

A Note to Teachers

While advanced technology might surprise students, today's farmers use it to work smarter and implement sustainable practices.

This lesson uses videos to showcase real-life farm technology. Teachers may prefer to show the videos over a period of time, such as snack time over a week (a 'chew and do' model), then engage in one of the tasks.

An [Active Viewing Questions](#) document is provided to boost engagement and facilitate thinking. After learning from the videos, select one of these three follow-up tasks based on your goals.

- [Researching Technology Questions](#) (Slide 13)
- [Reporting on Technology](#)-Broadcasting/Podcasting (Slide 14)
- [Renewable Energy STEM Challenge](#) (Slide 15)



Time: Approximately 60 minutes, *not including* time for the research, reporting, or STEM Challenge tasks

Optional Career and Coding Connections: a [Drone Operator](#) is the featured career and [Micro:Bit advanced Auto Farming](#) lesson relating to [UN SDG 15-Life on Land](#) is included. Teachers should review the required resources for the coding activity.



Field Trip! Consider asking a local farm equipment dealer for a tour! The sheer size and complexity of farm equipment is astounding.



A Note to Teachers

Background Information



Teachers! You may be learning about tech on farms for the first time. Here are some resources that will give you a head start.

- [Tech toolbox for sustainable farming - Good in Every Grain](#)
 - Ideas for introducing students to tech in agriculture
 - How farmers use technology for sustainable farming
 - STEM challenge, vocab, videos and more!
- [Coding in Agriculture - Good in Every Grain](#)
- [Use of Drones on Farms](#) - Video from Australia
- [SMART Farming](#) - by IBM

Expectations

STEM Skills and Connections

- A2 identify and describe impacts of coding and of emerging technologies on everyday life, including skilled trades.
- A3.1 describe practical applications of science and technology

Earth and Space Systems

- E1.1 analyse long-term impacts of human uses of energy, natural resources

Language - Foundations

- B1, B2, B3: listening, applying oral communication skills, writing, punctuation, presenting

Transferable Skills:

- Critical thinking & problem solving; innovation; creativity

Agriculture/Agri-Food:

- Understand how agriculture has changed and how farmers apply technology to farm more efficiently and protect the environment



Expectations

Vocabulary



- **Autonomous:** able to do things on one's own; in machines, it means following coded instructions without a person operating the machine. Think: a robot that moves by itself.
- **Debugging:** fixing errors. It means going back through your work to make sure everything is correct.
- **Drone:** also known as an unmanned aerial vehicle; it is an aircraft without a human pilot or passengers. Drones can be very small or big.
- **Precision Agriculture:** a way to farm that involves collecting, analyzing, and taking actions based on data. It helps grain farmers grow more while saving resources and time.



Stage 4 Lesson 3: Farm Tech



Learning Goals



We are learning that...

- Agriculture has changed from manual labour-intensive to highly technical and more scientific.
- Modern farms use STEM skills such as GPS mapping, operating equipment like drones and autonomous vehicles, and monitoring fields with remote sensing.
- Farmers and others in agriculture are developing practices and equipment that protect the environment.



Business Connection

How will this learning help our business?



Minds ON!

What problems might
a wheat farmer
experience?

Think about what it
takes to plant, grow,
and harvest crops.



Innovative Technology

Farmers are using technology to solve problems! Modern farming uses lots of technology, such as drones, GPS mapping, digital sensors, and even robots! Tablets and smartphones are important farm tools.



[Drones in Agriculture: Weed Detection](#)
(1:00)



[What is Precision Agriculture? \(4:28\)](#)

Robotic Weeding Machine

The Dino Robot is a weeding machine that is being tested in Canada.



[Dino: Autonomous Mechanical Weeding Robot](#)
[\(1:43\)](#)

What is Agriculture Technology

Agricultural technology supports modern farmers by improving agricultural methods to help farmers grow more with less manual labour and fewer resources.



[What is Agriculture Technology?](#)

Renewable Energy on Farms

Renewable energy used on farms can come from several technologies like solar, wind, geothermal, and hydropower.



[Renewable Energy on a Grain Farm](#)

[\(6:08\)](#)

Inquiry Focus

How is technology changing the way Ontario farmers grow grains like barley, corn, oats, soybeans and wheat?

Technology in Grain Farming

You are no longer students. You are **journalists!**

Your Reporting Assignment

You've been asked by your *local broadcasting station* to prepare a short report that teaches your community something they might not know — that **technology is an emerging trend in agriculture!**

Your report will focus on how Ontario grain farmers use technology to grow food in smarter, more sustainable ways.



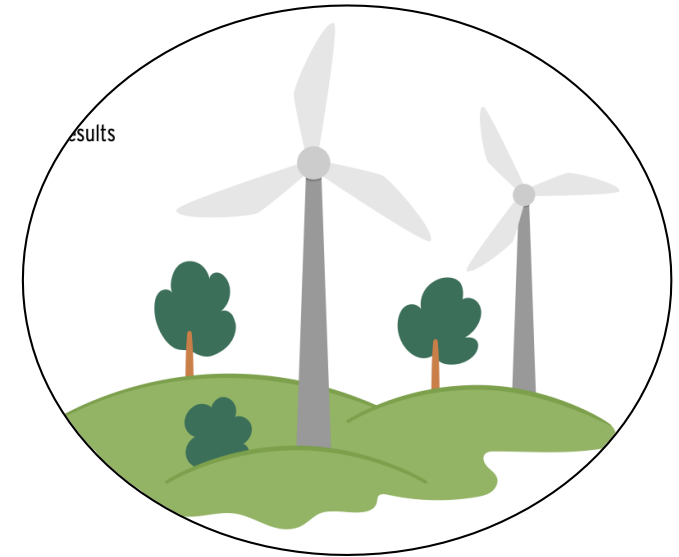
Renewable Energy STEM Challenge

Create a simple model of a wind turbine to show how differences in the shape of blades affects how they spin.



[Renewable Energy on a Grain Farm](#)

(6:08)



- Paper or cardstock
- Pencil and scissors
- Skewers
- Blow-dryer (to create wind)

Wrap Up

How could grain farm technology affect your pizza business's key ingredients, like flour for dough or the feed needed for dairy cows to produce cheese?



Check In – What's Next?





Career Connections



Drone Operator



In what ways do you think drones can be helpful to farmers?

“

“Drones overall will be more impactful than I think people realize, in positive ways to help society.”

- Bill Gates



Coding Connections



Coding Connection

