

KIBO the Playful Animal – 1 hour

Playful self-expression; modeling real-world systems; input & output

Overview: In this lesson, students will turn KIBO into a playful animal that moves in response to a program the children create. Students can also experiment with KIBO's input and output options to take it further.

Learning Goals: Students will:

- **Model** a natural system (animal movement).
- Create an **algorithm** to express an idea.
- Understand that **output** parts allow robots to express with light, sound, and movement.

Materials/Resources:

- One KIBO 10 kit or higher per 2-4 students
- A variety of craft and recycled materials for building and decorating.
- **Book:** *Move*, by Page and Jenkins



New to KIBO? Watch the Videos!

If this is your first time using KIBO, we encourage you to check out our short tutorial videos at kinderlabrobotics.com/getting-started.

Lesson Plan



Inspire: Output Parts: 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**. An animal might show how it's feeling by how it moves, or growls, or barks, or purrs. For KIBO, the different movements are a kind of output. So are the sounds KIBO makes when it BEEPs or SINGs.

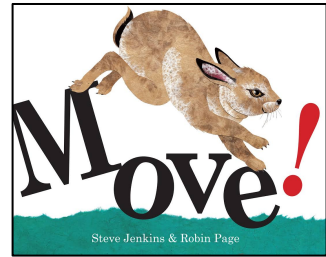
What are some other ways that animals and people express themselves?

Introduce KIBO with its wheels and motors. Test and share this program to move KIBO in different ways and make a sound:





Connect: Read *Move*. Today we'll turn our KIBOs into animals that move, shake, and spin! Read *Move* by Robin Page (author) and Steve Jenkins (illustrator). This fun book explores the many different ways animals move. Flying, climbing, swimming, and running animals will get students thinking about how their robots might move as well. (If you don't have access to this book, lead a group activity where students act out different animal movements.)



Small-Group Work: Playful KIBO animals that move, beep, and sing! In this activity, students will decorate and program playful KIBO animals. They will decorate a robot animal and give the robot a program that represents the animal's movements, sounds, and behavior.

Groups should each choose an animal, then design decorations and a movement program to bring their animal to life.

Give groups time to IMAGINE and PLAN - time to think and talk about their animals, sketch and plan their constructions, and experiment with KIBO programming. Students can also use Engineering Design Journals to sketch of their animal.

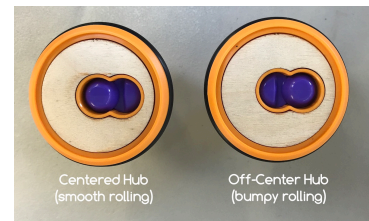
Encourage each group to include BEEP and SING output commands in their animal's behavior. If you have access to KIBO's Light Bulb module and LIGHT ON blocks, you can offer students these options as well. Does the animal use these sounds and lights to represent its feelings? To communicate with other animals?

Students also decorate their animals using arts and crafts materials. If you have KIBO art platforms, allow students to use the stationary or rotating platforms in their constructions.

Finally, include time to TEST AND REVISE the programs and creations. Whenever appropriate, call a brief "technology circle" to allow students to share difficulties and ideas.

Wobbly Wheels

Remember that KIBO's wheels can be attached to the hubs in two different ways. Inserting the hubs off-center leads KIBO to move in a bumpy, wobbly way. If students are creating an animal like a donkey or frog that moves unevenly, attaching the wheels off-center can help them express this.



Reflect: Sharing our animals. Students should share their animals with the group. Encourage them to explain how KIBO's output commands, such as movement, sounds, and light, represent the behavior (real or imagined) of the animal they created. Also ask them to talk about the decorations they chose and how these decorations represent their animal.

Standards Addressed

NGSS: LS1.D: Information processing; LS4.D: Biodiversity and Humans.

CSTA K-12 Computer Science Standards: 1A-AP-08, 1A-AP-10, 1A-AP-12, 1A-CS-02, 1B-CS-01