

Simple Machines are Everywhere on the Farm Teacher Guide

Grade: 5

Subject: Science

Unit: Forces and Simple Machines

SLO

5-3-10 – Identify and describe types of simple machines. Include: levers, wheel and axle, pulley, gear, inclined plane, screw, and wedge

5-3-06 – Identify common devices and systems that incorporate pulleys and/or gears.

GLO

B1 – describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both locally and globally.

Materials:

- Copies of activity sheets page 1 -4.
- Answer key

Pre-knowledge

- Students should have already been introduced to the different types of simple machines.
- Students will identify the 6 types of simple machines and gears.

New knowledge

- Students will identify the simple machines found on modern farm machinery.
- Students will be introduced to the main types of farm machinery and their uses.
- Science and technology have increased the productivity of Canadian farmers so much that they currently produce enough food to feed us as well as people in over 200 countries throughout the world.

Video Resources:

The following 2 videos take a look at auto steer in tractors.

- Drilling with John Deere airseeder with auto steer (Look ma – no hands) <http://www.youtube.com/watch?v=LskeiiOuR8> 0:47 minutes, or
- John Deere auto steer for travis <http://www.youtube.com/watch?v=f0abMbxA-aQ> 3:35 min. – more in-depth look at auto steer and airseeding.

Technological innovations in agriculture

- Agritechnica 2011 – Innovations in Agriculture 4:32 min., http://www.youtube.com/watch?v=9T4mC24fw-w&list=UUgPloxeI5a0aJ_9mr7QJR1w&index=5&feature=plpp_video Agritechnica is an international trade show which features cutting edge technological development in agricultural equipment such as auto steer tractors, gps, tractors running on electricity, smart phone use for sprayer monitoring etc.. This video will give students a glimpse at the use of technological innovation in agriculture, the international scope of the agriculture industry and a look at some of the diverse jobs available in agriculture.

Teacher background information:

Using GPS and auto steer systems on farm equipment provides advantages for the farmer's health, the environment and the farm's profitability. Some of these advantages are:

- *Overlap is reduced to almost zero when seeding, fertilizing and spraying.*
 - *This reduces the amount of fuel, seed, fertilizer, spray and equipment run time used while maintaining or increasing crop productivity. Lowering these input costs increases farm profitability.*
 - *Using fewer inputs helps protect the environment. Less fuel means fewer emissions. No overlap when fertilizing means there is no unused fertilizer to leach away into waterways.*
- *Reduces driver fatigue*
 - *Using auto steer leaves farmers less fatigued. This in turn leads to fewer mistakes and accidents which improves safety on the farm. It also allows for better life balance between work and family time.*

Scientific research and the application of new technologies have allowed farm productivity to increase in North America. Further innovation will be needed to produce enough food to feed an increasing world population.

- *In 1960, 1 hectare of farm land produced enough to feed 2 people*
- *In 1995, 1 hectare of farm land produced enough to feed 4 people*
- *Due to the ever increasing world population, in 2025, 1 hectare will need to produce enough to feed 5 people*

(Source: video 'Agriculture is under Pressure', International Seed Federation, 2:49 minutes
<http://www.youtube.com/watch?v=2jF2IsicDC4&feature=related>)

Note: This 'Simple Machines are Everywhere on the Farm' resource is also available for download from the AITC-M website www.aitc.mb.ca. Just go to our resource webpage or follow this link <http://www.aitc.mb.ca/Resources.htm> and check out the resources for Grades 5 – 8.