



## EMPLOYEE ACTIVITY

# Cobot/Human Collaboration

## OBJECTIVE

After learning about cobots and their potential, students will design a collaborative task for humans and cobots.

## MATERIALS

- Scrap paper, one per student
- *How Can Cobots Help Humans?* article, one per student
- Markers or highlighters, two different colors per student
- Cobot + Human Collaboration handout, one per student

## ENGAGE

- Distribute a piece of blank paper to each student and ask them to sketch a picture that shows humans and robots working. (Provide no other instructions!)
- Then encourage students to share with a partner:
  - What is the human doing in your image?
  - What is the robot doing?
- Ask student to demonstrate through a show of hands:
  - Who drew a human and robot working separately?
  - Who drew a human and a robot working together?
- Next, write the word “cobot” on the board. Explain that a cobot is a special kind of robot.
- Underline “co” and ask students if they can think of any other words that begin this way. After hearing students’ thoughts, write the words “cooperate,” “coworker,” and “collaborate” on the board. Ask students to consider what “co” may mean based on these words.
- Help students understand that the word part “co” means “together.” A cobot is therefore a robot that works side-by-side, or together, with a human.
- Ask students to look back at their drawings and consider: Who drew a cobot?

## EXPLORE

- Distribute the *How Can Cobots Help Humans?* article to each student, and instruct them to take out two different colored markers or highlighters.
- Based on students' reading levels, decide whether it will be best to read the article as a class or in pairs. Then either lead the class in reading the article aloud as they follow along or instruct pairs to read it individually. No matter how the article is read, students should annotate (highlight or underline) details that describe humans in one color and details that describe cobots in another color.
- When the reading and annotating is complete, explain that students are about to compare and contrast cobots with humans. To prepare, work with the class to develop two different gestures or frozen "statue" poses: one for cobots and one for humans.
- For instance: A cobot gesture could be one that imitates moving items along an assembly line and a human statue pose could be one in which students point their thumbs back toward themselves.
- Then read the following statements, pausing after each one so students can make the gesture or pose that symbolizes the correct answer. If the answer is "both," students should move back and forth between the two.
  - \_\_\_\_\_ can perform specific tasks. (*both*)
  - \_\_\_\_\_ can likely perform repetitive tasks the most quickly, carefully, and efficiently. (*cobots*)
  - \_\_\_\_\_ can easily train cobots. (*humans*)
  - \_\_\_\_\_ can be in charge of the important decision making and problem solving. (*humans*)
  - \_\_\_\_\_ make very few, if any, mistakes. (*cobots*)
  - \_\_\_\_\_ can work side-by-side to perform work quickly, efficiently, and cheaply! (*both*)

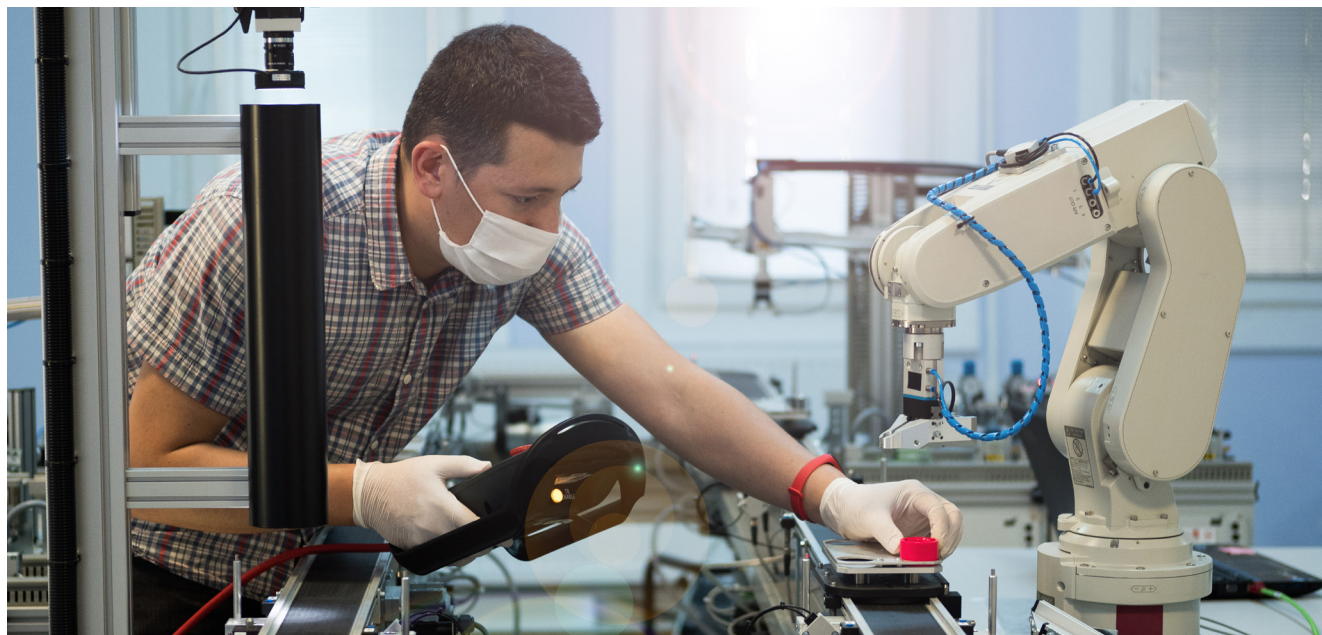
## APPLY

- Now that students have an understanding of how robots and cobots can collaborate, challenge them to think through a task that cobots and humans could perform together.
- Divide students into pairs and explain that students will pretend they are working in a factory that will be giving back to the community. Humans and cobots will be working together to prepare free sandwiches for those in need. More specifically:
  - Sandwiches need to be made and placed in boxes.
  - Once the boxes are full, they need to be brought outside to a delivery truck.
- Decide whether you will allow students to choose what kind of sandwich they create or if you will assign one. Then give each pair a Cobot + Human Collaboration sheet. Review the instructions provided and explain:
  - Pairs should write every task that needs to be completed in the handout's left column.
  - Students should then circle whether each task should be accomplished by cobots or humans!
  - If more room is needed, students may use a second handout.

- Before students begin, encourage pairs to consider every detail that needs to be completed in order to accomplish this task! It may be helpful to pretend to be a robot and have students give you step-by-step instructions for a task—such as drawing a smiley face on the board or turning off the lights. As students give you these instructions, do only *exactly* what they tell you to do so they realize how specific each step must be.  
*Challenge:* Older students may think about additional steps that may be helpful other than simply making and packaging sandwiches. For instance: Should someone or something check to ensure the sandwiches' quality? Or, should someone or something be in charge of overseeing the entire process to make sure it goes smoothly? Encourage students to think outside of the box!
- Once students understand the directions, instruct them to begin developing their plan.
- When students have finished their procedures, pair partners together and encourage them to share the steps they each developed. As one pair shares, the other pair can act out the steps to make sure nothing is missing.
- Regroup at the end of the activity, and ask students:
  - What kinds of tasks or jobs did you tend to assign to humans? Why?
  - What kinds of tasks or jobs did you commonly assign to cobots? Why?
  - Do you think the sandwich-making and packing process became easier or harder when cobots and humans could share the responsibilities?
  - How else could cobots be used for good?

## K-2 CONSIDERATIONS

- Keep the age level of the students in mind as you explain concepts and substitute simpler words as needed.
- Try to model sample responses to open-ended questions before you ask students to brainstorm or respond on their own.
- Read the *How Can Cobots Help Humans?* article aloud together.
- Select a simple sandwich for students to create, such as peanut butter and jelly.
- Complete the first couple steps on the Cobot/Human Collaboration handout as a class.
- Allow students to draw the steps on the Cobot/Human Collaboration handout.



When robots worked in factories, they used to be kept away from humans. Robots were in one room and humans were in another. Humans thought robots should only be used for jobs that they called “The 4Ds.” In other words, humans used robots for jobs that were Dirty, Dangerous, Dear (which also means expensive) and Dull (which also means boring or easy).

However, humans now know that robots can *help* them. They're even able to work together! When a robot works with a human, that robot is called a cobot. Cobot is a nickname for a collaborative robot. Collaborative is another way to say “working together.”

There are certain jobs that cobots are better at than humans. Cobots are really good at jobs that need something stronger than a human. They are also good at jobs that need something more careful than a human or something with a better memory than a human.

Humans can train cobots to help them do these things. Cobots are often trained by the people they will work with. For instance, a human might teach a cobot how it should move its arm. To do this, the human can move the cobot's arm again and again until the cobot can do it by itself. Once the cobot learns how the human wants it to move, the cobot can move more quickly and with fewer mistakes than a human.

While robots in the past focused on the 4Ds, cobots today focus on the 3Es: Efficiency (how quickly it can work); Effectiveness (how few mistakes it makes), and Enhancement (how it can make a process better). It's important to know that cobots don't replace humans. They just help them do their job even better!

Today, there are many different ways that cobots and humans can work side-by-side. Assembly lines are one place where they may work together. Cobots may also help humans lift goods off the shelves to prepare orders for shipments. Or, cobots may go and get the items needed for a grocery order while the human bags the groceries.

Companies are learning that when cobots and humans work together, they are able to perform tasks more quickly, more easily, and at lower costs!

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Adapted from:

- “The Future of Work: Are You Ready for Smart Cobots?” [forbes.com/sites/bernardmarr/2018/08/29/the-future-of-work-are-you-ready-for-smart-cobots/?sh=26b3bf62522b](https://forbes.com/sites/bernardmarr/2018/08/29/the-future-of-work-are-you-ready-for-smart-cobots/?sh=26b3bf62522b).
- “You've Heard of Robots; What Are Cobots?” [forbes.com/sites/cognitiveworld/2019/12/15/youve-heard-of-robots-what-are-cobots/?sh=6680f44c4862](https://forbes.com/sites/cognitiveworld/2019/12/15/youve-heard-of-robots-what-are-cobots/?sh=6680f44c4862).

# COBOT + HUMAN COLLABORATION

**Your Job:** Hundreds of sandwiches need to be made! After they are made, they need to be put into big boxes. The boxes then need to be brought to the delivery truck. Below, write or draw each step that needs to be done. Then circle *who* should do it!

Task/Job	<input checked="" type="radio"/> Cobot   or <input checked="" type="radio"/> Human
	Cobot   or   Human
	Cobot   or   Human
	Cobot   or   Human
	Cobot   or   Human
	Cobot   or   Human
	Cobot   or   Human
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