Maryland 4-H Youth Development

To Make The Best Better

UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community

Supplemental Lessons

Frederick County 4-H Youth Development
330 Montevue Lane
Frederick, MD 21702
Maryland Agricultural Education Foundation
Ag Literacy Program 2012 Lesson Plans

Clarabelle – Making Milk and So Much More
Cris Peterson - Boyd’s Mill Press 2007

Summary: Book features Clarabelle and her newborn calf on a modern day dairy farm. A cow is an amazing creature who transforms feed such as hay and corn into milk from which cheese, yogurt, and ice cream can be made. This story introduces students to the latest technology that allows farmers to create electricity and other by-products with the help of their dairy herds.

Vocabulary: alfalfa, bacteria, butterfat, dairy nutritionist, fertilizer, manger, manure, methane, silage, soybean meal, stalls, teats

Introduction: Begin the session by introducing the word AGRICULTURE. Ask, “What do you think this word means?” Accept answers and guide toward the following definition. (Write on the board)

Agriculture
agri (means land) culture (means to grow)

SO…
agri + culture = growing plants or raising livestock (farm animals) on the land?

What plants might a farmer grow? Accept suggestions. What are some animals that are raised on a farm? Accept suggestions.

Explain that today you are going to meet one of the animals that is raised on a farm – a dairy cow named Clarabelle. This might be a good time to ask or explain the difference between a dairy cow and a beef cow. (Also see article and Venn diagram—Beef Cow or Dairy Cow?)

Introduce the Book

Show the cover and title of the book, Clarabelle – Making Milk and So Much More. Highlight the upper right hand corner of the cover which says, Making Milk and So Much More.

Ask: What does a cow make other than milk? (Elicit student ideas. List their ideas on the board.) They may suggest other food products but they probably will not mention methane gas, electricity, or bedding. They may or may not mention manure. Before reading, encourage
students to listen carefully for other things that a cow produces. Challenge them to find at least three that have not been mentioned.

Explain to students that this book is full of numbers and they need to be “Number Detectives” and discover what each number means. Here are two different ways to use this number search.

a. Cut apart the Clarabelle’s Numbers - Cards and attach each number to the chalkboard. For younger students, they can be attached in the order they are found in the story. For older students, they can be mixed up. Students are to listen for the number in the story and remember what it represents. The order of the numbers in the story is:
   - 1,500 (Clarabelle’s weight)
   - 100 (newborn calf’s weight)
   - 5 (gallons of milk produced)
   - 160 (milk for this many bowls of cereal)
   - 4 out of 6 (hours chewing cud)
   - 30 (gallons of saliva)
   - 4 (stomach parts)
   - 25 (rumen holds this many gallons)

b. Another option is to copy several pages Clarabelle’s Numbers - Cards and cut them apart. Give students one or more numbers. It is their task to find
out what the number represents. Review the story by having students share what they discovered about their number at the end of the book.

c. A third option is to hand out the **Clarabelle’s Word Grid** and review the meaning of the categories and words. As you read the story, students can place the word in the correct category. *If this option is chosen during the reading of the story, students will most likely work best at their desks rather than sitting around you. This activity may best be done after the story is read as a review.*

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<tr>
<th>Category: Keeps Clarabelle Happy</th>
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<tr>
<td>Methane Gas</td>
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<tr>
<td>Teats</td>
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<tr>
<td>Soybean Meal</td>
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<td>Cheese</td>
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<td>Milk</td>
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<td>Sandpapery Tongue</td>
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<th>Category: Clarabelle's Appearance</th>
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<td>Hay</td>
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<tr>
<td>Wet Nose</td>
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<tr>
<td>Fresh Bedding</td>
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<td>Water</td>
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**Read the book and show the pictures.** Share any of the props *(see list that follows)* you brought that coincide with the book either as you read or as a review at the end.
Some Useful Props to Take into the Classroom to Accompany the Story
Consider bringing in any of the following items to enhance the presentation and student understanding of the dairy industry.

1. Different kinds of feed (corn, soybeans, hay, alfalfa, silage) for students to see, feel, and smell
2. Pictures of different breeds of cows
3. Scale to weigh students until they add up to the weight of Clarabelle (1500 pounds) or a newborn calf (100 pounds)
4. Ear tag or birth certificate
5. Empty containers from milk products such as ice cream, yogurt, butter, cheese
6. Calf bottle
7. Pill pusher
8. Gallon milk bottle to help students visualize the number of gallons of milk produced and the amount of water a cow drinks

Follow-up Activities:

1. Provide copies of Clarabelle’s Word Grid for each student or pair of students. Go over the instructions and familiarize students with the categories and words. Students cut apart the words and sort them according to the categories. Go over the correct answers before students glue them into place.
2. Review each number and what it means.
3. Provide Clarabelle’s Numbers matching worksheet for students to answer.
4. Review with students the meaning of the word AGRICULTURE.
5. Leave copy/copies of Dairy Cow or Beef Cow? article with Venn diagram with the classroom teacher to use.
6. Leave copy/copies of the AG News - Cream to Butter student newspaper for the teacher or each student.

Check out the following resources that extend the lesson. They are available on our website www.maefonline.com under Elementary Education, Ag Literacy Program 2012:

- Clarabelle’s Numbers - cards
- Clarabelle’s Numbers - matching worksheet
- Clarabelle’s Word Grid - worksheet
- Dairy Cow or Beef Cow? - article and Venn diagram
- AG News – Cream to Butter – student newspaper (run on legal size paper)

Maryland Agricultural Education Foundation Ag Literacy Program 2012
For questions or information contact: Jeanne Mueller at jmueller@maefonline.com or 410-848-4745
Clarabelle’s Word Grid

Directions: Use your detective skills to discover in which category each word belongs. Cut the words apart. Sort them according to categories. Write or paste the word in the correct box!

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### Clarabelle Word Grid

<table>
<thead>
<tr>
<th>Huge black spots</th>
<th>Corn</th>
<th>Butter</th>
<th>Fans</th>
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1. Clarabelle produces about this many gallons of milk each day.  1500

2. Clarabelle spends this many hours eating and chewing her cud.  100

3. A baby calf weighs about this many pounds.  25

4. Clarabelle produces enough milk for this many bowls of cereal  4

5. Clarabelle produces this number of gallons of saliva each day.  5

6. Part of Clarabelle's stomach holds this many gallons.  160

7. Clarabelle's stomach has this many parts.  4-6

8. Clarabelle weighs this many pounds.  30

www.maefonline.com
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<td>5</td>
<td>160</td>
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Did You Know?

Dairy cows spend six hours eating each day. Cows eat 20 pounds of grain and concentrated feed as well as 35 pounds of hay and/or silage each day. (Silage is fermented corn, wheat, or hay with the stalks and leaves.) Dairy cows drink about 35 gallons of water each day. A dairy cow turns this food and water into over 100 glasses of milk a day. Cows spend an additional eight hours chewing their cud, or ruminating. Most cows chew at least 50 times per minute.

With eating all this food, the typical dairy cow weighs about 1,400 pounds. The average American eats about 4 pounds of food a day. If people ate and drank as much as cows, they would have to eat about 360 cheeseburgers and drink 400-800 glasses of water each day!

Colorful Cows

Dairy cows come in many colors. They can be black and white, tan, brownish gray, reddish brown, or shades of these colors. However, one of the easiest to recognize is the Holstein with its black and white spots. A Holstein's spots are like a fingerprint or snowflake - no two cows have the same pattern of spots. Ninety-five percent of the dairy cows in the United States are Holsteins. Other dairy breeds are Jerseys, Brown Swiss, Guernsey, Ayrshires, and Milking Shorthorns.

Which Cow to Raise?

Some breeds produce a lot of milk and some breeds produce milk with a lot of butterfat. Farmers consider this when choosing which type of dairy cow to raise. Farmers can choose to raise cows that produce more milk, or cows that have a higher butterfat content in their milk, or a combination of several breeds of cows.
**Dairy Trivia**

- Dolly Madison served ice cream at the 2nd Inaugural Ball at the White House in 1812.
- A dairy cow's udder can hold 25-50 pounds of milk.
- Male dairy cattle are called bulls and do not produce milk.
- A cow gives almost 200,000 glasses of milk in her lifetime. That's enough to fill the average classroom two feet deep with milk!
- Dairy cows produce 90 percent of the world's milk. Water buffalo, camels, sheep, goats, and reindeer produce the remaining 10 percent.

**Jokes**

A. Why did the farmer feed his cow money?
B. What do you get from a nervous cow?
C. What do you get from an Alaskan cow?

**Farm Facts**

In one day, a cow can produce...

- 2.9 pounds of butter
- OR 6.0 pounds of cheese
- OR 7 gallons of milk!

**Joke Answers**

A. He wanted rich milk.  
B. A milk shake.  
C. Ice cream  

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Moovin' Along

Long ago when people traveled and wanted milk, they had to take their cows with them. Today, thanks to refrigerated trucks and tanks, milk and milk products are available almost everywhere.

In 1884, people began to store milk in glass bottles. Before that, they used jars, pails, and cans. People would leave their glass bottles on the porch with a note letting the milkman know how many bottles of milk they wanted delivered. The glass bottles were returned to the dairy, cleaned, and reused.

Paper containers for milk are now so commonplace that it is hard to imagine a time when we didn’t have them. John Van Wormer is responsible for paper milk cartons. He got the idea for paper milk cartons after dropping a glass milk bottle one morning. The bottle broke, the milk went everywhere, and he found it an annoying way to start the day. After much hard work, Wormer got a patent for a paper carton. Paper cartons were introduced in 1906. It wasn't until 1964 that plastic jugs were used.

Do the Math!!

1. How many hours a week, does a cow spend eating? __________
2. How many pounds of dry food does a cow eat in one day? ____________
3. How many gallons of water does a cow drink in one week? ____________
4. How many gallons of water would 100 cows drink in a day? ____________
5. If an average child weighs 50 pounds, how many children would it take to equal the weight of one cow? ____________
6. How many more pounds of food does a cow eat in one day than an average American? _______
7. Number the containers for holding milk in the proper chronological order.
   (#1 is the oldest.)
   Plastic jug _____  Pail _____  Glass bottle _____  Paper Carton _____
Milk, Butter and Now Ice Cream

You were able to explore the states of matter when you took the liquid milk and turned it into solid butter. Now explore the states of matter again by making ice cream!

Matter is anything that has mass and takes up space (volume). Typically, matter is found in one of three states - solid, liquid, or gas. In this science investigation, you will be changing matter from one state to another!

Materials you will need:
- One pint zipper bag
- One gallon zipper bag
- 1/2 cup of whole milk or half & half
- 2 tsp. of sugar
- 1/2 tsp. of vanilla
- Ice cubes
- 2 Tbs. of rock salt

Procedure:
1. Place the milk, sugar, and vanilla in the pint bag.
2. Carefully seal the bag.
3. Place 3 cups of ice cubes and 2 Tbs. of rock salt in the larger gallon bag.
4. Place the smaller bag into the larger bag. Seal carefully.
5. Shake the bag for about 10 minutes, until you see the ice cream form.
6. Carefully remove the small bag from the large bag.
7. Get a spoon and enjoy your treat!

States of matter...
1. How would you describe the ice cream mixture in the bag before shaking - solid, liquid, or gas?
2. How would you describe the ice cream when it is finished - solid, liquid, or gas?
3. How do you think the mixture was able to change from a liquid to a solid?
4. What will happen to the ice cream as it warms up?