



PB&J Programming

Primary Audience:

Description: This demonstration is designed to be presented in front of the whole class using two volunteers. The purpose of the demonstration is to let the students discover how specific (exact, precise, detailed) a computer programmer must be when programming a robot to do a task.

Keywords: Robot, computer, programming

Materials:

- 1 jar of peanut butter or anything else that could be put on bread to make a sandwich (jelly, lunch meat, lettuce, tomatoes, pickles, mustard)
- 2 slices of bread
- 1 blindfold
- 1 wooden spatula
- 1 pair of tongs
- Electrical or duct tape
- Table

Pre-Activity Preparation:

Using the electrical or duct tape, securely attach the spatula to the tongs as an extension of the tongs. Make sure your students don't see the props before the demonstration! If the robot knows what it is doing, the demo is not as effective.

Instructions:

One person will play the role of a robot, and one person will play the role of a computer programmer. The robot is blindfolded and does not know what task it will be asked to perform. The programmer must verbally instruct the robot to make a peanut butter sandwich. However, the programmer is not allowed to use the words peanut butter, bread or sandwich. Have robot start the demonstration with one pair of tongs in each hand, with hands resting on the table top. (You can refer to this starting position as the "home" position.)

To help transform the person into a robot, the programmer will refer to the robot's hands as "grippers" (the technical term for the claw at the end of a robotic arm).

The programmer should also refer to the spatulas as "instruments" or "tools" and the peanut butter and bread as "objects."

Possible Interactive Questions:

Robotics

After all the peanut butter is cleared away, have students discuss ways to make it easier to program a robot.

1. Can the position of words in a sentence change the meaning of a sentence? (grammar) For example: “How many sandwiches are left on the table?” vs. “How many sandwiches are on the left of the table?”
2. Did the robot understand the words the programmer used? What other vocabulary words could the programmer have used?
3. What could you do to make sure the bread wasn’t damaged by the robot?
4. If you had to make 100 sandwiches, how would you make sure the robot was putting the same amount of peanut butter on each sandwich?
5. What would happen if the peanut butter or bread ran out? Would the robot stop or keep going?
6. Are there some activities that require a certain sequence or order?

Relevant Ohio Science Content Standards:

- Science and Technology K-2 B: Explain that to construct something requires planning, communication, problem solving and tools.
 - 1.7: Explore that several steps are usually needed to make things (e.g., building with blocks).
- Science and Technology 3-5 A: Describe how technology affects human life.
 - 3.1: Describe how technology can extend human abilities (e.g., to move things and to extend senses).