The Snow Plow

Created by

Stephanie Racine

STEM Educator

sracine@mpsri.net

Topics

Robotics

Programming

Technology

Ages

Grades 5-8

Duration

7 50-minute periods

Ozobot Bit/Evo: The Snow Plow

Note: *This lesson requires Ozobot Bit/Evo and uses OzoBlockly to program the robot. Using OzoCodes should work, but may be difficult for the robot to follow because of the "snow".*

This lesson is designed as a culminating activity to show the students ability to program using Ozoblockly and work through the steps of the design process.

Lesson Duration: 7- 50 minute classes

Materials:

- Ozobot Bit/Evo
- Access to a computer with the Ozoblockly website
- Engineering notebook
- Roadway track that will be plowed
- Cardstock
- Tape
- Glue
- Scissors
- "Snow" (I used small white pom poms with no extra fuzz.)

The students will work in teams to design and build a plow that will attach to their Ozobot Bit/Evo. Once created, they will create an Ozoblockly program that will navigate their robot through the roadway track and plow the "snow". Their depth of understanding is represented through their team collaboration, brainstorming, design idea sketches, fabrication of the design solution, testing of their design solution with the Ozoblockly program, evaluating their work and peers and finally through their presentation.

Lesson Suggestions:

- Have students research plow types/shapes if they are unsure where to begin.
- If students are using the Ozobot Evo, have them write the Ozoblockly program rather than just drive the robot.
- The complexity of the program will coincide with the complexity of the roadway track . To differentiate, you can have different roadway tracks for different students. More complex with lots of twists and curves for those students that like a challenge. For the beginner student, it can be a straight road. There are many options. There can be intersections and/or driveways for the students to plow.
- If you wanted to add more time, you can also require the students to build their own road to plow. This allows them to self differentiate based on their own abilities. Make sure that if they use one piece of a flat material to construct the roadway track from. (One of my students used vinyl tile.)
- Before students write their Ozoblockly program, I have them write their pseudocode down in their notebook. By adding this step, it forces the students to plan their pathway for the roadway track.
- I suggest the students make a backup of their final plow design in case their plow is accidentally destroyed during the evaluation.

Criteria/Constraints:

- The plow must be made of cardstock.
- The plow can not be taped or glued to the Ozobot Bit/Evo skin.
- The plow must remove 90% of the "snow" on the road.

- The Ozobot Bit/Evo has no more than 2 minutes to remove the “snow”.
- All team members must have experience on both the construction of the plow design and writing the Ozoblockly program. (This means that you have to work together and take turns.)

Timeline:

- Day 1- Introduce the design challenge (show the roadway) along with the criteria and constraints. Answer all questions and break students into groups.
- Day 2- Students should each brainstorm/sketch their own ideas for what the snow plow should look like. They can also do research using the internet on the different types of snow plows used. Choose final design.
- Days 3&4- Students should construct snow plow.
- Day 5- Students first write their pseudocode. Then, using Ozoblockly, students use their pseudocode to help them write their program.
- Day 6&7- Students will test/modify their code or plow until they successfully complete their task.

The Snow Plow

TEAM MEMBERS: _____

PROBLEM: The roadway is covered with snow and you must design and construct a plow that will attach to your Ozobot Bit/Evo to remove the snow. Your Ozobot Bit/Evo will navigate the roadway using an Ozoblockly program that you write.

BRAINSTORM: Possible plow shapes/designs

RESEARCH: Record the websites that you used to research your possible design ideas.

PSEUDOCODE: Language that you use to plan out the directions you want your robot to follow.

Step 1	
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	
Step 7	
Step 8	

ACTUAL OZOBLOCKLY CODE: Copy your program that you used on the Ozobot Bit/Evo.
