

Snow Removal

Problem Many towns and cities have ordinances that require residents to remove snow from their sidewalks a few hours after the snow stops falling. How can elderly or disabled residents, living alone, manage to get snow removed without having to rely on others for help?

Lesson Summary Engineers are presented with the problem of snow removal from sidewalks by disabled or elderly residents in a timely manner without assistance from outside sources. They will design and create a working model to demonstrate to a panel for marketing. The engineers should consider cost of the product to residents since these residents usually have limited financial resources. The design should be tested thoroughly to be sure it can completely remove snow from the entire surface area with as little interaction from the residents as possible before presenting their final product.

Major Topic and SOL

Math SOL (2009)	5.4, 5.5
Science SOL (2010)	5.1, 4.2, 4.3,
Language Arts SOL (2010)	5.2, 5.2, 5.3, 5.7

Length of Time 6 days/1 ½ hours

Student Objectives

- The student will design, create, and demonstrate a working model of a snow removal robot using a [Hummingbird Robotics kit](#) and consumables. The model should require very little human interaction since it will be created for elderly or disabled residents. The student will present the project to a panel, discussing the functionality of the model in order to persuade them to purchase their product for mass production.

21st Century Skills

- Critical-Thinking and Problem Solving
- Communication
- Creativity and Innovation
- Collaboration
- Information and Media Literacy

Assessment Evidence

- peer reviews via checklist
- parent show case

Supplies/Materials/Technology

- various boxes, cardboard, paper rolls, hot glue gun and sticks, popsicle sticks, decorations, Hummingbird kit, computer, pipe cleaners, snow balls

Lesson 1:

- Introduce the [Hummingbird Robotics kit](#)
- Explain how to [attach the accessories to the circuit board](#)
- Introduce problem for think about until next meeting time

Lesson 2:

- Introduce [Visual Programmer](#)
- Explain how to program the accessories to function properly
- Create a plan or drawing of product

Lesson 3:

- Create working model
- Attach robotics parts
- Program
- Test

Lesson 4:

- Revise and test
- Make a plan for presentation

Lesson 5:




- Make presentation for feedback
- Revise model if needed

Lesson 6:

- Final presentation
- Peer reviews and parent show case

Project Evaluation Checklist

Group Name: _____

Project Requirements or Goals	You Did It! 	Almost There! 	Not There Yet! 
Created a working model in which all components functioned properly.			
Working model required minimal human interaction (could be remotely controlled).			
Team listened to feedback and made necessary improvements.			
Cost of production was fair and reasonable for residents.			
Presentation information was complete.			
Presentation was appealing and persuasive.			