DISCOVER Dairy

Lesson 2
Adopt A Cow

Let's Check In!

Objectives:

- Students will identify how the calf has changed or grown.
- Students will identify important vocabulary related to the lesson.
- Students will explain and describe how farmers care for calves differently as they grow.

Approximate Lesson Length: 40 to 45 minutes (additional time for activities)

Materials Needed:

- "Let's Check In" PowerPoint
- Optional: Copies of "Compare and Contrast Growth Changes" Worksheet
- Optional: Materials from maker space environment to build a feeder
- Optional: Copies of "Design Sheet" and "Assessment Rubric"
- Optional: Computer or paper and pencil for Evaluation 1A
- Optional: Copies of "Dairy Vocabulary" worksheet for Evaluation 1B
- Optional: Copies of "Prompt Response 1 & 2" for Evaluation 2A & B

Lesson Components:

Component	Time	Component	Time
Motivator & Discussion	5 min.	Build a Feeder STEM Project	80 min.
PowerPoint & Discussion	35 min.	Wild Milk Chase	30 min.
Compare and Contrast	15 min.	Creative Drawing A & B	40 min.
Nutritious & Delicious	20 min.	Prompt Responses	30 min.

Motivator:

Ask students to think about how much they have grown since they were born. How have they changed? How are they able to tell that they are growing and changing? Is there anything that their families have to do differently for them since they were babies?

Vocabulary: Use the "Dairy Vocabulary Definitions" sheet for definitions

Pre K - K	Grades 1 - 2	Grades 3 - 5	Grades 6 - 8
Veterinarian	Vaccines	RFID Tag	RFID Tag
Ear Tag	Timothy Hay	Nutrition	Nutritionist
Shots	Sweet Grain	Pellets	Ruminant
Hay	Weaning	Fiber	Pelletizing
Wean	Salt Block	Rumen	Well-Balanced Diet
Sweet Grain	ID Number	Vaccinations	

PowerPoint Lesson:

Ask students to estimate how much the calf has grown since receiving the first update. How much do you think the calf weighs now? How tall do you think she is? Record estimates for students to compare with actual growth after the slide deck.

Slide 1: Using the PowerPoint slides included with the second update, remind the class of their adopted cow and its size when they first met back during the first update. Before moving to the second slide, explain to the students that one purpose of adopting a cow is to see how it grows and changes over time. Ask: How much do you think you grew in the first four months of your life? Can you name some of the ways that you changed?

Slide 2: Share with the students that this slide shows the calf's current age, height and weight. Compare that to the first update. How have the height and weight changed? If grade appropriate, challenge the students to find the difference in their height and weight.

Slide 3: Introduce the word vaccinations to the students. Depending on the age of your students, elicit background knowledge of the students by either asking if they received vaccinations or why are vaccinations important? Take time to confirm that vaccinations are important to not only the calf, but to the herd as well. It is important to keep the herd from getting sick as well as the individual calf.

Slides 4 & 5: The next few slides show how the calf's needs have changed since it has grown older. Explain that the slides will show how the calf's diet has changed. Introduce the age appropriate vocabulary: **hay, timothy hay, sweet grain, pellets, water, salt block, fiber, ruminant and nutrition**. In the fifth slide, explain the calf's housing situation. As calves get older, they will eventually move to group housing.

Slide 6: Tell the students that they are also going to get an update on the calf's mom (Dam). Ask: Why did the farmer want her to have a calf? *So she could produce milk.* Ask: Since she gave birth, what do you think she is busy doing now? *She is producing milk for people to drink.* Share the slides about the calf's mother. Ask: Why do you think the farmer wants her to have another calf soon? *If she is pregnant, she will continue to produce milk and follow the natural cycle of life for a cow.*

Slides 7 & 8: These slides give them a reference point for how big the calf is right now.

Questions for Discussion:

1. **As the calf has grown, how have the calf's needs changed?**
   Answer: The calf needs to have different food, shelter, and care as it gets older.
2. **What does the calf need to survive now?**
   Answer: The calf's food changed from milk to food with fiber and protein to help develop their digestive system. Farmers slowly wean them off milk and switch to hay, sweet grain and pellets. Salt blocks can be added to keep their appetite healthy, and there is an unlimited supply of water.
3. **Can you share one new thing that you learned today?**
4. **Were you surprised by any of the facts that you heard?**
5. **How has the calf's shelter changed since they were born?**
   Answer: Answer varies depending on the farm
6. **Why does each calf need an ear tag?**
   Answer: It allows the calf's health to be tracked electronically and is a visual reminder of the calf's identity.
7. **Why is it important for each calf to be vaccinated before moving to a group pen?**
   Answer: They protect the calf from getting harmful diseases that they may come in contact with.

Classroom Activities:

Please note: The activities below can be changed or modified to fit different classroom needs. The activities tie in nicely with the lessons. Please choose the activities that are a good fit for your students. Also, these activities are not included in the approximate time for the lesson.

1. **Compare and Contrast Cow & Human Changes:**

   Compare and contrast how calves and babies change as they grow, using a graphic organizer. Using the information from the update and the PowerPoint slides, students can compare and contrast how quickly changes occur. Suggested level is upper elementary from grades 3 to 5. This activity could be scaffolded for younger students in grades 1 and 2. Using additional research, middle school students (grades 6-8) could create a timeline for how humans and cows grow and change over time to compare their growth and development.

2. **Nutritious & Delicious:**

   Using the information from *My Plate* (available to order at http://www.fns.usda.gov/tn/myplate-posters), have students learn about healthy eating. Introduce them to concepts of the *My Plate Food Guide* and balanced diet. Using the *My Plate Food Guide* poster as a visual in your discussion, begin to talk about what a student needs to keep them healthy each day. Explain that your diet is an important part of keeping you healthy and active. By knowing about the Five Food Groups, you can help make sure you feed your body right.

   Each of the Five Food Groups—Grains, Vegetables, Fruit, Dairy and Proteins—work together to help you balance your nutrition. Ask students to share ways they can make sure to incorporate all five food groups in their daily eating habits. Students should learn how to balance their plate to keep them healthy each day.

   Compare students' healthy eating to that of the calf. How have their nutrition needs changed since they were small? What do farmers have to feed them now and why is it important to change their diet as they grow?

STEM Projects - Learning Activities:

Students will plan, design, and create a feeder for young heifers. Using a maker space environment, students will use a variety of donated materials to build a prototype feeder that would provide the different types of food that the heifer's need for proper nutrition.

A maker space is a place in the classroom which has a collection of donated, found or recycled materials that students can use to build ideas that they have worked together to plan. Teachers will often add a request for cardboard, craft supplies, containers, cardboard tubes, scrap materials or papers, or anything else that can be used to design and build within the classroom.

1. Students work in partners or small groups to use the design engineering sheets to plan a type of feeder that is different than the headlocks for the heifers. Students are trying to create a new type of feeder that allows the heifer to feed with their heads at a more level height rather than down to the ground. Students want to make their prototype out of donated or recycled materials that have been collected for the maker space. As students collaborate to design their feeder, they have to use what they have learned to ensure that their feeder provides what each cow needs to eat healthy and help them develop their four stomach digestive system as well as get the water that they need. In addition, they also have to keep in mind that they are feeding a small group which also requires unlimited access to water.
2. Ask students the following questions to get them started.
   - **What does an engineer do?** *Designs things to solve a problem.*
   - **What would an engineer have to keep in mind when designing a feeder?** *Having fresh food and water all day while providing a safe environment.*
   - **Can you name some of the things that a cow needs for a healthy diet?** *Unlimited clean water, dry food, grain, hay*

STEM Project Continued...

3. Break the students into partners or small groups (3 or 4). Review the design sheets with the students. Explain the rules for collaboration:
    - All ideas have to be heard
    - Everyone listens respectfully
    - Everyone works together to make decisions for the plan
    - Everyone records the plan on their own sheet to turn into the teacher

Give students time to plan and design their idea of the feeder. Once the plan and design are approved, students may begin to collect materials and build. One way to have students engaged is to allow them to work on their project when they have finished other responsibilities in their reading, writing, or math workshops. Students will work to finish other work to be engaged in this activity. Or students could build only during their science period for 2-3 days as the teacher feels is appropriate for the age.

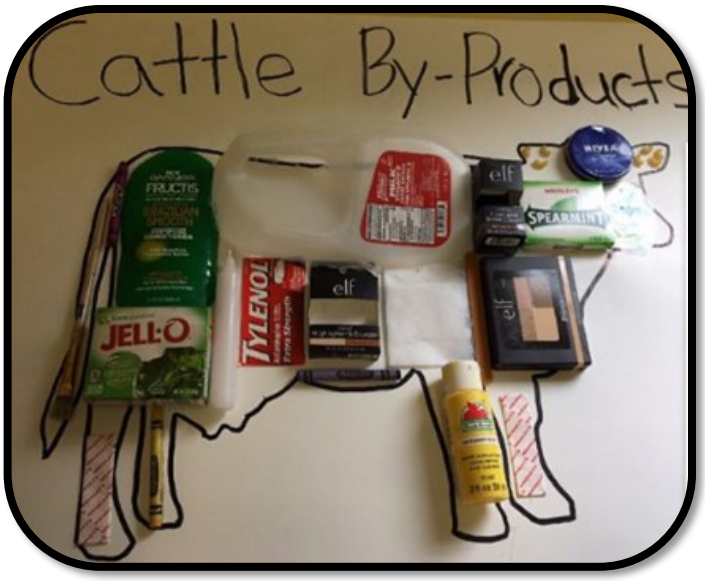
When students have all finished their prototypes, have them share their feeders with the class and use the rubric to evaluate their project.

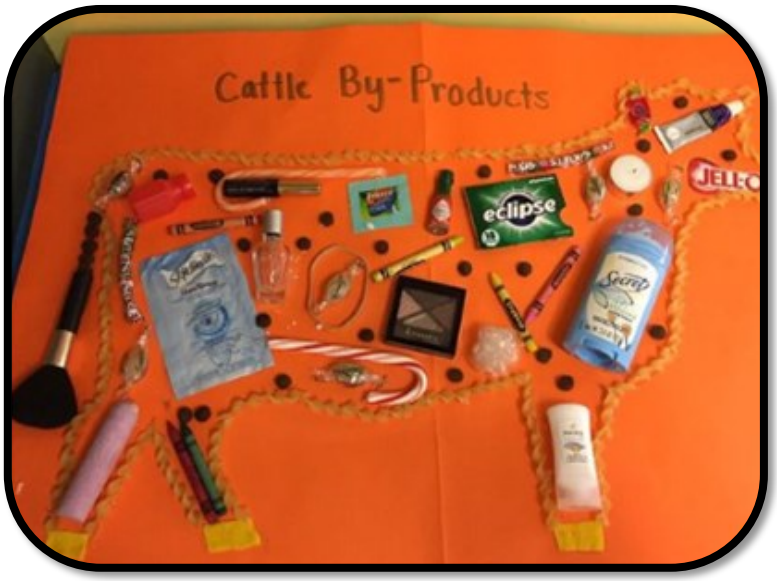
Differentiation: **Younger students** could build with class blocks, Legos, or Playdough to make their feeder. **For older students**, teachers can choose to embed as much research to find additional specifics or engineering research as appropriate for the grade that you teach.

Project Based Learning Activity - Wild Milk Chase

For upper elementary - First work together as a class to make a list of all the different products that are produced from milk (butter, cheese, yogurt, whipped cream, etc.). Have students go on a research scavenger hunt to find products that are made from or with milk. Challenge students to create a way to display their results from their milk research through a poster, a collage or a collection of labels. Students can then evaluate what group each food would be grouped into on the *My Plate Food Guide.* Examples below show cattle by-products, not dairy by-products, but give an idea of one type of product that could be turned in for this project. Technology could also be used to have students make digital posters using a variety of platforms.

Differentiation: **Younger students** can find and list the different products that are produced from milk and create a poster, drawing, or some other way (song, play, poem) to share they learned.





Evaluation:

1. Creative Drawing:

A. Students create a physical or digital picture of the calf now and when it was born. Students can draw pictures near each calf showing their food and shelter. The picture should show how the calf has grown and the different food and shelter that is needed at the different stages of its life.

B. Students can choose four vocabulary words. Use the “Dairy Vocabulary” worksheet to illustrate each vocabulary word and write an explanation of the vocabulary word below the picture.

2. Prompt Response:

Have students respond to one of the prompts listed below. Use the prompt sheets if desired:

A. Describe how the calf’s needs have changed as the calf has grown since birth. Use specific examples to illustrate your points.

B. Compare and contrast the growth of a baby and a calf. Be sure to give examples of how the calf and baby are similar and how the calf and baby are different.

Dairy Vocabulary Definitions

Ear Tag: a tag that is worn in the ear of a cow like an earring—often has an ID number, dam and sire's name, and name and birthdate of the calf

Fiber: a plant-based nutrient, sometimes called roughage or bulk, and is a type of carbohydrate. Can only be broken down by ruminant animals

Hay: a grass, legume, or other plant that has been cut and dried to be stored for use as animal feed

ID Number: a number given to a calf at birth to assist in identifying the calf

Nutrition: the process of providing or obtaining the food necessary for health and growth

Nutritionist: a professional who develops feeding programs and monitors the condition of dairy cows to ensure that production goals are met. They are directly involved with the dietary management of the cows.

Pelletizing: the process of compressing or molding a material into the shape of a pellet

Pellets: small particles created by compressing an original material – in this case, animal feed, to reduce particle size

RFID Tag: a radio frequency identification tag used on all cattle to keep records of cows nationally

Rumen: the first stomach of a ruminant animal, which receives the food or cud from the esophagus, partly digests it with the aid of bacteria, and passes it to the reticulum

Ruminant: animals that have four compartments in their stomach, including the rumen, reticulum, omasum and abomasum

Salt Block: a block of salt that provides a source of salt throughout the day to encourage a healthy appetite

Shots: medication that is administered through a small needle

Sweet Grain: a mixture of cracked corn kernels and pellets covered in a sweet molasses

Timothy Hay: a long grass that is cut, dried and harvested for animal feed

Vaccination: treatment with a vaccine to produce immunity against a disease

Vaccines: medication given to animals that helps build immunity against diseases

Veterinarian: a professional who is trained to treat diseased or injured animals—large animal vets will visit the farm routinely to continuously check up on the herd's health

Wean (-ing): the process of gradually introducing an infant (or baby) mammal to its adult diet

Well-Balanced Diet: consuming the right balance of different foods daily to ensure a healthy body

DISCOVER Dairy

Lesson 2
Compare and Contrast

Name: _____ Date: _____

Compare and Contrast Growth Changes

Directions: Compare and contrast the changes of calves and babies as they grow by completing the blocks below.

Baby (Different)	Same for Both Baby & Calf	Calf (Different)
1. Babies begin to eat cereal and baby food.	**1. Both the calf and the baby switch from just drinking milk to other foods.**	**1. A calf begins to eat hay, and sweet grain to keep them healthy.**

DISCOVER Dairy

Lesson 2
STEM Activity
Design Sheet

Name: _____ Date: _____

The Engineering Design Process

1. **What is the problem or challenge?**

2. **Imagine the possibilities! What different types of options can you think of for the project?**

STEM Activity: Design Sheet Page 2

3. **Pick a design idea for the feeder for the young heifers. Draw and label a diagram of your design. Add any details on the lines below.**

STEM Activity: Design Sheet Page 3

4. What materials do you need to build your feeder? List them below and collect the materials you need to make the map with your group.

5. Build your design.

6. Were you able to include everything you needed to feed the heifers a balanced diet so they continue to grow? What did you include? What did you forget?

7. Is there any way that you could improve your design? If so, how would you do that?

8. Evaluate and reflect on your design work. How did your team work together and what are you proud of about your design?

STEM Activity: Assessment Rubric

Name: _____ **Date:** _____

Challenge: _____

3	2	1
Student followed all of the instructions for the challenge.	Student followed some of the instructions for the challenge.	Student did not follow the instructions for the challenge.
Student worked with the group to create an idea to solve the problem.	Student worked with the group to create an idea to partially solve the problem.	Student worked with the group and was not able to create an idea to solve the
Student used his/her best effort and perseverance for the challenge.	Student showed good effort and perseverance for the challenge.	Student did not show effort or perseverance for the challenge.
Student followed the design process during the challenge submitting a plan, constructing a prototype, testing and iterating their design.	Student partially followed the design process during the challenge submitting a plan, constructing a prototype, testing and iterating their design.	Student did not follow the design process during the challenge submitting a plan, constructing a prototype, testing and iterating their design.
Student fully collaborated with all group members and contributed fairly to the group.	Student partially collaborated with all group members and contributed fairly to the group.	Student struggled to collaborate with all group members and/or did not contribute fairly to the group.
Student was able to fully help create a product to share the work of the group.	Student was able to partially help create a product to share the work of the group.	Student was not able to help create a product to share the work of the group.
Student fully contributed to class discussions and activities prior to the challenge.	Student partially contributed to class discussions and activities prior to the challenge.	Student did not contribute to class discussions and activities prior to the challenge.

Total Points _____/ 21

Comments: _____

_____

_____

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Lesson 2
Dairy Vocabulary Worksheet

Name: _____ Date: _____

Dairy Vocabulary

Directions: Choose four vocabulary words. Draw a picture of each vocabulary word below. Label the vocabulary word in the picture. On the lines below each picture, explain what the word means.

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Name: _____ **Date:** _____

Evaluation: Prompt Response #1

Directions: On the lines below, respond to the following prompt. Be sure that your writing is clear. When you finish your response, please take time to read over your answer to check and make sure you have a complete piece with a beginning, middle, and end. Also, check your capitalization, punctuation, and spelling before handing in your paper.

Prompt: Describe how the calf's needs have changed as the calf has grown since birth. Use specific examples to illustrate your points.

Name: _____ **Date:** _____

Evaluation: Prompt Response #2

Directions: On the lines below, respond to the following prompt. Be sure that your writing is clear. When you finish your response, please take time to read over your answer to check and make sure you have a complete piece with a beginning, middle, and end. Also, check your capitalization, punctuation, and spelling before handing in your paper.

Prompt: Compare and contrast the growth of a baby and a calf. Be sure to give examples of how the calf and baby are similar and how the calf and baby are different.

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_____

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Prompt: Describe how the calf's needs have changed as the calf has grown since birth. Use specific examples to illustrate your points.

Name: _____ **Date:** _____

Evaluation: Prompt Response #2

Directions: On the lines below, respond to the following prompt. Be sure that your writing is clear. When you finish your response, please take time to read over your answer to check and make sure you have a complete piece with a beginning, middle, and end. Also, check your capitalization, punctuation, and spelling before handing in your paper.

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