



STAGE 4: SOIL IN THE ENVIRONMENT

Students will learn about the importance of healthy soil to healthy plants. They will explore soil composition, including the biodiversity of this complex ecosystem, to understand that there are different types of soil. Often soil dictates what can be grown—or not—in a particular area. Students will explore human impact on soil and farmers' role in soil health and the technology they use to mitigate environmental harm. Designing a new farming machine is an optional bonus activity.

Lesson 1: What is Soil?

Lesson 2: Soil Types in Ontario (and Regions)

Lesson 3: Compaction and Erosion

Lesson 4: Soil Nutrients

Lesson 5: STEM and Technology on Farms

Lesson 6: Designing an Innovative Farm Machine

LESSON 5 - Technology

Overview:

In this lesson, we'll pause to review with students what they've learned before turning to an introduction to the innovative technology coming to farms.

There is a lot going on in the field of agricultural technology! Farmers and equipment manufacturers are looking for ways to farm that will protect soil and the environment, and are more efficient and cost-effective.



Learning Goals

- Introduction to technology on farms
- Consider the role of STEM in agriculture
- Write the story of your granola bar ingredients - where the ingredients came from.

Materials Needed

- Lesson Slides
- Tennis balls, or other balls suitable for playing catch, for use in groups
- Farm to Fork worksheet

Time Frame: 40 min

Curriculum Expectations

Language Strand A Literacy Connections and Applications

- A1.1 Identify how transferable skills can be used to support communication.
- A1.2 Demonstrate an understanding of how transferable skills help them to express their voice and be engaged in their learning

Language Strand B Foundations of Language

- B3.1 Construct sentence types and forms containing adverbial clauses
- B3.2 Demonstrate an understanding of the functions of parts of speech
- B3.3 Use capitalization and punctuation
- C3.2 Make inferences using stated and implied information and ideas

Agriculture/Agri-Foods Themes

- Modern farm machinery is more efficient and less harmful to the soil and the environment.
- More efficient vehicles mean farmers spend less time driving on fields, which means less soil compaction, less emissions and therefore a healthier soil an environment.



Media Links

Embedded in the slides

Autonomous Tractors <https://www.youtube.com/watch?v=K-FvYZv785U>

GPS Helps Farmers Use Less Pesticide

<https://canadianfoodfocus.org/on-the-farm/gps-helps-farmers-use-less-pesticides/>

Robotic Weeder

<https://www.naio-technologies.com/en/news/large-scale-vegetable-weeding-in-canada-with-dino/>

In teaching notes

Farms in Ontario

<https://www150.statcan.gc.ca/n1/pub/96-325-x/2021001/article/00006-eng.htm>

Teaching Notes

<p>Slide 6: Minds On!</p>	<p>Let's Recap the Last Session</p> <p>In small groups, ask students to throw a tennis (or similar) ball to each other. Each time they catch it, they have to share a fact they remember about soil, compaction, erosion, or nutrients from last lesson.</p> <p>This recap is important to set the stage for thinking about the role of technology to maintain soil health.</p>
<p>Slide 7-11: Innovative Technology</p>	<p>Work is being done to find a solution to soil compaction. Some of these solutions include changing farming practices but others involve innovative technology.</p> <ul style="list-style-type: none"> • Review the technology we learned about in Stage 3, Lesson 3. • Let's watch some videos to learn more! (Could be shown at lunch time.) • This video shows 10 innovative farm machines. Which ones do you think will prevent soil compaction? https://www.youtube.com/watch?v=K-FvYZv785U



<p>Slide 12: Benefits of Technology</p>	<p>There are more than 48,000 farms in Ontario (2021 Census). They are located in the most fertile areas of the province.</p> <p>Source: https://www150.statcan.gc.ca/n1/pub/96-325-x/2021001/article/00006-eng.htm</p>
<p>Slide 13: ACTION: Food Origins</p>	<p>Farm to Fork: The Story of Your Food</p> <p>This activity is an opportunity for students to apply their transferable skills as they use their imaginations and what they've learned about agriculture.</p> <p>If time and schedule permit, you may wish to have your students present their stories to the class or post them around the classroom for others to enjoy.</p>

Assessment Resources. Coming soon!

Please check the STEMterprise webpage at <https://goodineverygrain.ca/ontario-farming-stemterprise/>

Farm to Fork: The Story of Your Food

Customers like to know where their food comes from.
Use this worksheet to prepare for your marketing work in stage 5.



What grain(s) will you use in your granola bar. (circle all that apply)

- A. Barley B. Corn C. Oats D. Soybeans E. Wheat

Describe the farm where your grains were grown (be creative!). For example, who are the farmers? Where is the farm located? What kind of grains do they grow? What about their farm makes it a good place to grow this crop? When are the seeds planted, and grains harvested?

What strategies and technologies does the farmer use to care for the environment?

For example, how does it help - the plant, environment and farm?

Are there any technologies that the farmer is testing on their farm?

Why is this important to the customer?
