



Reggie's Technology Adventure

Farmer Robot – How Robots Improve BC Agriculture

Students will learn about the role of robotic machines in the agriculture industry through reading “Reggie’s Technology Adventure” and through viewing a series of videos showing agriculture robots in action. Students will have the opportunity to design their own agriculture robot to work on a specific task related to farm production with the goal of increasing efficiency and safety on the farm, and to create a commercial advertising for one of the robots viewed in the video segments.

Subject Levels/ Suggested Grade

Grade 3 Applied Design, Skills and Technologies

Grade 3 Arts Education

Grade 4 Science



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Grade and Subject	Curricular Competencies	Content Connections
Grade 3-5 Applied Design, Skills, and Technologies	<p>Identify needs and opportunities for designing, through exploration</p> <p>Generate ideas from their experiences and interests</p> <p>Make a product using known procedures or through modelling of others</p> <p>Use trial and error to make changes, solve problems, or incorporate new ideas from self or others</p> <p>Demonstrate their product, tell the story of designing and making their product, and explain how their product contributes to the individual, family, community, and/or environment</p> <p>Use personal preferences to evaluate the success of their design solutions</p> <p>Use materials, tools, and technologies in a safe manner in both physical and digital environments</p>	<ul style="list-style-type: none"> Students are expected to use the learning standards for Curricular Competencies from Applied Design, Skills, and Technologies K-3 in combination with grade-level content from other areas of learning in cross-curricular activities to develop foundational mindsets and skills in design thinking and making.
Grade 3 Art Education	<p>Choose elements, processes, materials, technologies, tools, and environments of the arts</p> <p>Explore identity, place, culture, and belonging through arts experiences</p> <p>Connect knowledge and skills from other areas of learning in planning, creating and interpreting works of art</p>	<ul style="list-style-type: none"> Elements of Design: line, shape, space, texture, colour, form Principles of Design: pattern, repetition, rhythm, contrast, emphasis
Grade 4 Science	<p>Identify questions about familiar objects and events that can be investigated scientifically</p> <p>Identify some simple environmental implications of their and others' actions</p> <p>Co-operatively design projects</p> <p>Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate</p>	<ul style="list-style-type: none"> Devices that transform energy

Teacher Background

A robot is a mechanical device that is capable of performing a variety of tasks on command or according to pre-programmed instructions. Robots have several advantages over human workers. Unlike humans, robots can work virtually nonstop without becoming strained or injured by repeated movements. They can be built to be much stronger than people, and they deliver consistent results. Robots can perform tasks faster, longer, more accurately, and more efficiently than humans. Robots are reprogrammable, and one robot has the potential to perform a variety of different tasks.

Agricultural robots perform farming tasks that are often repetitive, time consuming, and potentially hazardous or harmful to humans. Robots are used on crop farms for harvesting, weed control, mowing, pruning, seeding, monitoring, spraying, sorting, and packing. On livestock farms, robots can perform the tasks of feeding, milking, monitoring, cleaning, and herding. Robot applications in precision agriculture (such as seeding and applying chemicals) can save time, money, and resources and be more profitable, efficient, environmentally friendly, and safe.

With an aging agricultural workforce and changes to immigration laws, farm labor scarcity is an issue facing the agriculture industry. Robots can be seen as one solution to food production labor shortages. By automating jobs that are not seen as desirable, higher paying jobs open up for people to move into management and programming of these robots.

Materials

- Short story – “Reggie’s Technology Adventure” available to order from <https://www.bcaitc.ca/resources/resource-order-form>
- Links to videos for viewing robots in action
 - Halifax Robotic Weed Puller <https://www.youtube.com/watch?v=ENf2hgWDiM8>
 - DOT Robot: <https://www.youtube.com/watch?reload=9&v=peHbtzUASCI>
 - Strawberry Harvester <https://www.youtube.com/watch?v=M3SGScaShhw>
 - LELY Milking Robot/Feeder <https://www.youtube.com/watch?v=Cz2C5rSTWnM>
 - Tech Insider Iron Ox Farm <https://www.youtube.com/watch?v=fFxzWG-KGGU>
- Student handouts:
 - Design an Agriculture Robot Worksheet

Procedure: Activity 1

1. Hook: Read the story, “Reggie’s Technology Adventure” to the class as part of Canadian Agriculture Literacy Month (CALM). Contact BCAITC to invite a farmer, agriculture worker, or 4-H member into the class to help deliver the story and have them share how they use technology in their careers/involvement in agriculture.
2. Pose the following question to the class for a Think-Pair-Share activity. "How do you think robots can be helpful on a farm?" Record student responses on a whiteboard or chart paper and circle overlapping responses.
3. Hand out the “What is a Robot?” Worksheet to each student and have students complete it on their own, with some volunteers sharing their robot creations to the class.

Procedure: Activity 2

1. Break students into five groups (4-5 students per group) and have them view one of the videos listed in this lesson. If students are unable to access computers or tablets to view in groups, then the whole class could watch these videos one at a time.
2. After viewing the videos, have the students work together in their groups to create a commercial to persuade farmers to buy the robot from the video their group viewed. Groups can either act out their commercial live or film and edit their commercial using a movie-making platform such as iMovie, Videolicious, or WeVideo. The commercials should include these details:
 - a. Name of the robot
 - b. Tasks the robot can perform
 - c. How the robot can be useful on a farm
 - d. How the robot can help a farmer save time, money, and/or resources
3. Allow time for the groups to share their commercials with the class.
4. Refer back to the question, "How do you think robots can be helpful on a farm?" Ask the students if they have any other ideas to add to the list after viewing their classmates' commercials. Add new ideas to the list until it includes at least the following uses for robots on farms:
 - a. Crop Farms: harvesting, weed control, mowing, pruning, seeding, monitoring, spraying, sorting, and packing
 - b. Livestock Farms: feeding, milking, monitoring, cleaning, and herding

Extension Activities

- Instead of drawing their farm robot, have students create it in an online building platform such as Minecraft or as a Maker Space building project
- Use an educational robot, such as the Edison bot, to practice some of the coding commands you would like your farm robot to perform (moving objects, lifting things, etc.)
- Have an agriculture worker who uses robotics in their work come into the class to present on their career
- Take a farm tour with your class like Reggie did to explore robots and other technology currently being used on farms in your area
- This lesson can be used as a precursor or companion lesson to "Farms of the Future" available for download on the BCAITC website www.bcaitc.ca/resources

Credit

"Reggie's Technology Adventure" was produced by AITC Newfoundland as part of the Canadian Agriculture Literacy Month initiative.

This lesson is based off activities one and two in the National Agriculture in the Classroom (USA based) lesson "Robots in High-Tech Farming" available at <https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=690>.

What is a Robot? Worksheet

Name: _____

Date: _____

Describe what a robot is using your own words:

How can a robot help out on a farm?

Now it's your turn to design a robot to help out on a farm!

List the jobs your robot helps with on the farm:
