).
- If you have a word wall, or another form of vocabulary presentation, prepare the new terms.

Lesson Tips and Tricks:

💡 **Teaching tip:**

You can use a variety of discussion strategies to get the most engagement from your students. For example, you can have students write their answers before asking anyone for an answer. You can use one of many think-pair-share methods. You can have students write their answer and share with someone, and then have other students share answers they heard from their peers. You can randomly select students to answer.

👫 **Pre-Mission Warm-up:** -- slides 2-3

Students can write in their log first and then share, or discuss first and then write in their log.

- Question: What are some things you can connect to a computer or laptop?
- Introduce the term “peripheral”. Peripherals can be connected to a computer or laptop, like a keyboard, mouse or printer. They can also be connected through the circuit board, like a sensor, LED or button.
- Question: Why do you think you should learn how to program a computer?
- Students can share their answers. You may want to revisit this question at the end of Mission 3, and periodically throughout the Mission Pack.

💻 **Mission 2 Lesson 1 Activities:**

Students do not need the CodeBot for this lesson, but they will need a computer or laptop and access to the Internet. The Chrome browser works best, but other browsers also support CodeSpace.

Each student will complete a Mission Log (print or digital). Students could work in pairs through the lesson, or they can work individually.

💡 **Teaching tip: Mission Introduction** -- slides 4-7

Definition of CodeBot and a list of outputs and inputs. Students will write this information in their log. You can point out where the peripherals are on the CodeBot now, or after Objective 5 during the CodeBot review.

💡 **Teaching tip: Objective #2** -- slides 10-13
Students will answer a question in the mission log assignment.

The CodeBot has 17 LEDs, but only 13 are easy to find. The user LEDs are in the middle of 'bot, and they turn red. The line sensor LEDs are on the bottom edge of the 'bot, and they turn green. Each proximity sensor also has a very small LED just below it. They light up when the proximity sensor actively senses something. The other two LEDs are difficult to find and not used in coding. One is above the power switch, labeled D21. The other is above the left proximity sensor, labeled D2.

💡 **Teaching tip: Objective #4** -- slides 15-16
The wheel encoder is easiest to find if students rotate to the back of CodeBot. It is a little black disc mounted on the yellow motor.

💡 **Teaching tip: Objective #5** -- slides 17-18
The buttons are named BTN-0 and BTN-1, but in code students will just use 0 or 1. The reboot button is not used for input in a program.

💡 **Teaching tip: Quiz** -- slide 19
Before students take a ❓ short quiz, they learn about static electricity and how to avoid it when handling the CodeBot. They will answer questions in the mission log assignment. The quiz question is shown below.

💡 **Teaching tip: More CodeBot Peripherals** -- slides 20-22
The instructions in Objectives 1-5 cover most of the CodeBot, but students should be able to identify the sensors and buttons as well. Use the slides or workbook pages to review more parts of the CodeBot. Then have students label the parts of the CodeBot on their mission log assignment.

> 🗝️ With the CodeBot review, you can ask students to indicate if a CodeBot part is input or output.

👫 **Post-Mission Reflection:**

The post-mission reflection asks students to think critically about technology. You can change the questions if there is something else you want to emphasize with your students.

- Inspect your CodeBot. All electronic devices you use have similar circuit boards inside. Name a few devices you use every day that might contain computer chips or "microcontrollers" such as the one on the 'bot.
- What is something you do that uses an electronic device? How do you think this activity was done before electronic devices?

You can use an extension or cross-curricular activity as post-mission activity. You can show the Code.org video on how computers are changing everything. (link above)

You can use the Mission 2 Obj. 1-5 Kahoot as a lesson review. (link above)
End by collecting the Mission 2 Lesson 1 Log.

SUCCESS CRITERIA:

- ❑ Identify 15 parts of the CodeBot
- ❑ Identify a peripheral as input or output

❓ Quiz Question

What should you do *before* handling your CodeBot? +5 XP

☒ Jumping jacks ☒ Clean it with wet wipes ☑ Touch some grounded metal