Intermediate Lesson 5: Happy and You Know It

Topics: Expressiveness, Conditionals, Input and Output, SEL

Learning goals: students learn that output parts allows robots to put information out into the world. Students collaboratively create an expressive algorithm including both input and output. They learn the function of KIBO's Light Bulb output module.

Background: What are Outputs?

Output parts do the opposite of inputs. They put information out into the world. On a computer, the output devices include the screen and speakers. "Output" can also refer to the results of a computer program. If a program is designed to find the sum of two numbers, the output is the sum.

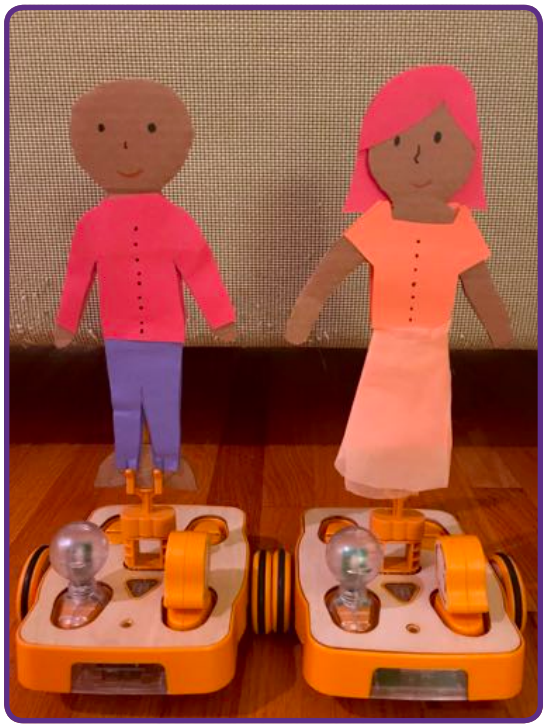
KIBO has a light bulb that can output light in three colors. Along with movement and decoration, the light bulb allows KIBO to become more expressive.

KIBO has additional optional output parts, such as the Sound Record / Playback Module, that allow KIBO to express even more.

Inspire: Introducing the Light Bulb

Remind students about the sound sensor and WAIT FOR CLAP. Show the WAIT FOR CLAP block and create an example program together, like BEGIN – WAIT FOR CLAP – SHAKE – END. Run the program, then have students discuss what the robot is doing. A sensor provides **input**, allowing the robot to take in information (like the sound of a clap).

Then introduce KIBO's **light bulb**. While children make their guesses about what this part might do, add your block to the demo program. Your new demo program should be: BEGIN – WAIT FOR CLAP – WHITE LIGHT ON – SHAKE – END. Scan and test the new program. Remind them that this is not a sensor, because it puts light out into the world rather than taking information in.



Introduce the term **output.** Output means the different things a computer or robot can display or show. For a person, speaking might be considered output; while listening is input. For KIBO, the different movements are a kind of output. So are the sounds KIBO makes when it BEEPs or SINGs. And with the light bulb part, light is another kind of output for KIBO. If sensors are like our senses, then output is like our ability to speak, smile, and sing.

Can students think of other kinds of output that humans or robots might make? Make a list of their ideas.

Connect: Dance to "If You're Happy and You Know It"

Have the class dance along to the song "If You're Happy and You Know It." Include a light bulb verse for KIBO!

If you're happy and you know it, light your bulb!
If you're happy and you know it, light your bulb!
If you're happy and you know and you really want to show it
If you're happy and you know it, light your bulb!

After the dance, discuss with students the different ways they showed their happiness through movement of their bodies. This expressive movement is also a kind of **output**.

Engage: Expressing Happiness With KIBO Output

The students will use a sound sensor and the new light bulb part to help KIBO dance to "If You're Happy and You Know It." Each group's robot should include at least the Ear and Light Bulb, along with two motors and wheels.

Children program their robots to move in any direction during the lyrics "If You're Happy and You Know it" and then wait until the robot hears a clap (representing the lyrics "Clap your Hands"). Students then select one or more LIGHT ON blocks – plus other favorite instructions – to express their happiness.

You can also choose to allow children to decorate their robots with arts and crafts materials to express their happiness visually.

Reflect: What Makes You Happy?

Students share their WAIT FOR CLAP and LIGHT ON programs. How do the blocks they chose after WAIT FOR CLAP express happiness?

Then ask students to share something that makes them feel happy. How do they show it?

Tips for the Teacher:

New Part: Light Bulb and LIGHT ON blocks: KIBO's Light Bulb is an output part. It works with three different LIGHT ON blocks, allowing the light to display red, white, or blue.