

December Challenge: Factory Assistant



Robotics Curriculum
IT Adventures



Factory Challenge Overview

As the supply chain continues to tighten, you get a call from your aunt, who runs the factory down the road. “I need extra hands! Can you help me?” After thinking on it a bit, you decide you can do one better: you’re going to design a robot assistant for the factory! Your aunt thinks that it is a great idea, and asks for you to quickly get it running. Are you up for the challenge?

Challenge Details

In your creation, you will be both programming and building the robot to complete the pieces of this puzzle.

- The robot should be able to start and stop remotely.
- The robot should have an arm to carry components (be creative with this! Feel free to create a custom bucket or other pieces using equipment from around the room, such as tape and cardboard.)
- The robot should have a variable speed controller.
- The robot should visit at least 1 piece of machinery, 1 cargo bay, and the loading bay. It should be able to pick up stuff from the cargo bay and drop it off at *either* the machinery or the loading bay.
- The robot should not run into any obstacles - people or otherwise. Remember that the people will be moving around - is there a way to program the robot to stop when it gets too close to something?

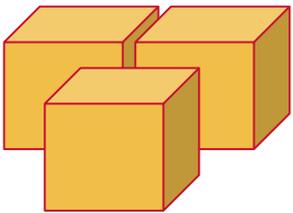
As you are working on completing the above objectives, keep in mind what you’ve learned this semester. What sensors might come into play, both from the littleBits topper kit and built into the RVR/micro:bit? How can you use some of the earlier programming concepts, such as variables and loops, to ensure your program is reliable and efficient?



Extra Challenge Details

Congratulations! The robot has been working successfully in the factory, loading components onto a single track and into the loading dock. Now, your aunt would like for you to include extra locations into the program. The workers appreciate the carrying abilities of the robot, but want more control over it. Add some or all of the following functionality:

- Have the RVR accept different inputs to select a destination - what different options do you have for this?
- Have the RVR display its speed, make warning noises for if it is moving at high speeds, and other safety features relating to the speed.
- Analyze how the RVR can interact with the employees and the environment - what else can you add to make a fully-interactive, safe assistant?



Recommended Extra Materials

We recommend having masking tape and cardboard - alongside other materials, if wished - to customize your RVR and your own field. Ask your club sponsor to about these materials, and brainstorm with your team if there might be anything else that could be useful.

Physical Set Up

Prepare the room that you are in for this challenge. Consider moving desks and chairs to represent the physical barriers that you would be facing, and lay down masking tape (or something similar) to highlight what your starting and ending points are. Being able to represent this environment will help with testing and proving that your code is meeting the challenge. In addition, create buckets (creating them out of cardboard and tape is a cheap and good way to simulate) to drop boxes in, and some tiny boxes to carry along. For people, feel free to place them randomly around the map - they would be moving in real life!

Last but not least, have fun and good luck!

Factory Map

