

This is Our Final 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.
- Students will identify how a cow’s daily life changes when they become an adult.

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

Materials Needed:

- 3rd Update PowerPoint
- Optional: Copies of “Growing & Changing” Worksheet
- Optional: Materials from maker space environment to build a barn
- 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.	Butter Battle & Ice Cream	40 min.
PowerPoint & Discussion	35 min.	Build a Barn STEM Project	80 min.
Growing & Changing	20 min.	Creative Drawing A & B	40 min.
Cow Growth Chart	15 min.	Prompt Responses	30 min.

Motivator:

How big do you think the calf is? If you had to think about how much the calf has grown, is there something that you can use to compare to the size of the calf? What object could you name that might be about as big as the calf now? Remember, the calf was born back in September/October.

Vocabulary: Use the “Dairy Vocabulary Definitions” sheet for definitions

Pre K - K

Herd
Healthy
Weight
Pasture
Housing

Grades 1 - 2

Herdmate
Pellet Grain
Develop
Dry Lot
Economy

Grades 3 - 5

Dry Lot
Stomach Compartments
Prefresh Cow
Ultra Sound
Economy

Grades 6 - 8

Prefresh Cow
Pregnancy Check
Ultrasound
TMR
Life Cycle
Producer
Economy

PowerPoint Lesson:

Explain that you are going to be sharing the final update for the calf that the class adopted. Explain that the calf is now about 6 to 7 months old. Ask the students to think about the calf and ask the following questions: Do you think that anything has changed for the calf since the last update? What things do you think might have changed again? (food, shelter, nutrients, size, amount of food)

Slide 1: Using the PowerPoint slides included with the final update, remind the class of their adopted cow and her size when they first met in November and then her size in the 2nd update.

Slide 2: Share with them the size and weight of the cow after growing for six/seven months. This slide shows the calf's current age, height and weight. Compare that to the first and second updates. How have the height and weight changed? If grade appropriate, challenge the students to find the difference in their height and weight from birth to now. Discuss how much weight the calf has gained and how tall she has grown. Use a tape measure or ruler to show how tall the calf is at this point.

Slide 3: Remind the students that the farmer's role is to care for the calf from birth through their entire life. **Ask: Do you recall the five things that the farmer must provide for the cow?** (Note: the slide has reminders so if you want to ask before you show the slide, you can see if students can recall the answers—food, water, shelter, bedding and veterinary care.) Display the slide. **Ask: Compare the farmer's role to that of a parent or guardian. How are they alike? How are they different?**

Slides 4: Remember that before we started, I asked you to think about how things have changed for the calf. **Ask: Do you think that the calf is still living in the same barn? Is the calf still eating the same amount of food? How do you think things have changed?** After students share their answers, show them the slide and review the answers with them.

Slide 5: Since we have been talking about how the calf is changing, what do you think is happening with the calf's mother? This slide shares that the calf's mother is expecting another calf in the fall. Depending on the age of the students, decide how much of the information is appropriate to share with the class. There is an **ultrasound** video of the calf.

Slides 6: Do you think the mother will stay with the other cows when she is ready to have her calf? (No). Farmers move the mother into a special area before the cow is ready to have the calf. Often right before birth, the cows move to an individual pen known as a prefresh stall to have the calf. A prefresh stall is a birthing stall. At this point, the farmer calls the cow a **prefresh cow**. A prefresh cow is a cow that is going to give birth, it can be a first time mother or a cow that has already had a calf. Once she gives birth, the cow becomes a milk producer and an active member of the herd. Review or introduce the word **producer**. A producer is something that produces food.

Slides 7: What do you think a cow does all day as a part of the milking herd? This slide shows some of the things that a cow does as part of the milking herd.

Slides 8: What do you think is necessary to run a dairy farm? After accepting students' answers, explain that the farmer and his family are the most important parts of the success of the dairy farm. Do you think that a farmer's family is different from your family? Share the slide and explain that the farmer's family is similar to students' families, but that the farmer often depends on the family to help with the farm. Farmers have an important role in the **economy** of our country. Farmers are extremely important to the economy of our state and nation. To talk more about dairy in the economy and community, complete the Discover Dairy lessons called "Handin' It On," or "In the Community."

Slides 9: Share the slide of the calf. Explain that as the calf continues to grow, she will one day become part of the milking herd after she reaches the age of about two and has her first calf. For right now, she will continue to grow until she is able to have a calf.

Slides 10: Thank You! This slide thanking you and your class for adopting a cow! Please remember to sign up again next year.

Questions for Discussion:

1. **As the calf has grown, how have the calf's needs changed?**

Answer: The calf is old enough to live in the group housing and is now eating 10 to 20 pounds of hay a day and 5 to 10 pounds of grain.

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 and develop their 4-chambered stomach. 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?** (accept all answers)

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: The calf was moved from hutch or calf pen to group housing with a other heifers.

6. **When will the heifer join the milking herd?**

Answer: Once the heifer is about two years old, she will have her first calf. After she has her calf, she will become part of the milking herd.

7. **Why are farmers such an important part of the economy of our state?**

Answer: Dairy farmers produce a very valuable agriculture product, milk. Wisconsin is the leading state in the nation for milk product. Where does your state rank?

8. **How does that help our economy?**

Answer: It helps to provide jobs and keep money coming into our state's economy.

9. **Are farmers important?**

Answer: Yes, not only do farmers provide fresh products for people, farmers help to keep our economy, community, and environment healthy too!

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. **Create a Cow Growth Chart:**

Using the attached graphic organizer entitled Growing & Changing, have students draw pictures and write about how the calf has changed in each update. You might need to use the slides from the previous two updates for students to fill in the important information about the calf and how they calf has grown and changed over time since it was born.

2. **Butter Battle:**

Make butter with your students. Younger elementary students enjoy this activity immensely. You will need small containers with secure lids for each pair or group of children. Fill each container half full with cream and add a pinch of salt if you choose. Secure the lid tightly and have children shake. They need to shake for at least 10 minutes. Room temperature cream works best. Start a timer and see how long it takes. You can even make this into an experiment with half the class using cream at room temperature and the other half using cream directly from the refrigerator. Compare the time it takes for each type of cream to become butter.

It is ready when you have a ball of butter in the center of the container—if you stop too soon, it will only be whipped cream! The liquid remaining is skim milk. Serve with salted crackers or pretzels. Note: Students love to taste the butter they have made!

Classroom Activities Continued...

3. Rock & Roll Ice Cream (Ice Cream in a Coffee Can):

Ingredients: 1 cup of milk and 1 cup of whipping cream OR 2 cups of half and half, 1/2 cup of sugar, 1/2 tsp of vanilla

Steps:

1. Mix all ingredients and pour into 1-pound coffee can with a tight fitting lid, or secure the lid with tape
2. Place the 1-pound coffee can with ingredients inside a 3-pound can with tight fitting lid
3. Pack the space between the cans with crushed ice and at least 3/4 cups of rock salt
4. Place the lid on the large can and roll it on a hard surface for 10 minutes
5. Open the outer can, remove small can and carefully remove the small can's lid.
6. Use a rubber spatula or spoon to stir the mixture, scraping the sides of the can and replace the lid.
7. Drain the water from the large can and place small can in large can. Repack with more ice and salt.
8. Put on lid and roll for five additional minutes (*Makes 3 cups*)

Notes: The activity can be done with the ingredients in a small Ziploc bag inside a large Ziploc bag with the ice and rock salt in the large bag. Then shake or move back and forth for the same amount of time. Students, however, prefer rolling the cans. The lesson on the differences in the freezing point of the water with and without salt could be used with older students.

STEM Projects - Design and Create a Mature Cow Barn:

Students will plan, design, and create a barn and shelter for the milking herd. Using a maker space environment, students will use a variety of donated materials to build a prototype milk cow barn that would provide essential cow care items that can be found in a barn.

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 barn that will provide everything the herd needs. Students are trying to create a new type of barn that will meet the needs of the whole herd. 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 barn, fencing, and shelter, they have to use what they have learned to ensure that their barn provides what each cow needs to eat healthy and keep them comfortable. In addition, they also have to keep in mind that they are now working with a herd that 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 barn?** *Having everything that a farmer needs to keep the cows healthy might also include feed storage*
 - **Can you name some of the things that a cow needs to be happy?** *Food, water, comfortable stall and bed, waste management, a place for veterinary care*

STEM Projects - Learning Activities 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 barn. 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 barns 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. Additionally, you could require them to think about how technology could be incorporated to keep track of the herd and its health.

Evaluation:

1. Creative Drawing:

- A. Students create a physical or digital picture of the life cycle of a cow. Now that students have learned the complete life cycle, have students demonstrate that understanding through drawing. Students can draw pictures of the calf, the young heifer, and the mature cow. Students can add as much or as little detail as directed. For example, a student might picture the calf in a fresh pen or a young heifer with its herdmates in a dry lot.
- 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 a farmer cares for a cow from its birth until it becomes a mature cow in the milking herd.
- B. Do you think farmers are an important part of our community and our state’s economy? Explain why you think farmers are an important part of the community and the economy.



Dairy Vocabulary Definitions

Develop: grow or cause to grow and become more mature

Dry Lot: a fenced-in area that is free of vegetation and is used for containment, feeding, and housing for cattle

Economy: the wealth and resources of a country or region, especially in terms of the production and consumption of goods and services

Healthy: in good health, in good shape, physically fit

Herd: a large group of hoofed mammals, that live, feed, or migrate together or are kept together as livestock

Herdmates: any animal that is the same as another animal in the herd, often referring to the animals that live with the noted animal

Housing: a secure location where cattle live that provides protection and basic cow care

Life Cycle: a series of changes in the life of an animal from birth to death, including reproduction

Stomach Compartments: a cow is a ruminant animal with one stomach that has four compartments—the rumen, reticulum, omasum, and abomasum.

Pasture: land covered with grass and other low plants suitable for grazing animals

Prefresh Cow: a cow that is one to two weeks away from giving birth

Pregnancy Check: a physiological test to determine the existence of pregnancy in an individual (a test to determine if the cow is carrying a baby)

Producer: a cow that makes milk

Pellet Grain: a small, round, compressed mass of grain

Ultrasound: sound or other vibrations having an ultrasonic frequency, used during herd checks and pregnancy checks

TMR: or Total Mixed Ration, a perfectly balanced diet that allows each cow to consume the required level of nutrition in every bite, includes chopped up forages, grains, proteins, vitamins, and minerals

Weight: the heaviness of a thing

Name: _____

Date: _____

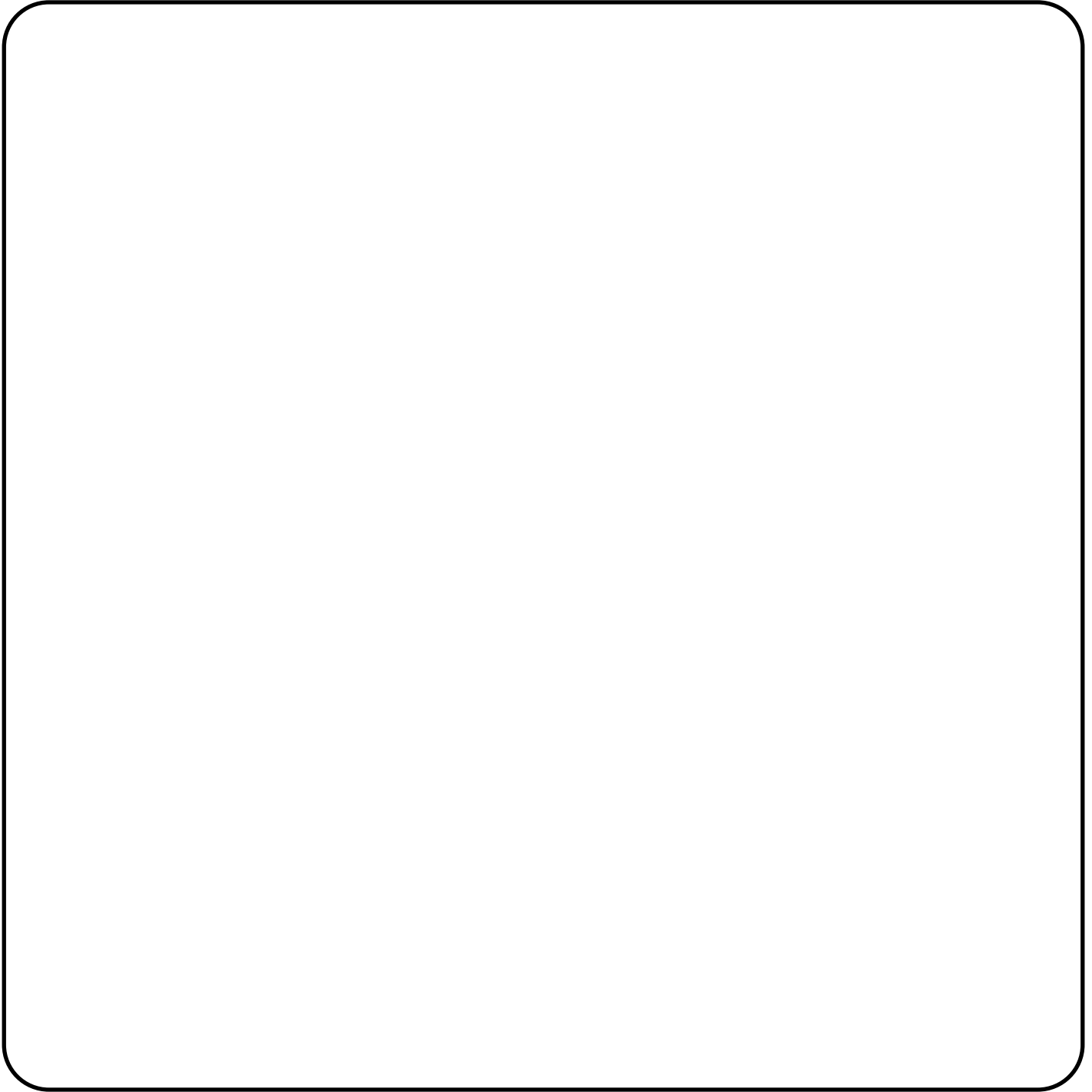
Growing & Changing

Directions: Fill in the calf information and then draw the calf throughout her growth. Draw housing changes, diet changes, etc.

1st Update—Calf	2nd Update—Young Heifer	3rd Update—Heifer
(Drawing)	(Drawing)	(Drawing)
Height:	Height:	Height:
Weight:	Weight:	Weight:
Food:	Food:	Food:
Shelter:	Shelter:	Shelter:
Special Care:	Special Care:	Special Care:

STEM Activity: Design Sheet Page 2

3. Pick a design idea for the barn for the milk cows. 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 barn? 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 cows and keep them comfortable? 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: _____




Name: _____

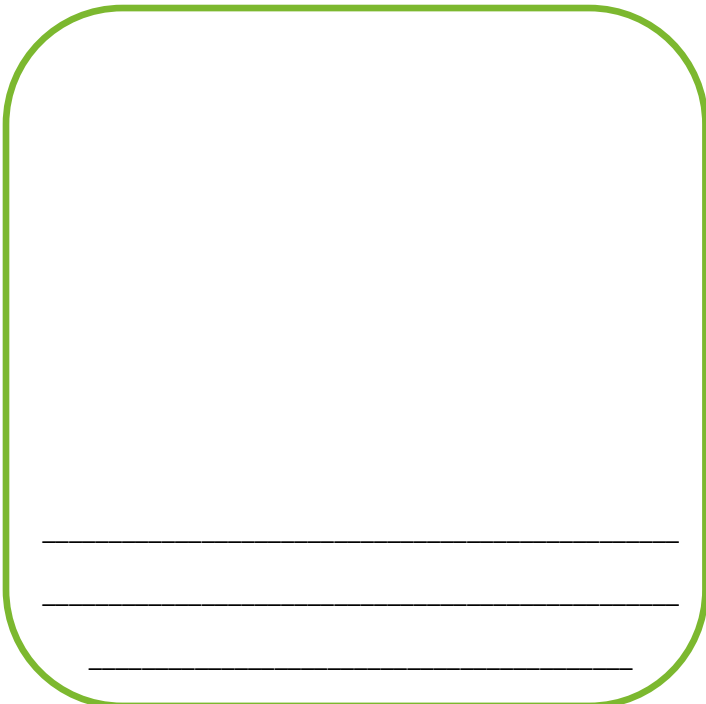
Date: _____

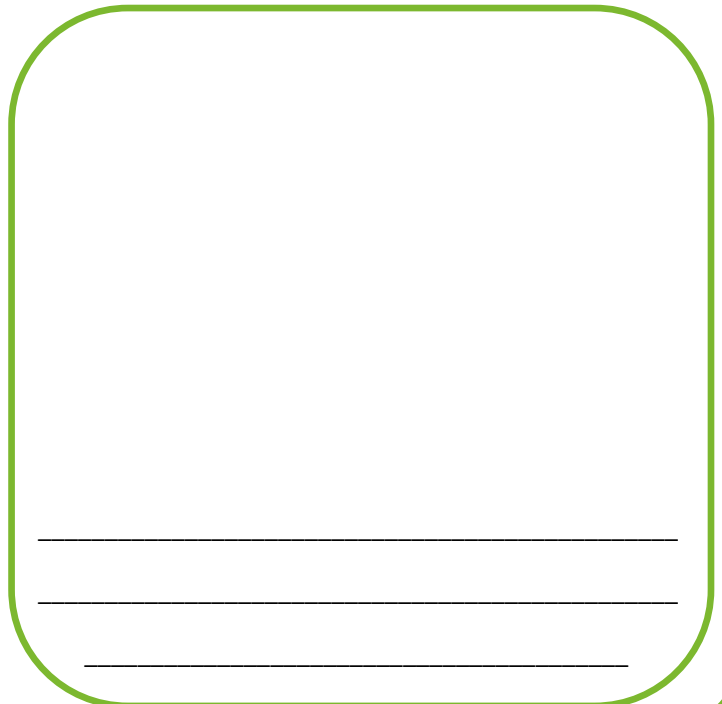
Dairy Vocabulary

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.









Name: _____

Date: _____

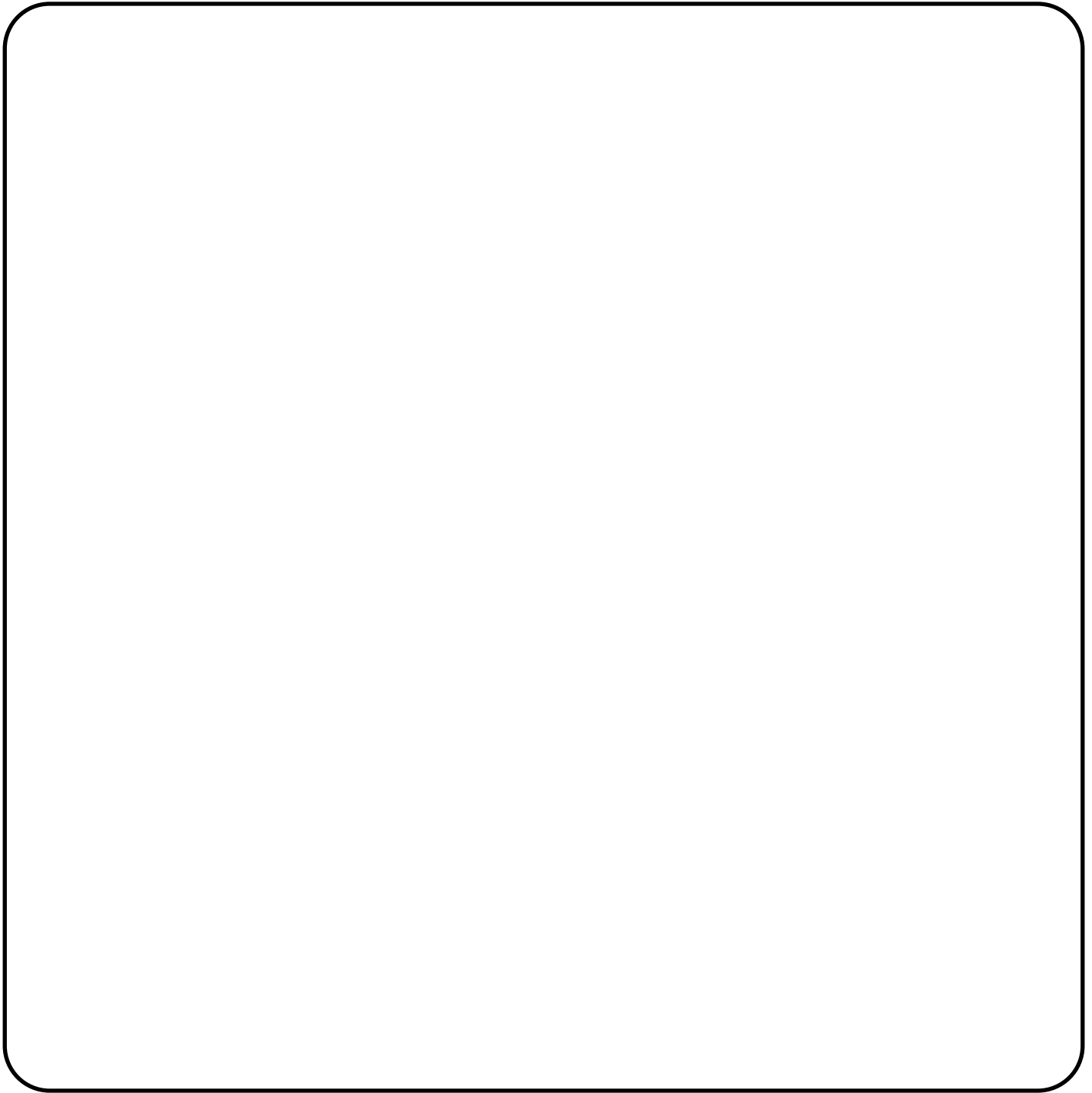
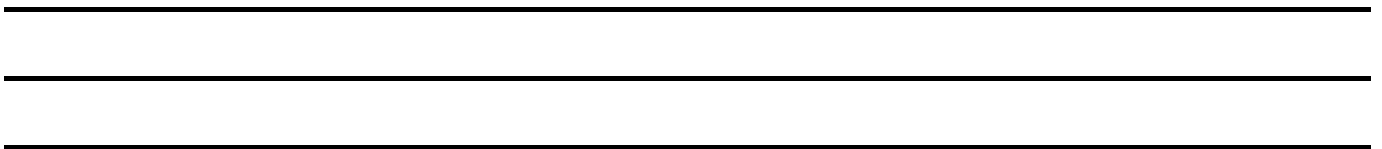
Growing & Changing

Directions: Fill in the calf information and then draw the calf throughout her growth. Draw housing changes, diet changes, etc.

1st Update—Calf	2nd Update—Young Heifer	3rd Update—Heifer
(Drawing)	(Drawing)	(Drawing)
Height: Weight: Food: Shelter: Special Care:	Height: Weight: Food: Shelter: Special Care:	Height: Weight: Food: Shelter: Special Care:

STEM Activity: Design Sheet Page 2

3. Pick a design idea for the barn for the milk cows. Draw and label a diagram of your design. Add any details on the lines below.

A large, empty rounded rectangular box with a black border, intended for drawing a design for a barn for milk cows. The box is positioned in the center of the page and occupies most of the vertical space below the instructions.Three horizontal black lines are located at the bottom of the page, below the drawing area. These lines are intended for labeling the different parts of the barn design drawn in the box above.

STEM Activity: Design Sheet Page 3

4. What materials do you need to build your barn? 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 keep the cows comfortable? 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: _____



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.

