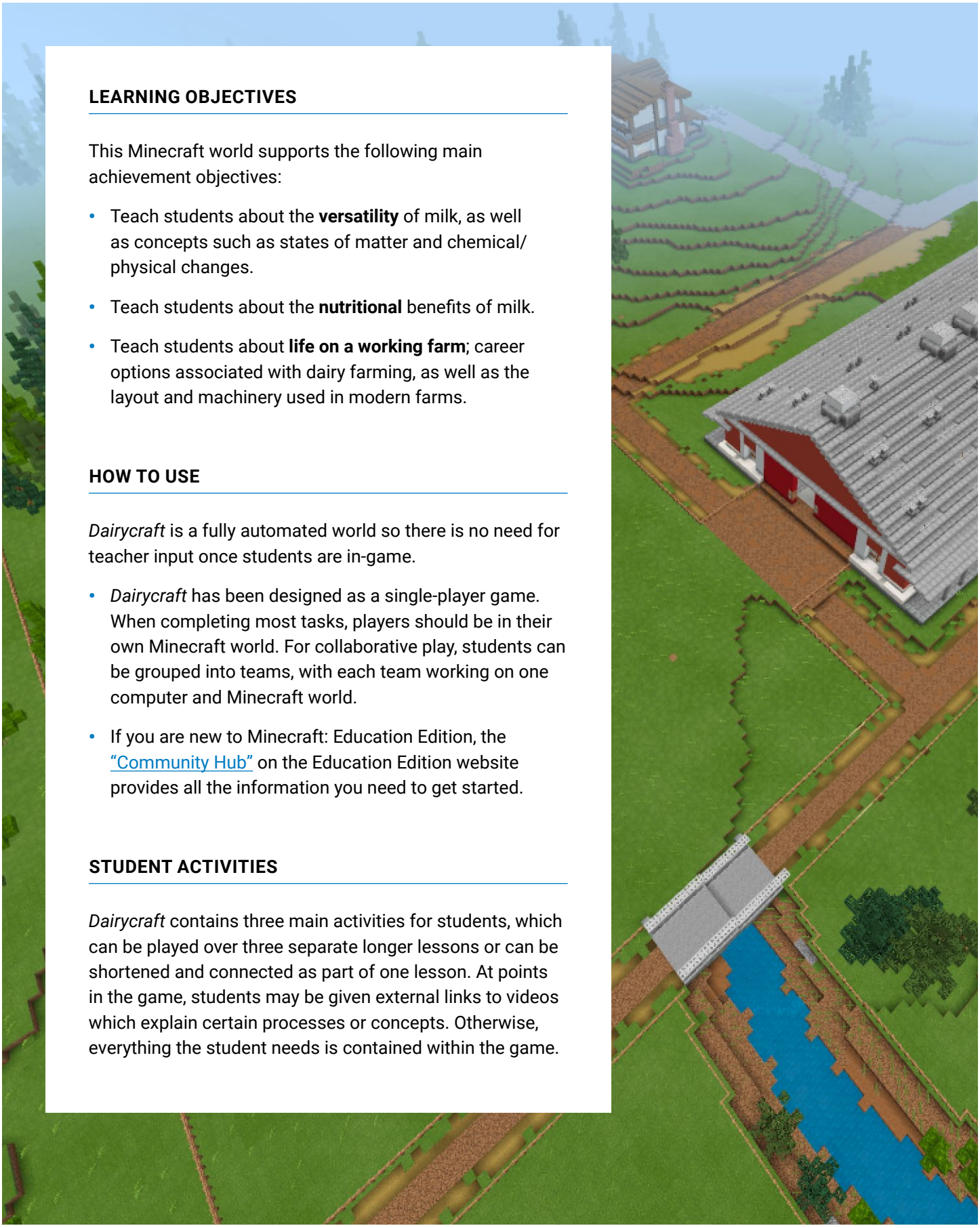
DAIRYCRAFT

LESSON PLAN

Matter: Changing States

Grade: 5 | **Subject:** Science and Technology | **Total time:** 20 min





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, as well as the layout and machinery used in modern farms.

HOW TO USE

Dairycraft is a fully automated world so there is no need for teacher input once students are in-game.

- *Dairycraft* has been designed as a single-player game. When completing most tasks, players should be in their own Minecraft world. For collaborative play, students can be grouped into teams, with each team working on one computer and Minecraft world.
- If you are new to Minecraft: Education Edition, the "Community Hub" on the Education Edition website provides all the information you need to get started.

STUDENT ACTIVITIES

Dairycraft contains three main activities for students, which can be played over three separate longer lessons or can be shortened and connected as part of one lesson. At points in the game, students may be given external links to videos which explain certain processes or concepts. Otherwise, everything the student needs is contained within the game.

OVERVIEW

Students will learn about the different processes that change the state of matter of dairy into other foods like cheese, yogurt, and butter.

CURRICULUM ALIGNMENT

Designed for grade 5 science and technology curriculum, understanding matter and energy strand.

SPECIFIC EXPECTATIONS

3) Understanding Basic Concepts

By the end of the lesson, students will:

3.1) Identify matter as everything that has mass and occupies space.
3.2) Identify properties of solids, liquids, and gases and state examples of each.
3.3) Explain changes of state in matter and give examples of each.
3.4) Describe physical changes in matter as changes that are reversible.
3.5) Describe chemical changes in matter as changes that are irreversible.
3.6) Explain how changes of state involve the release of heat or the absorption of heat.
3.7) Identify indicators of a chemical change.
3.8) Distinguish between a physical change and a chemical change.

STUDENT EXPECTATIONS

Demonstrate an understanding of the properties of matter, changes of state, and physical and chemical change.

ACTIVITY: THE PROCESSING PLANT

Players start outside the Processing Plant. They speak to the Milk Truck Driver who asks them to go inside, taking 3 milk buckets from the chest. Players speak to the Dairy Worker who directs them to the Lab Technician inside the Briefing Room.

STEP 1 Player will be greeted by the Dairy Worker and provides a link to "From Moo To You" video

STEP 2 The Lab Technician will teach players about the States of Matter. The table display and diagrams on the wall will demonstrate examples of states of matter, as well as how states may change through heating or cooling. The book on the lectern will explain physical and chemical changes, and the key differences between the two.

STEP 3 Players must speak to the lab assistant to gain access to the kitchens. The Assistant will ask players if frying an egg is a chemical or physical change. The correct answer: (chemical) will open the doors to the kitchens and prompt players to go there next.

STEP 4 **Yogurt.** The Yogurt Producer and recipe book provides players with a basic recipe for yogurt. Players must

pasteurize milk first (using the pasteurizer). They are then left with 'pasteurized milk', which they need to heat, and then add bacterial culture to (these steps are done by pressing the button underneath each step). The Yogurt Producer will ask if this was a chemical or physical change (correct answer is chemical).

STEP 5 **Cheese.** The Cheese Maker and recipe book provides players with a basic recipe for cheese. Players must pasteurize the milk (using the pasteurizer), add bacteria and rennet then heat again to separate the curds and whey (these steps are done by pressing the button underneath each step). The Cheese Maker will ask if this was a chemical or physical change (correct answer is chemical).

STEP 6 **Ice Cream.** The Ice Cream Maker and recipe book provides players with a basic recipe for ice cream. Players must pasteurize the milk (using the pasteurizer), then add sugar and ice and freeze it (these steps are done by pressing the button underneath each step). The Ice Cream Maker will ask if this was a chemical or physical change (correct answer is physical). The correct answer will unlock the butter churn.

STEP 7 **Butter.** The Butter Maker and recipe book provides players with a basic recipe for butter. Players must pasteurize the milk (using the pasteurizer), then separate to get cream from milk and finally use the churn to create butter (these steps are done by pressing the button underneath each step). The Butter Maker will ask if this was a chemical or physical change (correct answer is physical).

Once a player has made butter, they will be able to click on the button to teleport to the Biodigester for a bonus task.

BONUS TASK: THE BIODIGESTER

Player starts outside the biodigester. They speak to the Farmer inside.

STEP 1 A Farmer explains the biodigester and provides a link to a "Poop to Power" video. After watching the video, players travel to the manure pit to collect some 'poo blocks' from the chest in the middle of the pit

STEP 2 After gathering the manure and placing it in one of the biodigesters, the energy meter in the building will light up, and players will get fertilizer.

STEP 3 Players will be asked to go to the test field opposite the biodigester, plant the seeds in the chest, and use their fertilizer to grow the crops.

STEP 4 Once all the crops have fully grown, the player has completed the lesson, and will be teleported back to the spawn point.