Lesson Plan

Soil to Sustenance

Grade: 3 & 7 | Subject: Science & Technology | Duration: 40 Minutes



Dairycraft Overview

Learning Objectives

This Minecraft world supports the following main achievement objectives:

- Teach students about the versatility of milk, as well as concepts such as states of matter and chemical/physical changes.
- Teach students about the nutritional benefits of milk.
- Teach students about life on a working farm, career options associated with dairy farming, and the layout and machinery used in modern farms.
- Teach students about waste management and renewable energy production on dairy farms.
- Teach students about how technology is transforming dairy farming.
- Teach students about the relationship between crop farming and milk production.

How to Use Dairycraft

Dairycraft is a fully automated Minecraft educational world, so there is no need for teacher input once students are in-game. Additional teacher input or guidance may be beneficial for students below the set lesson grades.

- Dairycraft has been designed as a single-player educational game. When completing most lessons, extensions, and sub-activities, each student should be in their own Minecraft world.
- Dairycraft can function on any device compatible with Minecraft: Education Edition.
- For collaborative play, students can be grouped into teams to complete the major extension task: building their own farm based on the knowledge they have learned.
- If you are new to Minecraft: Education Edition, the '[Support Center]' on the Education Edition website provides all the information you will need to get started.

Activities for Students

Dairycraft contains six main activities for students, each of which can be played independently of the others. It will benefit students to have completed Lesson 2 before proceeding with other lessons, in order to have a basic understanding of the farm's layout. Each lesson has an extension task, and after all six lessons are completed there is one major

extension activity in which students are encouraged to build their own farm using the information they have learned from the lessons.

At points in the game, students may be given external links to videos that explain certain processes or concepts in more detail. Everything else they need to learn and interact with is contained within the game.

Dairycraft Map Layout



Lesson 6: Overview

This Minecraft-based lesson immerses students in the dynamic connection between crop farming and dairy production, showcasing how crops are cultivated to feed and support dairy cows. Through this interactive experience involving activities and interacting with NPCs (non-playable characters), students will operate farming equipment, plant corn, and fertilize fields while exploring crop growth stages, the role of fertilizers, and sustainable farming practices.

The lesson combines interactive gameplay with real-world insights, fostering curiosity and critical thinking about the time and effort required to manage a successful dairy farm and the advantages of growing crops to sustain dairy operations.

Learning Objectives

Through this lesson, students will:

- Learn about the crop farming process on dairy farms.
- Understand the role of crop farming in supporting dairy farm operations.
- Learn the growth stages of corn grown on dairy farms, and how it is harvested for silage feed for dairy cows.
- Operate a tractor, combine harvester, and agricultural tools (cultivator drill and fertilizer sprayer) to simulate real-world crop farming processes.
- Recognize the environmental benefits of sustainable farming practices such as fertilizer use and biodigesters for waste vegetation.

Curriculum Alignment

Designed for Grades 3 and 7 in the Ontario curriculum:

- Describe different food plants and where they are found or grown locally.
- Explain how plants, animals, and people depend on each other.
- Describe how farming and food harvesting affect ecosystems, and identify ways to keep ecosystems healthy and in balance.
- Grade 3: Science and Technology B2.7 & B2.8
- Grade 7: Science and Technology B2.8

Overall Expectations

Students will learn how to:

- Demonstrate an understanding of the relationship between farming practices and sustainability.
- Demonstrate knowledge of various pieces of agricultural machinery and its uses in modern day farming.
- Understand the importance of agriculture to the economy, and specifically dairy farm operational costs.
- Understand and apply knowledge of how corn crops grow and are harvested in order to create silage for dairy cows.

Specific Expectations

Students will learn how to:

- Identify and explain the role of different crops in dairy farming, with a particular focus on corn.
- Describe the process of growing and harvesting corn for silage in a modern day crop farming system.
- Operate a tractor with farming attachments and understand the function of each one.
- Examine how sustainable practices (like fertilizer use) impact farming and the wider environment.

Student Expectations

Demonstrate an understanding of the ways in which crops are grown on dairy farms to create food for cows, how modern day machinery is used to speed up crop farming, and the ways in which crop farming on dairy farms can be done in a sustainable manner.

Activity and Extension Task Overview

During this lesson students will:

- Watch an introductory video about how crops are grown on dairy farms (optional).
- Interact with four non-player characters (NPCs) to learn about the types of crops grown on dairy farms, the types of machinery used to grow and harvest crops, and how crop farming on dairy farms can be done in a sustainable and environmentally friendly way.

- Complete three tasks, including cultivating and drilling a field, fertilizing a field, and harvesting a field in order to create silage.
- Take notes as they learn, and complete a randomized knowledge test at the end of the lesson.
- Complete an extension task involving collecting silage bales and driving them over to a neighbouring farm to sell (highlighting how dairy farming can be done in a cooperative and sustainable way).

Activity: Crop Farming

Student spawns outside the farm office, in the center of the farm.

STEP 1 | Introduction

- NPC ‘Cheryl’ welcomes student and offers an optional video to watch.
- Student chooses to watch the video or proceed directly to the next stage of the lesson.

STEP 2 | Cultivator Drill Attachment Pickup

- Student encounters NPC ‘Scott’ outside the vehicle barn, who introduces the vehicles used in this lesson, and explains why dairy farms grow crops.
- NPC ‘Scott’ describes the first task: to fill the cultivator drill with seeds.
- Student drives tractor with the cultivator drill attachment to the seed barn.

STEP 3 | Corn Growth Cycles and Silage

- NPC ‘Rosa’ explains how seeds grow after they are planted, describing the growth cycle and stages of the corn plant (germination, photosynthesis, pollination, and harvesting), and how it is used to make silage.

STEP 4 | Knowledge Test

- Student takes a knowledge test based on the information they have just learned.
- Student needs to answer two randomized questions successfully in order to proceed. Incorrect answers prompt a review and retest.

STEP 5 | Corn Seed Pickup

- Student heads into the barn to pick up corn seeds from the chests and load them into the cultivator drill’s inventory.

- NPC ‘Rosa’ describes the next task: cultivating and drilling a field with corn seeds.

STEP 6 | Cultivating and Drilling Corn

- Student drives to the designated field and must plough and drill at least 70% in order to complete the task.
- Student returns to the vehicle barn where NPC ‘Scott’ describes the next task: fertilizing the corn plants.

STEP 7 | Fertilizer and Water Sprayer Attachment Pickup

- Student switches to the tractor with the fertilizer sprayer attachment, drives to the fertilizer storage barn, and loads fertilizer and water into the sprayer’s inventory.
- Student sprays the field until inventory is empty, then returns to the vehicle barn.

STEP 8 | Harvesting the Corn

- NPC ‘Scott’ introduces the combine harvester and explains how corn used for silage is grown differently from corn used for human consumption.
- On the assumption that two months have now passed, student drives the combine harvester back to the fertilized field to harvest the now fully grown crop.

STEP 9 | Unloading Harvested Corn

- Student encounters NPC ‘Haileab’ outside the storage bunks for freshly harvested crops.
- Student unloads the harvested corn from the combine harvester’s inventory.
- Student returns the combine harvester to the vehicle storage barn.

STEP 10 | Knowledge Test

- Student takes a knowledge test based on the information they have just learned.
- Student needs to answer four randomized questions successfully in order to proceed. Incorrect answers prompt a review and retest.

STEP 11 | Reward and Feedback

- Upon successful completion of the test, student is rewarded with a pail of speed-boost milk and the choice to continue on to the extension task or return to the spawn room to choose the next lesson.

- If student decides not to continue with the extension, the exclamation point above the Lesson 6 NPC in the spawn room turns amber, indicating student has yet to complete the lesson's extension task.

Extension Task: Taking Silage to the Neighbours

Student spawns in front of the farm office, close to the farmhouse.

STEP 1 | Introduction

- Student is introduced to the activity challenge by NPC 'Shilpa'. They will need to deliver silage to a neighbouring dairy farm.
- NPC 'Shilpa' explains why farmers might need to buy silage from one another to keep their cow herds well fed.

STEP 2 | Loading and Transport

- Student picks up a flatbed truck and loads the correct amount of silage into the inventory.
- Student drives to the neighbouring farm to deliver the silage, and interacts with the farmer, 'Danny'.

STEP 3 | Completion and Small Plane Reward

- NPC 'Danny' congratulates student for completing the task and extension task, and gives them the lesson-specific trophy.
- Student is also rewarded with a yellow plane in the airplane hangar next to the farmer's market, which has now been unlocked and is flyable.
- Student places their trophy in the spawn room trophy display cabinet for teacher verification. (The trophy and display cabinet demonstrate that student has completed the lesson in full.)

Miscellaneous

If you are experiencing technical problems or bugs with this lesson, please report them directly through our website's bug report form: crackedcubes.co.uk/report-a-bug.

For general information about Minecraft: Education Edition, including additional information on how to play and set up lessons, please head to the dedicated Minecraft Education support center: edusupport.minecraft.net/hc/en-us.