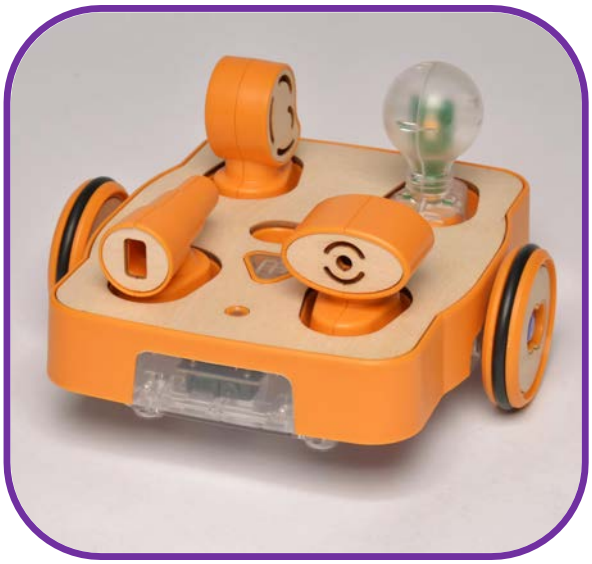
An Introduction to AI with KIBO – 1 hour

For more lessons like this, visit www.kinderlabrobotics.com/ai

Overview: *Students will explore the big ideas of artificial intelligence and see how they relate to their own experiences. They'll review some fundamentals of KIBO programming that relate to AI. They'll gain practice with creating programs using repeat loops that allow KIBO to operate independently.*

Learning Goals: Students will:

- Become familiar with the definition of artificial intelligence.
- Understand parallels between AI and robots.
- Create loops with KIBO's REPEAT: FOREVER statement.



Materials/Resources:

- One KIBO 18 kit or higher per 2-4 students
- **Optional**: A variety of craft and recycled materials for building and decorating.

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: An Introduction to AI

"Today we will start to explore the idea of 'artificial intelligence' or 'AI'." Introduce the term "Artificial Intelligence" or "AI". Ask students if they have heard this term – perhaps from their parents, or in stories and movies - and encourage them to share their ideas and impressions.

"One definition of 'Artificial intelligence' is when engineers make a computer or robot sense what is happening and react to it. Human engineers decide what the computer or robot should do. They give the robot rules like 'if it's dark, you should turn on a light.'" Ask the students to think about programming they've done with KIBO before, and share times they've decided on rules like this.

"'Artificial intelligence' involves rules like this too. But an AI system combines lots of these rules at once. Sometimes AI systems can be so complicated and have so many rules, they can do amazing things like drive a car by themselves or answer spoken questions. We will explore how some of these systems work using KIBO!"

Connect: Real World AI

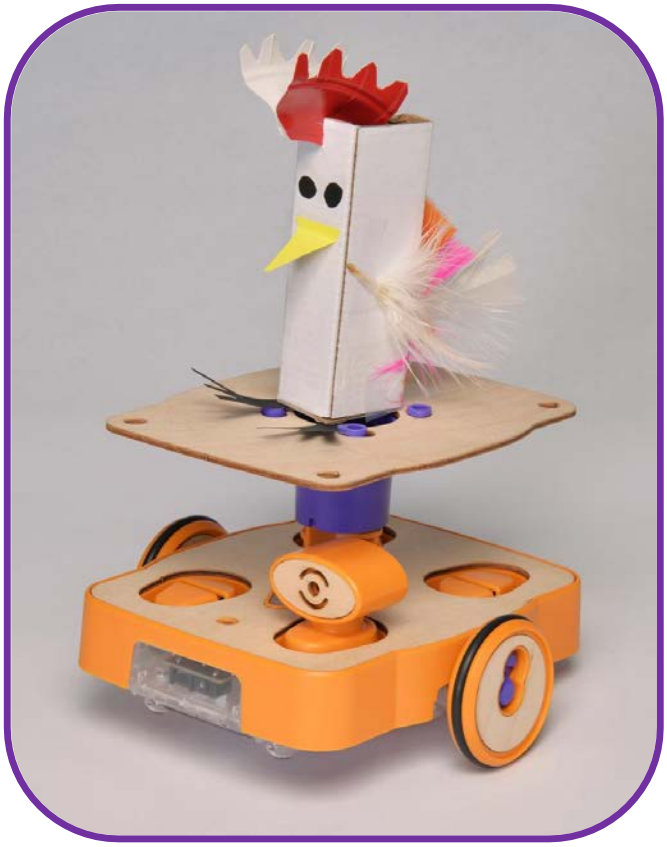
Optionally, play a video about real-world examples of artificial intelligence[1]. Ask students if they know of any systems that use AI that they might encounter during their day. Some examples to contribute if they aren't sure:

- Self-driving cars
- Voice assistants like Amazon's Alexa or Apple's Siri
- Home automation systems that turn lights on automatically at night
- Finding routes in Google maps
- Space probes and rovers that operate on their own
- KIBO!

Review the list afterwards. For each example, ask students to talk about what the computer is doing that is either like or not like the way a person thinks. You might also share if *you* have used AI to help you teach, such as for assessment, tutoring, or lesson planning.

Engage: Repeating a Task

One of the powerful ideas of robotics that relates to AI is the concept of **automation**. For the main activity, students will practice and refresh their KIBO loop coding skills by creating a robot that *operates independently*. "**Automation** refers to the ability of a computer system, or robot, or AI to carry out a task over and over by itself. Robots and AI don't get tired of repeating the same task over and over again! That's one of the ways they can be helpful to people."

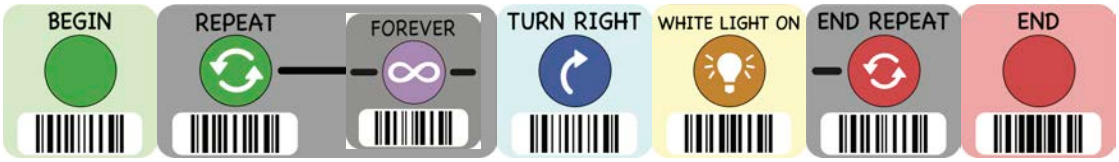


With KIBO, we can explore the concept of automation through the REPEAT and END REPEAT blocks. For today's group activity, ask the students to imagine something they'd like a helpful robot to do that requires the robot to do the same thing over and over again. Each group should decide on a helpful behavior, then represent this helpful behavior in a KIBO program inside a REPEAT: FOREVER loop.

---

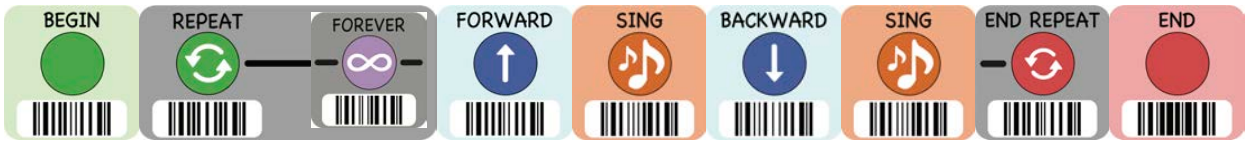
[1] Some suitable videos are linked from KinderLab's curriculum page at kinderlabrobotics.com/curriculum.

Some examples/prompts for REPEAT: FOREVER programs:



A KIBO light house that rotates and shines a light in each direction

A KIBO guard that patrols the castle walls in a square



A KIBO bird that sings and hops from branch to branch

Tip: To stop a REPEAT: FOREVER loop, just press KIBO's triangle button again while it is still running. (Also, a KIBO running a loop will shut itself off after about 15 minutes to save battery power.)

Reflect: How is KIBO helping?

Ask students to describe and share the program they created. What helpful activity is their automated robot doing? If they could imagine any sort of helpful robot, what kinds of things would it do? Would it need to be able to see, or hear, or speak, to better help?

Background for the Teacher: AI Definitions and Guidelines

A helpful definition of AI comes from the Association for the Advancement of Artificial Intelligence (aaai.org): "AI is a collection of techniques that allow computers to do things that, when people do them, is considered evidence of intelligence." This definition highlights the fact that AI systems don't need to *be* intelligent – they simply are able to do things that we associate with intelligence, like understanding speech, producing written text, organizing information, and operating independently.

KinderLab's AI activities were developed in alignment with the Artificial Intelligence for K–12 initiative's (AI4K12) curriculum guidelines. These guidelines are a collaboration between AAAI and CSTA. The complete AI4K12 guidelines, sample activities, readings, and other resources are at ai4k12.org.