Course: Agricultural Science II  
Unit: Introduction to Grassland Management  
Subunit: Grassland Management Practices  
Lesson: Grasslands and the Nutritional Needs of Livestock  
Estimated Time: Two 50-minute blocks

**Student Outcome**

Analyze the nutrient needs of livestock.

**Learning Objectives**

1. Describe what determines the nutritional needs of livestock.
2. Describe the daily forage dry matter intake requirements for cattle.
3. Describe when livestock herds have the highest forage quality requirement.
4. Identify how daily dry matter intake is calculated.

**Grade Level Expectations**

**Resources, Supplies & Equipment, and Supplemental Information**

**Resources**

1. PowerPoint Slide  
   Ppt 1 – Energy Needs of a Mature Beef Cow for Spring Calving
2. Activity Sheets  
   AS 1 – Calculating Dry Matter Intake

**Supplemental Information**

1. Internet Sites  
   [http://extension.missouri.edu/explore/agguides/ansci/beef.htm#Feeding](http://extension.missouri.edu/explore/agguides/ansci/beef.htm#Feeding).
**Instructor Directions**

**Objective 1**

*Just as the nutritional needs of humans differ according to their growth and life stage, so do the nutritional needs of livestock. Ask students to describe what determines the nutritional needs of livestock.*

Describe what determines the nutritional needs of livestock.

1. Type of production (function)
   a. Maintenance: carbohydrates, fats, protein, and minerals
   b. Growth: protein, carbohydrates, fats, minerals, and vitamin D
   c. Fattening: carbohydrates and fats
   d. Reproduction: protein, carbohydrates, fats, and minerals
   e. Rebreeding: carbohydrates, fats, protein, and vitamins
   f. Lactation: carbohydrates, fats, protein, and minerals
   g. Work: carbohydrates and fats

2. Level of output or production
3. Size of the animal

**Objective 2**

*Ask students if they know the daily forage dry matter intake requirements for cattle. Emphasize that factors such as size and level of production affect the amount of forage required for production. Point out that dry matter intake is given as a percentage of live bodyweight.*

Describe the daily forage dry matter intake requirements for cattle.

1. Dry beef cow: 2% of bodyweight
2. Lactating beef cow (average milk prod.): 2.5% of bodyweight
3. Lactating beef cow (superior milk prod.): 3% of bodyweight
4. Bull (during breeding season): 2.5% of bodyweight
5. Bull (out of breeding season): 2% of bodyweight
6. Growing steers and heifers: 3% of bodyweight

**Communicate the Learning Objectives**

1. Describe what determines the nutritional needs of livestock.
2. Describe the daily forage dry matter intake requirements for cattle.
3. Describe when livestock herds have the highest forage quality requirement.
4. Identify how daily dry matter intake is calculated.
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<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
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<td><strong>Objective 3</strong></td>
<td>Describe when livestock herds have the highest forage quality requirement.</td>
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| *Ask students when the herd needs the highest quality forage. Use PPt 1 to illustrate the changing energy needs of a mature beef cow.* | 1. The herd has the highest forage requirement after the majority of the cows have given birth, when they require energy for lactation and rebreeding (Stage 1).  
2. In spring calving, cows calve just before the peak of grass growth in May and June, when forage quality is very high.  
3. Fall calving matches the period of highest nutritional needs with another peak in grass growth in October. |
| **Objective 4**       | Identify how daily dry matter intake is calculated. |
| *Have students explain how daily dry matter intake is calculated. Point out that optimum production requires close management and supervision. The calculation of daily dry matter intake will help to produce the best livestock possible. Have students complete AS 1.* | 1. Daily dry matter intake =  
\[ \text{# of animals} \times \text{avg. weight} \times \frac{\text{forage dry matter in a class per animal intake requirement}}{\text{per animal intake requirement}} \]  
2. The number of pounds of forage dry matter needed per day for a herd is equal to the total of the daily dry matter intake for all classes of cattle in the herd. |
| **Application**       | Answers to AS 1  
1. 2,136.5 lbs.  
2. 1,010 lbs.  
3. 3,964 lbs. |
| *Visit the facilities of a local dairy or beef cattle operation. Have the manager describe the procedures used for feeding the cattle and the changes made based on growth, gestation, lactation, and maintenance.* | Other activities  
Visit the facilities of a local dairy or beef cattle operation. Have the manager describe the procedures used for feeding the cattle and the changes made based on growth, gestation, lactation, and maintenance. |
### Instructor Directions

**Closure/Summary**

The true test of productive grassland is the livestock it produces. If the grassland meets the nutritional needs of the animals during all of their life stages, it is successful. In order to meet these needs, the grassland manager must match the production potential of the grasses to them. The best grasslands will provide nutrients in a sufficient quantity to allow the producer to meet his or her production goals for the herd.

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### Evaluation: Quiz

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<td>4. The herd has the highest forage requirement after the majority of the cows have given birth. In spring calving, cows calve just before the peak of grass growth when forage quality is very high. Fall calving matches the period of highest nutritional needs with another peak in grass growth.</td>
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<td>5. Any four of the following: maintenance, growth, fattening, reproduction, rebreeding, lactation or milk production, and work</td>
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<td>6. 1,615 lbs. of dry forage matter per day</td>
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