

Lab 3.1: A Dairy's Role in the Environment

Name: _____

Each of us plays an important role in protecting our environment, whether we live on a dairy farm or in a residential community. Dairy farms have a positive effect on the environment because dairy farmers continue to apply environmentally-friendly practices. Use the two sketches on the back of this page to compare and contrast the two communities and their impact on the environment.

What aspects of the farm have a positive effect on the environment? What should the farmer do to make sure he or she protects the environment from any harmful effects? What aspects of the residential and industrial community could negatively impact the environment? What can we do to protect the environment from those negative effects?

1. List 3-5 attributes of each community that could affect the environment:

Farm Community Attribute	Positive or	Residential and Industrial	Positive or
Dairy Barn Manure	Negative	Smoke Stacks	Negative
Wind Turbine	Positive	Roads	Negative
Open Fields	Positive	Cars	Negative
Manure Lagoon	Negative	Houses	Negative
Solar Panels	Positive	Tree and Grass	Positive

2. List ways the farmer can make all of the attributes have a positive impact on the environment:

By hauling manure from the lagoon at the right times and/or using the methane from the manure to produce electricity, a farmer can ensure his dairy facility has a positive effect on the environment.

By using no-till farming practices, he can assure that his crop fields have a positive effect on the environment.

3. List ways we can ensure the residential community has a positive impact on the environment:

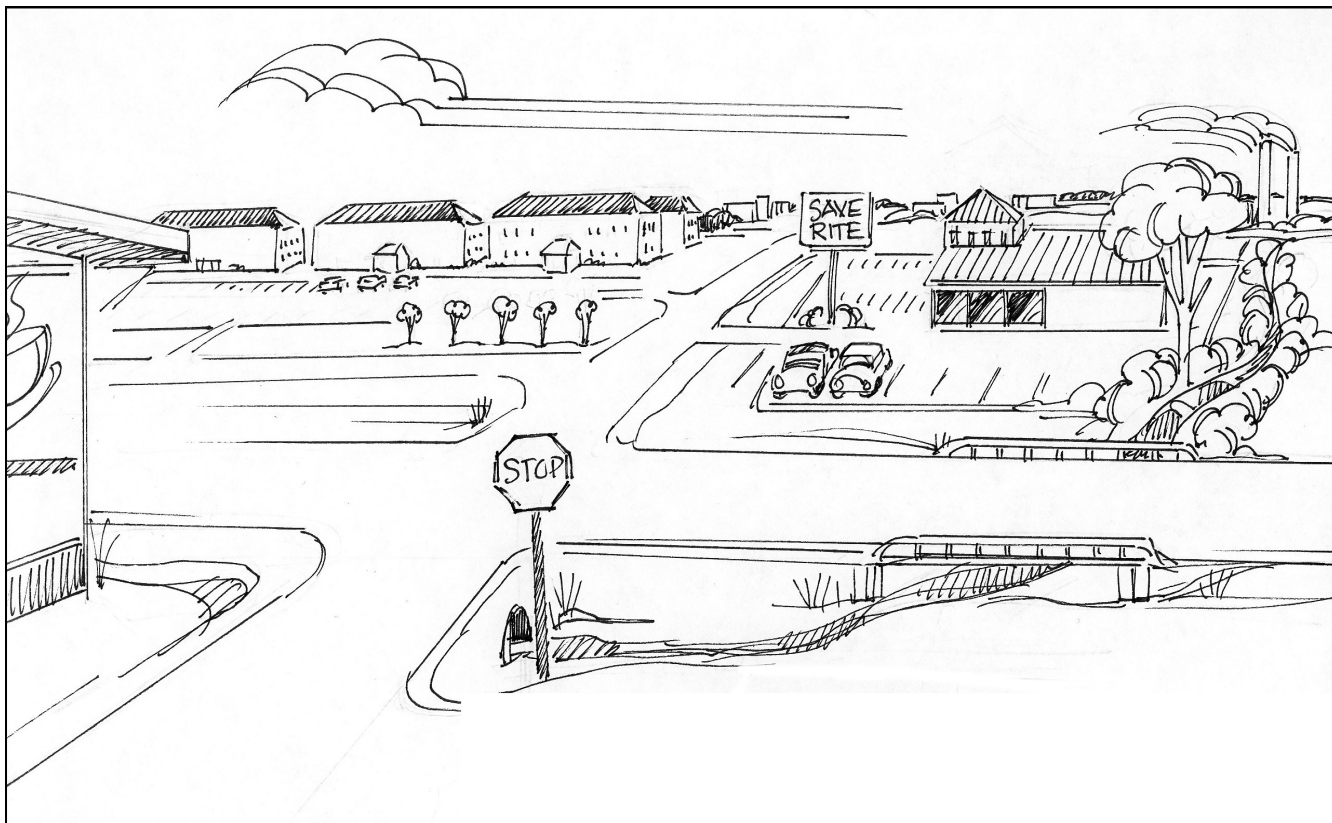
Making sure the factory with smoke stacks is filtering its waste to make sure it isn't releasing harmful compounds back into the environment, by using hybrid cars, riding a bike, or taking the bus and by conserving energy in our homes and recycling our waste.

4. Explain ways the dairy farm in the sketch benefits the environment around it:

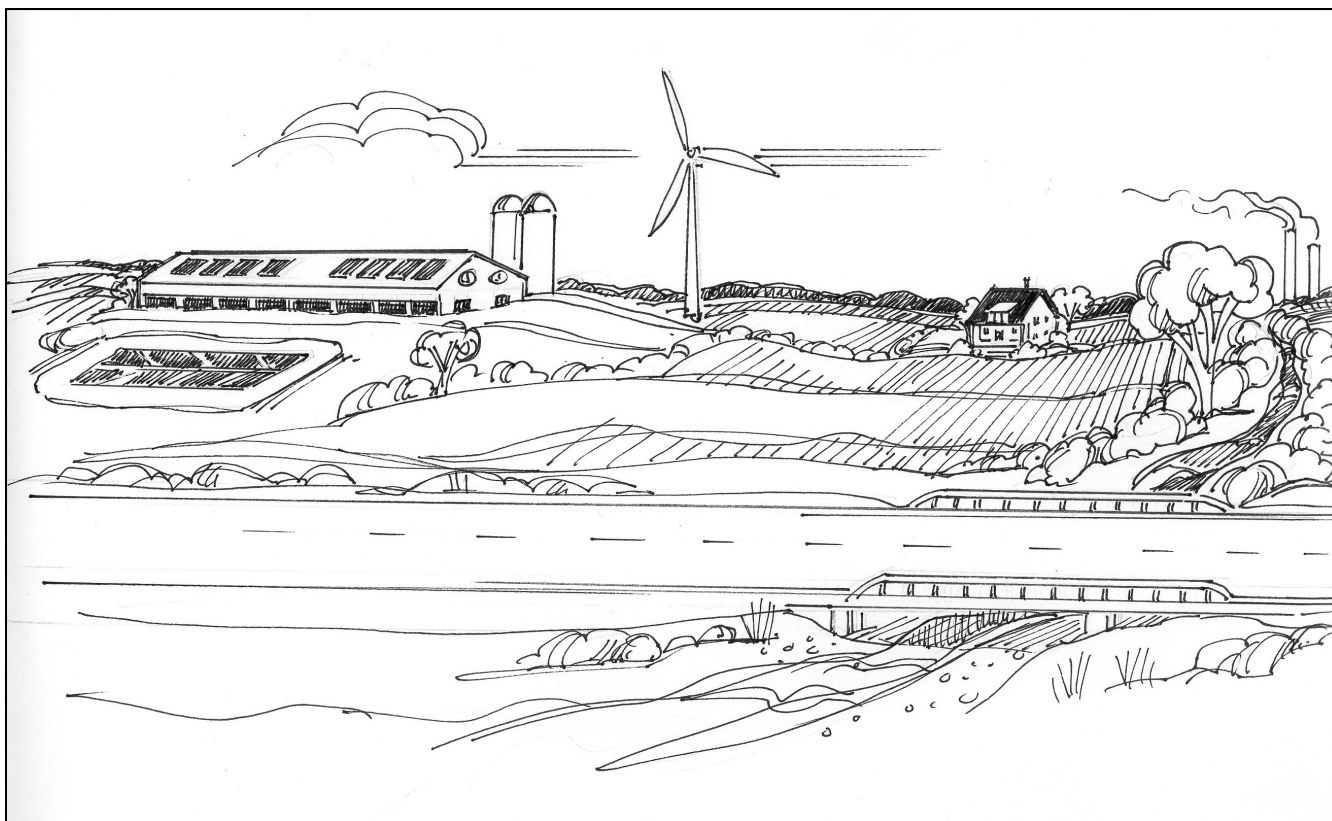
Solar panels, wind turbines and methane digesters all produce alternative energy for us to use. the open fields provide a place for nutrients and water supplies to recharge in our environment.

Lab 3.1: A Dairy's Role in the Environment

Residential and Industrial Community



Farm Community



Lab 3.2: Sources of Energy on the Farm

Name: _____

In this activity, you will be determining whether thermal energy, which is energy produced from heat, can be made to do useful work. Before you begin the experiment, circle the hypotheses you believe is true and write it below.

Hypotheses: *Thermal Energy can / can not be made to do useful work.*

Rewrite Your Hypotheses: Thermal energy can/can not be made to do useful work.

What you will need:

Plastic 1-liter bottle (empty)

Large balloon

Bowl of hot (not boiling) water

Bowl of ice water

Small rock

Freezer to cool bottle and balloon

Steps:

1. Cool the balloon and the bottle in a freezer for 5 minutes.
2. Fill the bowl with hot, not boiling, water.
3. Put the balloon over the mouth of the bottle, making sure the air has been squeezed from the bottle.
4. Place the bottle into the bowl of hot water.
5. The air inside the bottle should expand and inflate the balloon.
6. After it is inflated, put the bottle with the balloon in the bowl of ice water and observe what happens.
7. Put the rock on top of the balloon to observe how the expansion and contraction can be converted into useable work.

Questions:

1. What happened when you put the bottle in the warm water? The balloon expands.
Why? Because molecules expand when they are warmed.
2. What happened when you put the bottle in cold water? The balloon deflates.
Why? Molecules contract when they are cooled.
3. Were you able to create a device that performed useful work? **YES** or **NO**
How? When the balloon expands, it moves the rock forward.
4. What other devices can you think of that use thermal energy to do work? (Class ideas)
5. How do you think sunlight and solar energy relate to thermal energy? Sunlight is a form of thermal energy because it creates energy by heating things.