

Course	Agricultural Science I
Unit	Introduction to Dairy Production
Lesson	Herd Management
Estimated Time	Two 90-minute blocks or four 50-minute blocks
Student Outcome	

List management factors important to profitable dairy production.

Learning Objectives

1. Identify the production costs for operating a dairy.
2. Describe the facility requirements for dairy production.
3. Describe the factors that must be considered in raising replacement heifers.
4. Explain the factors to consider in reproductive management.
5. Describe the nutritional requirements for dairy cattle.
6. Explain the feeding methods for dairy cattle.
7. Identify the records that must be kept for profitable dairy production.
8. Describe the factors involved in marketing dairy products.

Grade Level Expectations

SC/LO/1/B/09-11/b

SC/ST/1/B/09-11/a

SC/ST/1/C/09-11/a

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slide
 - ☐ Ppt 1 - Lactation Curve of the Dairy Cow
2. Activity Sheet
 - ☐ AS 1 - Costs and Returns
3. *Introduction to Dairy Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1997.
4. *Introduction to Dairy Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- ☐ Empty gallon milk jug

Supplemental Information

1. Internet Sites
 - ☐ Center for Dairy Profitability. University of Wisconsin. Accessed August 30, 2007, from <http://cdp.wisc.edu/Welcome.htm>.
 - ☐ Dairy Publications. MU Extension. University of Missouri-Columbia. Accessed April 12, 2007, from <http://extension.missouri.edu/explore/agguides/dairy/>.
 - ☐ Livestock and Forages Publications. Division of Agriculture, University of Arkansas. Accessed August 30, 2007, from <http://www.aragriculture.org/livestock/publications.htm#Dairy>.
 - ☐ National Dairy Herd Information Association. Accessed August 30, 2007, from

<http://www.dhia.org/>.

2. Print

- ❑ Kellems, R. O., and D. C. Church. *Livestock Feeds and Feeding*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 2001.
- ❑ National Research Council. *Nutrient Requirements of Dairy Cattle*. 7th ed. Washington, D.C.: National Academy Press, 2001.
- ❑ Peters, A., and P. J. H. Ball, *Reproduction in Cattle*. 3rd ed. Blackwell Publishing Limited, 2004.
- ❑ Thomas, H. S. *Getting Started with Beef and Dairy Cattle*. North Adams, MA: Storey Publishing, LLC, 2005.

3. Electronic Media


- ❑ *Animal Nutrition Interactive PowerPoints*. University of Missouri-Columbia: Instructional Materials Laboratory, 2006.
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Interest Approach

Bring an empty gallon milk jug and ask the class how much milk would cost in the store. Compare that price to how much the dairy producer makes per gallon. (Contact the local milk cooperative or extension office for current milk prices.) Ask students to list facilities, equipment, and other requirements for a dairy farm. Discuss how much these things cost. Compare the cost of dairy production to the returns from milk sales.

Communicate the Learning Objectives


1. Identify the production costs for operating a dairy.
2. Describe the facility requirements for dairy production.
3. Describe the factors that must be considered in raising replacement heifers.
4. Explain the factors to consider in reproductive management.
5. Describe the nutritional requirements for dairy cattle.
6. Explain the feeding methods for dairy cattle.
7. Identify the records that must be kept for profitable dairy production.
8. Describe the factors involved in marketing dairy products.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Ask students to list production costs for a dairy operation. Write the list on the board or overhead. MU Guide Sheet G3651 can be used as a specific reference for a dairy cattle budget. Have students complete the budget in AS 1.</i></p> <p> AS 1 - Costs and Returns</p>	<p>Identify the production costs for operating a dairy.</p> <ol style="list-style-type: none">1. Facilities2. Feed – major cost on a daily basis3. Labor4. Marketing fees5. Fees for milk testing6. Veterinary fees and medicines7. Building repair and maintenance
<p>Objective 2</p> <p><i>Ask the class to list the facility requirements for a dairy operation. Write down the responses and then elaborate on each response. Remind students that dairy production may take place in a large-scale, labor-intensive environment.</i></p>	<p>Describe the facility requirements for dairy production.</p> <p>Milking parlors</p> <ol style="list-style-type: none">1. Milking parlors are required for modern dairies that produce Grade A milk.2. Designs<ol style="list-style-type: none">a. Parallel<ul style="list-style-type: none">-Cows stand at a 90° angle on both sides of a pit where the milkers stand.-The milking unit is attached between the hind legs.b. Herringbone<ul style="list-style-type: none">-Cows stand at an angle on both sides of the pit.

Instructor Directions	Content Outline
	<p>-The design allows easy access to each cow's udder from the side for putting on and removing the milking units.</p> <p>Free stall or stanchion barns</p> <ol style="list-style-type: none"> 1. In free stall barns, cows move freely between the separate stalls. 2. In stanchion barns, a headgate or a chain and collar confines cows to their stalls. <p>Feed storage</p> <ol style="list-style-type: none"> 1. Upright silos and pit silos hold corn silage and haylage. 2. Grain and bulk bins hold prepared feed or supplements. <p>Waste storage</p> <ol style="list-style-type: none"> 1. Lagoons are artificial waste holding areas that resemble ponds. 2. A watertight concrete or coated steel tank may also be used for manure storage; tanks may be above or below ground. <p>Heifer development facilities</p> <ol style="list-style-type: none"> 1. Calves are kept individually in hutches until weaning. 2. They are then moved to group pens.
<p>Objective 3</p> <p><i>Ask students what should be considered when raising replacement heifers. For specific feeding programs, consult National Research Council (NRC) recommendations.</i></p>	<p>Describe the factors that must be considered in raising replacement heifers.</p> <p>Dairy producers should consider the number of females needed each year as well as proper development.</p> <p>Heifers should be ready to calve at 24 months of age and weigh 1,000 to 1,300 pounds, depending on the breed.</p> <p>Careful feeding is essential if heifers are to reach this weight at the right time for breeding.</p> <ol style="list-style-type: none"> 1. Small, thin heifers give less milk. 2. Heifers should not be allowed to become too fat, since excessive fat deposits in the udder may reduce future milk production.
<p>Objective 4</p>	<p>Explain the factors to consider in reproductive management.</p>

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<p><i>Ask the class what factors dairy producers must take into account when managing the reproductive aspect of dairy farming. Use PPT 1 to illustrate the lactation curve.</i></p> <p>☐ PPT 1 - Lactation Curve of the Dairy Cow</p>	<p>Cows must become pregnant and calve for lactation to begin.</p> <p>Lactation usually peaks at eight weeks after calving and then slowly declines.</p> <p>Cows should be rebred 40 to 100 days after calving to maintain the cycle of milk production.</p> <p>Cows are dried off at 40 to 50 weeks of lactation, depending on the amount of milk produced and the expected calving date; most operators will dry off cows when milk production drops below 35 to 40 pounds daily.</p> <p>The dry period should last 40 to 70 days, with an average of 60 days.</p> <p>Most dairy cows are artificially inseminated.</p> <ol style="list-style-type: none"> 1. Permits the dairy producer to use bulls that are genetically superior 2. Helps in controlling the spread of reproductive diseases 3. Allows producers to keep more accurate records about reproduction, including breeding dates that can be used to calculate the expected calving dates needed to figure the proper dry period 4. Also used because of the problems associated with keeping a dairy bull on the farm, since dairy bulls are often very aggressive <p>Some producers use embryo transfer to increase the spread of superior genetics in the herd.</p>
<p>Objective 5</p> <p><i>List the various components of proper nutrition necessary for dairy cattle rations. Ask the class how to determine the nutritional requirements for dairy cattle. Obtain copies of NRC requirements for dairy cattle diets if students are interested in specific feeding programs.</i></p>	<p>Describe the nutritional requirements for dairy cattle.</p> <ol style="list-style-type: none"> 1. Nutritional requirements include energy (from carbohydrates and fats), protein, vitamins, minerals, and water. 2. The cow's nutritional needs are highest when lactation peaks. 3. Lactating cows should consume 3 to 4 percent of their body weight as dry matter. 4. Roughages should make up at least 40 percent of the diet to maintain correct microbe populations in the

Instructor Directions	Content Outline
	<p>rumen.</p> <p>5. The cow's production level and body condition determine the exact nutrient needs of the cow.</p>
<p>Objective 6</p> <p><i>Discuss the different feeding methods that can be used to meet the nutritional needs of dairy cows.</i></p>	<p>Explain the feeding methods for dairy cattle.</p> <p>Traditional feeding method</p> <ol style="list-style-type: none"> 1. This method involves feeding forages and grain separately. 2. Forages may be fed as pasture or as hay or silage. 3. Protein supplements, or concentrates, are added to the diet to increase the amount of protein; they may be fed in the barn mangers or in the milking parlor during milking. <p>Management-intensive grazing</p> <ol style="list-style-type: none"> 1. Producers rotate cows between grazing units in a preplanned cycle. 2. Cows are moved when they consume the forages on the grazing unit. 3. This type of grazing system helps lower costs by reducing the costs associated with equipment for harvesting forages and purchased feeds. <p>Total mixed ration</p> <ol style="list-style-type: none"> 1. A total mixed ration is a mixture of all the feed ingredients needed by dairy cattle, including forages, grain, and supplements. 2. Advantages include being able to feed a precisely balanced ration and reduced labor. 3. Special equipment for weighing and mixing the ration must be purchased. 4. Existing facilities may also need to be modified to feed total mixed rations.
<p>Objective 7</p> <p><i>Ask students what records should be kept for the dairy operation to run smoothly.</i></p>	<p>Identify the records that must be kept for profitable dairy production.</p> <ol style="list-style-type: none"> 1. Dairy Herd Improvement Association (DHIA) records—contain information on milk production levels and milk composition for individual cows 2. Breeding and calving dates 3. Calving dates and pedigrees for registered animals
<p>Objective 8</p>	<p>Describe the factors involved in marketing dairy products.</p>

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<p><i>Ask the class how milk is marketed in the United States. Explain the role that the United States government plays in controlling the price of fluid milk.</i></p>	<ol style="list-style-type: none"> 1. Most of the milk is sold through cooperatives; producers are members of the cooperative, and they sell directly to it. 2. The federal government sets base milk prices paid to producers to maintain a steady consumer milk price. 3. Producers receive bonuses based on the fat and protein content of their milk and low somatic cell counts.
<p>Application:</p> <p> AS 1 - Costs and Returns</p>	<p>Answers to AS 1</p> <ol style="list-style-type: none"> 1. (a) 175,500 (b) 1,755 2. \$14 3. 24,570 4. 2,200 5. 0 6. 26,770 7. (a) 6,000 (b) 300 (c) 250 (d) 0 (e) 200 8. (a) 19 (b) \$6 (c) 114 9. 6,864 10. (a) 1,750 (b) 290 (c) \$6 (d) 1,740 (e) 1,400 (f) 80% (g) 3,912 11. 1,300 12. 0 13. 150 14. 600 15. 500 16. 100 17. 200 18. 195 19. 625

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	<p>20. 0</p> <p>21. 120</p> <p>22. 20</p> <p>23. 220</p> <p>24. 50</p> <p>25. (a) 1,000 (b) 50% (c) 500</p> <p>26. 400</p> <p>27. 15,576</p> <p>28. 11,014, which is the total profit for the dairy operation</p> <p>Other activities: Obtain copies of the latest NRC recommendations for dairy rations, and have students develop feeding programs for dairy cattle.</p>
Closure/Summary	<p>Dairy production is a costly venture. Many production costs are associated with running a dairy operation, including the cost of the extensive facilities needed. Most producers market their milk through cooperatives, but the United States government controls the price of milk. Dairy producers need to be good managers to have a profitable operation.</p>
Evaluation: Quiz	<p>Answers:</p> <p>1. d</p> <p>2. a</p> <p>3. d</p> <p>4. c</p> <p>5. a</p> <p>6. Eight weeks after calving</p> <p>7. A total mixed ration is a mixture of all the feed ingredients needed by dairy cattle, including forages, grain, and supplements.</p> <p>8. The cow's nutritional needs are highest when lactation peaks.</p> <p>9. Information on production levels and milk composition for each cow.</p> <p>10. A management-intensive grazing system helps lower costs by reducing the costs associated with equipment for harvesting forages and purchased feeds.</p>