



Lessons presented by  
**Oklahoma State University**  
 Ferguson Family Dairy Visitor Center  
 With Southwest-Southland Dairy Farmers

<b>Instructor</b>	Jaycie Heath
<b>Grade Level</b>	9-12
<b>Lesson Title</b>	Life Cycle of Dairy Cattle (In Person)

### TEACHER PREPARATION

Learning Goals & Standards/Performance Indicators	
Learning Goals	Standards
1. Upon completion of this lesson students will be able to understand and explain the life cycle of dairy cattle. A. Critical Vocabulary: <ol style="list-style-type: none"> <li>1. Calf</li> <li>2. Cow</li> <li>3. Newborn</li> <li>4. Heifer</li> <li>5. Yearling</li> <li>6. Mature</li> <li>7. Holstein</li> <li>8. Jersey</li> <li>9. Weaning</li> <li>10. Peak Lactation</li> <li>11. Dry Cow</li> </ol>	1. AFNR AS.01.01.01.a, AS.01.01.02.a Identify the major uses of dairy cattle in the United States. 2. <u>AFNR FPP.01.01.01.a</u> Trace the steps milk undergoes when it leaves the dairy.
<b>Resources and Materials</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> <a href="#">VT Life Cycle</a></li> <li><input type="checkbox"/> Southwest- southland dairy farmers <i>Milk. From Cows to Kids</i></li> <li><input type="checkbox"/> <a href="#">NC State Feeding Dairy Heifers</a></li> <li><input type="checkbox"/> <a href="#">EPA Lifecycle Production Phases</a></li> <li><input type="checkbox"/> <a href="#">US Jersey A Quality Heifer</a></li> <li><input type="checkbox"/> <a href="#">PSU Dairy Heifer Growth</a></li> <li><input type="checkbox"/> Visuals in the center</li> <li><input type="checkbox"/> Student tour guides</li> </ul>	
<b>Announcement and Other Preliminaries</b>	
1. Welcome students to the Ferguson Family Dairy, introduce self and what you do for the dairy, etc.	

### LESSON DELIVERY

#### Anticipatory Set

- How do living things grow and change?

- Provide students with side by side images of people and animals at various life stages to equate to various life stages of cattle
  - Ex) Infant next to adult, puppy next to dog, etc.
- Ask them to come up with multiple differences between each age group and what they *can or can't* do and what physically makes them able to do those things at different ages.
  - Ex) Babies can't walk but children can because their legs are stronger, children can't drive but adults can because adults can get a license, puppies have accidents in the house and dogs are trained not to, etc.
- Explain that the same is true for dairy cattle; they are able to different things at different life stages because as they grow, they develop certain characteristics.
- Today we are going to learn about cattle at different life stages and learn the vocabulary words used to describe those stages.

**Direct Instruction**

<p><b>1<sup>st</sup> Learning Goal:</b> Upon completion of this lesson students will be able to understand and explain the life cycle of dairy cattle. (From VT Life Cycle and NC State Feeding Diary Heifers)</p>	
Content Outline	Instructional Strategies
<p><b><u>Newborn calf</u></b></p> <ul style="list-style-type: none"> <li>• “The average Holstein calf weighs from 90 to 100 pounds at birth. A newborn calf is fed colostrum milk for the first three days of life. Colostrum is special because it gives the calf extra nutrients to help the calf get off to a good, healthy start. Calves are usually fed milk or milk replacer starting at 3 days of age. They are also fed calf starter, a grain, beginning at 7 to 10 days of age. They are 4 to 8 weeks old when they are weaned from milk.” (VT)</li> <li>• “Jersey calves average 60 pounds at birth, with a range in birth weight from 42 to 72 pounds” (US Jersey)</li> <li>• All dairy calves are weaned from their mothers early on in life, normally about 12-24 hours after birth, to ensure they get the best care and nutrition possible and to make sure their mother is in good condition and healthy. Before they are taken to individual housing, they are given colostrum, a nutrient and immunoglobulin rich milk that serves to help build the calf’s immune system.</li> <li>• Calves spend approximately the first six to eight weeks of their lives in calf hutches that</li> </ul>	<ul style="list-style-type: none"> <li>• Would love to have a visual showing the size differences of each age group, I think it's hard for people to get a grasp on how much cattle grow in their first year</li> <li>• Perhaps show prerecorded video (or live feed if we can get that?) of the calves at the dairy, would like them to see calves being bottle fed, what a calf hutch looks like, etc.</li> <li>• Mature Cow- show students to the viewing window and point out the two breeds in the free stall barn before discussing more about the mature cows</li> <li>•</li> </ul>

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allow farmers to protect them from getting sick or hurt like they could if they were with older cows. Calf hutches also serve as a way to make sure each calf is getting enough to eat every day.

- Prior to weaning, calves will be vaccinated, dehorned, and most males will be castrated to be raised for beef.
- Calves will be weaned between six and eight weeks old, this means they no longer receive bottles of milk replacer. Once weaned calves will consume calf starter rations that are designed specifically to meet their nutritional needs.

### **6 Mo Heifer**

- “The six-month-old heifer is usually fed silage, hay, and grain. These heifers may also graze (eat grass) in a pasture. Holstein heifers weigh about 400 pounds at this age. Dairy farmers want their Holstein heifers to gain 1.6 to 1.8 pounds each day.” (VT)
- Jersey heifers at this age weigh between 259 and 321 (PSU)
- These heifers are housed in groups with similar ages and/or weights and may spend most of their time in a barn or in a pasture.
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### **Yearling**

- “This heifer is called a yearling because she is over one year old. The Holstein heifer weighs about 700 pounds and still has quite a bit of growing to do before she enters the milking herd in another year.” (VT)
- Yearling Jersey Females weigh between 471 and 548 (PSU)
- Yearling females, like the 6-month-old heifers, are housed in groups and can be inside or outside at this age.
- Dairy heifers will be bred as yearlings to allow them to calve around two years of age,

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this is the main difference between the 6-month-old heifer and the yearling. Because these females are being bred during this age, they will be watched and fed differently to ensure they are able to be bred. Some producers choose to use estrus synchronization, meaning heifers receive hormones to help all the females in their group cycle at the same time. This allows the producer to breed females within a few days of each other. Other producers opt to watch for signs of cycling, meaning not all the heifers will be bred (and calve) at the same time. Almost all dairies have move to artificial insemination, or AI. Utilizing AI ensures that farmers do not have to deal with dairy bulls, who can be dangerous and destructive. AI also allows dairies to increase their genetic diversity and match each female with a bull that will best compliment her traits. Like humans, cows have a gestation period of about 9 months, or about 283 days.

## **2 year old**

- “Dairy farmers refer to animals like this one as a first-calf heifer.” (VT) While she is technically a cow because a cow is a female bovine that has had a calf, she still has growing to do, thus leading to the term “first-calf heifer”
- “This cow is two years old and recently had a calf for the first time. She is now producing milk and will keep on growing for the next few years before she is fully mature. She weighs about 1,200 pounds.” (VT)
- Jersey 2-year-olds generally weigh around 790-893 (PSU)
- 2-year-old females will generally produce less milk than their mature counterparts, simply due to immaturity of the milk glands

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and her udder.

### **Mature Cow**

- “This adult [Holstein] cow weighs over 1,500 pounds. She is five years old and just had her fourth calf. She can eat over 100 pounds of feed a day and can produce over 12 gallons of milk a day during the early part of her lactation. A mature cow produces about 25 percent more milk than a first calf heifer.” (VT)
- “The average mature size for Jerseys is approximately 1,000 pounds and the range in weight and height of mature Jersey cows is narrower compared to ranges described for larger dairy breeds.” (US Jersey)
- Mature cows are generally kept in large free stall barns in groups of mixed ages, they are milked at least twice a day. In the case of the Oklahoma State Dairy, some females are afforded the opportunity to be milked more than twice a day via the robotic milker, this allows them to choose when to be milked and how often (with some limitations based on their phase in the lactation cycle).
- Mature cows will be milked for approximately 10 months before she is “dried off” prior to calving. The dry period, or when the cow is not producing milk, should last for about 45-60 days. This allows their body to rest and put more nutrients toward developing a calf as opposed to producing milk.

### **Learning Activity**

- Students could be provided with a bingo style guided note sheet with blanks in informational sentences about dairy cows for them to fill in.
  - Ex.) A \_\_\_\_\_ is where newborn calves live for 6-8 weeks (calf hutch)

### **Assessment**

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- Instructor could ask questions throughout or at the completion of the lesson like
  - “What happens when a cow turns 2?” (She has a baby and she can be milked or the first time)
  - What’s one of the differences between a calf and a cow? (cows give milk, calves live in hutches, calves eat from bottles, etc.)
  - How long are cows milked for at a time? (about 10 months)
  - When are calves weaned from their mother? (12 to 24 hours after birth)

**2<sup>nd</sup> Learning Goal:** Upon completion of this lesson students will be able to understand how producers care for dairy cattle during their lifetime. (From *Milk. From Cows to Kids*)

Content Outline	Instructional Strategies
<p>Feeding</p> <ul style="list-style-type: none"> <li>• Producers ensure cattle are fed appropriate diets throughout their lives, from high quality milk replacer for calves to, “a balanced diet of approximately 40 pounds of feed mixed into a ration consisting of such things as corn, wheat, oats, cotton seed, soybeans, and about 50 pounds of hay or silage,” for mature females. These mature cows will also drink between 25 and 50 gallons of water per day.</li> <li>• Each female will spend between 6 and 7 hours a day eating, here at the Ferguson Family Dairy some of our cows even get snacks when they go into the robotic milker in addition to their regular diet.</li> <li>• All the nutrients each milking cow consumes not only support her body, but they also contribute to her milk production, and helping her calf grow when she is pregnant. Making it critical that producers ensure each cow gets exactly what she needs every day, which they can do using special tags or pedometers that identify each cow and can let her into the feed bunk when she needs to eat more or can shut her out when she’s met her nutrition requirement for the day.</li> </ul> <p>Cow comfort</p> <ul style="list-style-type: none"> <li>• During the prime stages of her life a dairy cow will most likely live in a free stall barn,</li> </ul>	<ul style="list-style-type: none"> <li>• Be sure to point out the cows eating from the bunk</li> <li>• Maybe include prerecorded videos of the cows eating/being fed</li> <li>• Point out fans, beds, how the cows can go into the robot, etc.</li> </ul>

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like the one we have here. They are able to get up and move around as they wish, they have temperature control systems (like fans and wind blocks) to keep them comfortable, and some even have waterbeds to help them relax. Free stall barns allow the cattle to get up, socialize, or eat when they choose, with the added help of the robotic milker our cows are even able to choose when they get milked. For producers everything comes back to taking the best care of the cattle that they possibly can.

**Formative Assessment**

- Instructor should ask questions like:
  - “What are some ways farmers help cows stay comfortable?” (Fans, beds, etc.)
  - “What are some ways farmers make sure cows are getting the feed they need?” (Ear tags, special feeders, etc.)
  - How long do cows spend eating a day? (6-7 hours)

**Closure**

**Closing Announcements/Reminders**

- Answer any questions they may have
- Show them the robot and viewing windows one more time
- Thank students for coming to the Ferguson Family Dairy