

# STUDENT GUIDE

## ENGAGE LESSON 21



### Part 1: Our Motivation

Record what we were trying to figure out that led to this investigation.



### Part 2: Stages of Engineering Design

Record what you know about the engineering design process.

How do you think we can use engineering to help us improve the dairy system to provide dairy products more sustainably for people?





### Part 3: Defining the Problem by Analyzing Costs and Benefits of the Dairy System

Review your artifacts from previous lessons and use them to list all the benefits, costs, and risks of the dairy system. Record what you find in the table below.

Label each of the benefits, costs, and risks you described as economic, social, ethical, environmental, or geopolitical.

Benefits	Costs and Risks

Use the list of costs and risks to define the problem that you want to set out to design a solution for in this module.



## Part 4: Selecting and Defining Problems

Complete the Problem, Mechanism, and Impact Analysis for the problem you have defined.

- **Problem:** Describe the specific risk or problem associated with the dairy system.
- **Mechanism:** Identify the underlying mechanism or cause responsible for the problem.
- **Impact:** Explain the potential consequences of solving the problem. How will a solution to the problem improve the system?

Describe the <b>PROBLEM</b>	Explain the <b>MECHANISM</b>	Identify the <b>IMPACT</b>