

Lesson: Algorithm Activity: Human Robot

Big Picture

The students will write an algorithm to help a human robot accomplish a task. This robot must be given a set of step-by-step instructions to accomplish a task. This robot cannot create its own instructions. The robot will not improvise. It will follow the instruction set given by a “robot driver” (the student giving instructions).

Objectives

Students will be able to:

- Create a simple algorithm

Alabama Standards Alignment

6: Describe how algorithmic processes and automation increase efficiency.

Preparation

Print the student handout: “Human Robot”

Materials Required

Human Robot student handout (NOT for every student; just one/two per group)

Vocabulary and Concepts

- Algorithm: a step-by-step procedure for solving a problem or accomplishing a task.

Teaching Guide

Getting started (5 mins)

Instruct students to form into groups of 3 or 4 students. Each group will be given a copy of the “Human Robot Handout” worksheet. Explain that each group will be creating an algorithm to have a Human Robot complete a set of instructions such as moving in a square around the desk or room.

The teacher will explain the following set of rules:

The robot will only have a limited instruction set:

*Start

*Move Forward (by a #number of steps)

*Move Backward (by a #number of steps)

*Rotate 45°; 60°; 90°; 180°; 270°; 360° (To Turn your Robot)

*Stop

If any instructions other than the ones above are given to the Human Robot then it will respond by saying: “Does Not Compute”.

Activity Part 1 (10 mins)

Each group will first collectively decide what task they will have the Human Robot perform (square around the room, square around a desk, etc.). Then, the group will create a set of instructions for the Human Robot and write them on the handout sheet.

Activity Part 2 (35 mins)

Once all groups complete their steps, it is time to put the steps into action. One student from the class NOT from the group will be selected to be the Human Robot. A student from each group will be the “robot driver” and read the instructions written by their group out loud, one at a time. The Human Robot will follow the instructions.

If time allows, you may also complete any of the following:

- Give groups a chance to revise their algorithm and try to complete the task again.
- The class will agree on a new set of rules for the robot (e.g. bend down, pick up object, put down object, stand up, sit down, etc.) and decide on new tasks to write instructions for. Repeat previous activities.

Wrap Up (5 minutes)

Algorithms can be compared to see which team’s algorithm has the least number of steps for the same task. Ask the groups: “Can you rewrite your algorithm to have less steps and be more efficient?”