

Lesson 13: Senses and Sounds

Powerful Ideas of Computer Science	Hardware/Software, Representation, Control Structures, Debugging
Powerful Ideas of Literacy	Literary Devices
PTD	Communication
Palette of Virtues	Patience, Curiosity
Children will be able to...	<ul style="list-style-type: none"> • Distinguish between human senses and robot sensors • Use the KIBO Sound Sensor with its appropriate Wait for Clap block
Vocabulary	<ul style="list-style-type: none"> • Senses: the way humans and animals take in information about the world. Humans have five senses: touch, taste, smell, sight, and hearing • Sensor: a part of a machine that takes in information about the world.
Teacher Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> Read lesson plan. <input type="checkbox"/> Prefill jars with various materials (i.e. pennies, marbles, cotton balls) to create rattles with assorted sounds. <input type="checkbox"/> Refer to the following video to learn more about the KIBO's sensor modules. <input type="checkbox"/> Refer to the following video to learn more about the Wait for Clap Block and the Sound Sensor. <input type="checkbox"/> Fill several opaque jars with small items, such as pennies, marbles, beads, etc. Each jar should have one item (i.e., one jar with pennies, one with marbles, one with beads, etc.). <input type="checkbox"/> Open Lesson 13 Check for Understanding.
Warm Up <ul style="list-style-type: none"> • What Do We Hear? (<i>Suggested Time: 10 minutes</i>) <ul style="list-style-type: none"> ○ Pass each jar that has been pre-filled with specific items (e.g., pennies, marbles, etc.) around, and have children guess what's inside by gently shaking it. 	

Opening Tech Circle

- **Human Senses and Robot Sensors** (*Suggested Time: 10 minutes*)
 - Explain to children that we use our hearing to hear sounds around us. Just as humans have different **senses** to take in information from our environment (e.g., we can see friends in the classroom, taste ice cream, smell cookies, hear a fire truck, and touch a dog or cat), robots have sensors to do the same.
 - A **sensor** is an added part of a robot that allows the robot to take in information from its environment.
 - Tell children that today, they will learn about the Sound Sensor.

KIBO Time

Structure Challenge

- **Sound Sensor and Wait for Clap** (*Suggested Time: 10 minutes*)
 - Take out KIBOs and blocks. Show the Wait for Clap Block and the Sound Sensor and create an example program together. Run the program, and have children discuss what the robot is doing. When KIBO gets to the instruction “Wait for Clap,” KIBO listens for a sound (using its Sound Sensor!) before it goes to the next block instruction.
 - Remember, KIBO follows its instructions in order, so pay close attention to where the Wait for Clap Block is placed in the program. As you demonstrate using the Sound Sensor, ask children to follow along with the blocks so they know when to

What is the Sound Sensor?

KIBO's **Sound Sensor** is shaped like an ear and senses sounds from the environment. It is programmed using the Wait for Clap block. In the example program, KIBO will turn right, wait for a loud sound (like a clap) before it spins and ends.



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clap!

Expressive Exploration

Free Play (*Suggested Time: 10 minutes*)

- In groups, children should take this time to explore the Sound Sensor module freely. By the end of this free play, children should understand that when KIBO reads the Wait for Clap block, it knows to only keep going when it hears the noise.
- Children should also understand how KIBO's Sound Sensor is similar to humans' ears and also how they are different. Ask children: *Can KIBO only listen for a clap?* Encourage children to try other noises, like stomping or ringing a bell, to trigger the Sound Sensor!

Lesson 13 Check for Understanding: Check your children's understanding of the new concepts they've just learned. Read each question to the children. Have children hold up 1, 2, or 3 fingers (corresponding to the first, second, or third choice). Stop and re-explain concepts as needed.

Closing Tech Circle

- **Solutions Circle** (*Suggested Time: 5 minutes*)
 - In a circle, have children discuss some of their challenges with the Wait for Clap and Sound Sensor. Ask children: *Were there times KIBO did not act like you expected? Was there anything new you learned about KIBO? Have you encountered any bugs?* As children share out, have other children in the class provide solutions or ideas that may help them with any problems.