Build Competencies in **sustainable** PRACTICES

farm machines - design and function

MAKE IT PERSONAL

What types of machines do you associate with the food you prepare and eat? Describe at least two examples.

EXPLORE

Farm Machinery Functions

Agricultural machinery has many different functions – planting, seeding, fertilizing, controlling pests, irrigating, harvesting, binding and loading – among them.

ONE Start with a description of the function of each of these types of simple machines. How do you think each of these simple machines can be used in agriculture?

Levers

Screws

Use **HOW DOES MECHANIZATION IMPACT THE FOOD SYSTEM?** for these learning tasks. Use the Learning Source and the information for this guiding question in the **sustainable PRACTICES** carousel on **www.projectagriculture.ca**. Check out these weblinks for additional information.

Watch a video about the Scotch Walking Plough from the Canada Agriculture and Food Museum on YouTube at www.youtube.com/watch?v=L3QeM8B2AJc.

Find a collection of agricultural machinery on the Ingenium - Canada Agriculture and Food Museum website at https://ingeniumcanada.org/agriculture/collection-research/collection-highlights. Click on each image to learn more about different types of tractors and other artifacts.

View another collection of agricultural machines and other artifacts at the Manitoba Agricultural Museum at http://mbagmuseum.ca/collections-exhibits/artifacts-display-filtering/.

The "Fordson" was the first tractor to be manufactured on an assembly line and, like the Model T, was an affordable machine for farmers. Find a video about this factor from Henry Ford's Innovation Nation at www.youtube.com/watch?v=sqK8Q2Y5ZvM.

Wheels and Axles (Gears)

Incline – Incline Plane/Ramps

Pulley

Wedge

TWO The more complex agricultural machines used today incorporate a variety of simple machines. Revisit the examples of more modern mechanization in the **HOW CAN AGRICULTURAL ENVIRONMENTS CONTRIBUTE TO SUSTAINABILITY?** carousel slide.

Then, look at the design diagram of the machine below. Where can you identify simple machines that are part of this more complex farm machinery?

This is a diagram of key parts of a combine harvester that was used for a 1983 patent.

The numbered parts are not identified in this design diagram. How many parts do you think you can identify?

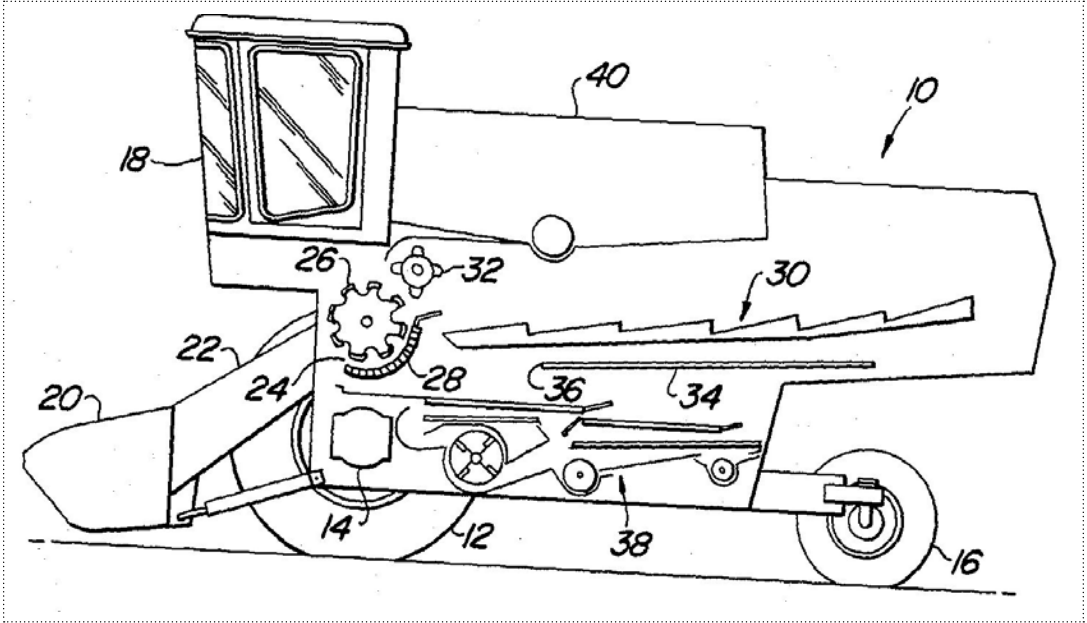

Diagram of key parts of a combine harvester. From US Patent 4,531,528: Public domain.

Describe or sketch the simple machines that are part of the combine harvester.

INVESTIGATE AND CREATE

Mechanization over Time

The changes that agricultural machines went through over time resulted from inventors and engineers working to improve existing machines. Simple machines were combined to make compound machines.

1. How does the combine harvester machine design represent improvements to the simple tools that farmers used hundreds of years ago?

2. A **compound machine** is two or more simple machines working together to make work easier. Revisit your descriptions of the different types of simple machine designs. What type of work does each make easier? Describe them in the **T-Chart** below or create your own.

The scientific definition of **work** says that when force is exerted on an object, and that object moves in the direction of the force.

Lever	
Screw	
Wheel and Axle	
Incline	
Pulley	
Wedge	

A machine on its own does not actually do the work. Its ability to do the work is limited to a **source of energy**. These machines do not take away the task that needs to be done. Strictly speaking, the machine enables a farmer to use less force.

3. Select **one** of the early agricultural tools you learned about. Explain how a compound machine lets farmers use less force to complete the same tasks.

4. How has the need for food been met in different ways over time? Focus on **one** type of farm equipment to describe how changes in mechanization has affected the ways that crops have been grown.

Create a **timeline** that traces the changes in mechanization over a time period that you choose. Include at least **three** examples of machines that changed during this time period.

Design your own format or use a graphic organizer such as a **Cause and Effect Chart** or a **Bubble Chart** to construct your timeline.