



Explorations in Agriculture

# THE ULTIMATE RECYCLER

## PURPOSE

Students will examine how cows help to conserve natural resources by reducing, reusing and recycling food processing by-products.

## TARGETED GRADE LEVEL

3rd-5th grade

## MATERIALS

Samples of food processing by-products  
cattle feed



## ACTIVITY

Ask students what it means to recycle. Help guide them to the correct answer that recycling is...

Ask students if they think that a dairy cow could recycle.

- Give a few examples of how a dairy cow can use items that we would consider as waste and show photos.
- Cottonseed: Most of your students are wearing clothes made out of cotton. Inside of a cotton boll (flower) are seeds that are extracted because they are not needed to make cotton fabric. These seeds are used to feed dairy cows, who then produce milk and milk products that are a healthy addition to our diets.
- Sugar Beet Pulp: Some of the sugar we use in cooking is produced by a sugar beet. Once the sugar is extracted from the beet the pulp remains. Sugar beet pulp is a valuable feed for cattle that is high in energy. It takes a lot of energy for a cow to produce milk. They can obtain some of this energy from beet pulp, a by-product that cannot be digested well or provide nutrition to us as humans.
- Almond Hulls: Almonds grow on trees. The nut is encased in both a shell and a fibrous cover called a "hull." Cattle have four chambers in their stomach which allow them to digest and gain nutrients from items that humans cannot. Dairy cows can eat almond hulls as part of their specially formulated diet. Cows use this energy to produce milk.
- There are many more examples of how dairy cattle help recycle and preserve valuable resources.

## Procedures

1. Place several types of food processing by-products used for dairy feed in separate, brown paper bags. Students take turns feeling inside the bags and guessing the feed ingredient. Review with students, identifying the original product and the changes that happened to create each by-product foodstuff.
2. Explain to students that dairy cows help us recycle materials that would normally be considered waste. We call these materials "byproducts". For example, after farmers harvest ears of corn, the stalks remain. These stalks are a nutritious addition to animal feed. Re-using products is an important way for humans to reduce the amount of waste sent to landfills. By recycling the material and using it as nutritious ingredients for dairy feed, we reduce our impact on the environment. Work with students to identify other waste products that are used in the dairy industry as feed.

*Continued*

- Share that the following steps are repeated to form an effective cycle. (Create poster to use)
- Cows consume feed, made of food processing by-products.
- The dairy farmer creates compost and collects manure.
- Manure is used to fertilize the field.
- The dairy farmer harvests the field and feeds the by-products to the dairy cattle.

### Summary:

What are some lessons we have learned from dairy cows that will help us reduce, reuse and recycle in our own lives?

## CLASSROOM CONNECTIONS

### Science

- Contact the California Beef Council ([www.teachfree.com](http://www.teachfree.com)) for “Things We Could Learn from a Cow and a Worm,” a colorful poster with accompanying activities that demonstrate the positive role cattle play in our environment.
- Students research the potential of “catching” methane gas from manure and using it as an energy source.
- Go on a field trip to a dairy with a methane digester.

### Language Arts

Create a storybook about the efficient and resourceful dairy cycle. Students also create a storybook sharing how they reduce, reuse and recycle.

## ACADEMIC STANDARDS

### Minnesota Science Standards and Benchmarkss

3.4.1.1.1 Compare how the different structures of plants and animals serve various functions of growth, survival and reproduction. For example: Skeletons in animals and stems in plants provide strength and stability.

5.3.4.1.3 Compare the impact of individual decisions on natural systems. For example: Choosing paper or plastic bags impacts landfills as well as ocean life cycles.

### National Agricultural Literacy Outcomes

T1.3-5.e Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals)

## ADDITIONAL RESOURCES

Children’s book: *Clarabelle* by Cris Peterson