

Course	Agricultural Science I
Unit	Equine Science
Lesson	Nutrition
Estimated Time	50 minutes

Student Outcome

The student will understand parts of the horse's digestive tract and what the different nutritional requirements are for different horses.

Learning Objectives

1. Describe the anatomy and function of the simple digestive tract.
2. Identify causes of colic.
3. Discuss how the nutritional needs for foals, yearlings, two-year-olds, breeding stock, and mature horses is determined.
4. Discuss the factors that affect digestion.
5. Discuss the importance of water.
6. Identify different feed types.
7. Determine when to feed and what types of feed to use.
8. Identify nutrition-related problems.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. *Equine Science* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1995.
2. University of Missouri-Columbia Extension Division agricultural publications
 - a. G2807: Feeding Horses
3. *Equine Science Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- ☐ Variety of horse feed samples that could include oats, pasture grass, alfalfa, pelleted horse feed, sweet feed, and horse supplements.

Supplemental Information

1. Internet Sites
 - ☐ Feeding and Nutrition. All About Horses. Accessed June 25, 2007, from <http://www.allabouthorses.com/site/health/feeding.html>.
 - ☐ Horse Nutrition 101. Accessed June 26, 2007, from <http://home.att.net/~horsenutrition101>.
 - ☐ Loch, W. *Feeding Horses*. University of Missouri Extension Publication agricultural publications, G2807. Accessed June 25, 2007, from <http://extension.missouri.edu/xplor/agguides/ansci/g02807.htm>.
 - ☐ *Basic Horse Nutrition*. University of Kentucky Cooperative Extension Service.

Accessed June 26, 2007, from

<http://www.uky.edu/Ag/AnimalSciences/pubs/asc114.pdf>.

- ❑ Ralston, S. L. *Diagnosis of Nutritional Problems in Horses*. Rutgers Cooperative Extension. Accessed June 26, 2007, from

<http://www.anslab.iastate.edu/Class/AnS415/Nutproblems.pdf>.

- ❑ *Drought Related Nutrition Problems Threaten Midwest Horses*. Research at MU. University of Missouri. Accessed June 26, 2007, from

http://research.missouri.edu/news/stories/070614_horses.htm.

2. Print

- ❑ Ensminger, M. E., and C. J. Hammer. *Equine Science*. 8th ed. Upper Saddle River, NJ: Pearson Education, Inc., 2004.

Interest Approach

Obtain a variety of feed samples (oats, pasture grass, alfalfa, pelleted horse feed, sweet feed, and supplements). Have the students compare the feeds by texture, smell, and appearance.

Communicate the Learning Objectives

1. Describe the anatomy and function of the simple digestive tract.
2. Identify causes of colic.
3. Discuss how the nutritional needs for foals, yearlings, two-year-olds, breeding stock, and mature horses is determined.
4. Discuss the factors that affect digestion.
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6. Identify different feed types.
7. Determine when to feed and what types of feed to use.
8. Identify nutrition-related problems.

Instructor Directions	Content Outline
Objective 1 <i>The digestive tract includes everything from the mouth to the rectum. Understanding how the horse's digestion takes place is an important part of being able to feed it properly.</i>	Describe the anatomy and function of the simple digestive tract. Differences between horses and other livestock <ol style="list-style-type: none">1. The capacity of the horse's stomach is 8-16 quarts, as compared to the cow's (about 200 quarts) and the pig's (about 6-8 quarts).2. A cow has a four-chambered stomach, while the horse and hog have only one.3. Therefore, the horse's digestive tract more closely resembles the pig's.4. Horses have a larger cecum than cattle or hogs. Where digestion takes place <ol style="list-style-type: none">1. Mouth (mastication)2. Stomach3. Small intestine4. Cecum (water gut) – fermentation5. Large intestine6. Enzymes from liver and pancreas
Objective 2 <i>Colic is the number one killer of horses. While some horses can be saved with surgery, others are lost. Great horses like the Kentucky Derby winner Unbridled and the Appaloosa</i>	Identify causes of colic. <ol style="list-style-type: none">1. Overfeeding2. Ingestion of sand3. Parasites or worms4. Irregular feeding schedule5. Sudden changes in feed

Instructor Directions	Content Outline
<p><i>champion Apache were lost to colic. It can affect young winning show horses to old family pets. Colic can happen even in the best and cleanest barns, so it is important for all horse owners to understand the causes of colic and take steps to prevent it.</i></p>	<ol style="list-style-type: none"> 6. Moldy or rotten feed 7. Twisted intestines
<p>Objective 3</p> <p><i>Nutritional requirements differ from horse to horse. A foal requires different amounts of nutrients than does a yearling, two-year-old, or a mature animal. It also makes a difference whether or not animals are breeding, pregnant, working, or just out to pasture.</i></p>	<p>Discuss how the nutritional needs for foals, yearlings, two-year-olds, breeding stock, and mature horses is determined.</p> <ol style="list-style-type: none"> 1. By the horse's size and age 2. By work load and breeding status 3. By stress level and quality of feed 4. By weather conditions
<p>Objective 4</p> <p><i>The horse's digestive system, unlike the cow's, is designed to take in small amounts of feed at a nearly constant rate. The horse's stomach empties completely in about 24 hours, while a cow's takes about three times as long.</i></p>	<p>Discuss the factors that affect digestion.</p> <ol style="list-style-type: none"> 1. Stress 2. Feed quality 3. Efficiency of digestion (30 percent)
<p>Objective 5</p> <p><i>Of all the nutrients required by the horse, water is probably the most important and least expensive one. Horses consume 10-12 gallons of water per day, depending on the temperature and how active they have been. Water intake should be limited before and after heavy exercise.</i></p>	<p>Discuss the importance of water.</p> <p>Functions throughout the body</p> <p>Water supply requirements</p> <ol style="list-style-type: none"> 1. Cleanliness 2. Freshness 3. Free choice availability
<p>Objective 6</p> <p><i>There are two main types of feeds:</i></p>	<p>Identify different feed types.</p> <ol style="list-style-type: none"> 1. Grains

Instructor Directions	Content Outline
<p><i>grains and hay (roughage). Oats and corn are the most commonly fed grains. In hay, a horse needs only about 1 percent of its body weight daily.</i></p>	<ol style="list-style-type: none"> 2. Hay (roughage) 3. Supplements 4. Minerals 5. Vitamins
<p>Objective 7</p> <p><i>Today, more and more feeds are premixed to save the customer's time. This means, however, that the horse is getting the nutrients the manufacturer produces, instead of what it really needs.</i></p>	<p>Determine when to feed and what types of feed to use.</p> <p>Availability</p> <p>Cost of feed stuff</p> <p>Requirements and needs of the animal</p> <ol style="list-style-type: none"> 1. Age 2. Health conditions
<p>Objective 8</p> <p><i>In the wild, the horse ate many small meals instead of one or two meals a day, as owners prefer to feed. The wild horse had few nutrition-related difficulties, while domesticated horses are prone to many digestion problems. Colic and founder are the most common digestion difficulties but are easily prevented.</i></p>	<p>Identify nutrition-related problems.</p> <ol style="list-style-type: none"> 1. Laminitis (founder) 2. Colic 3. Epiphysis 4. Vitamin deficiency (such as rickets) 5. Toxic plants 6. Blister beetles in alfalfa hay 7. Tying up
<p>Application</p>	<p>Other activities</p> <ol style="list-style-type: none"> 1. Use feed samples from the interest approach and quiz students. 2. Obtain feed tags from several types of equine feed and discuss the ingredients and uses for each. 3. Obtain models or digestive tracts of a horse and cow. Compare the structures. 4. Have students do research and report on current issues in equine nutrition or nutrition-related problems.
<p>Closure/Summary</p>	<p>In the wild, the horse was able to take care of all its needs and usually had few problems. The domesticated horse depends on people to provide all its nutritional needs. It is the responsibility of the owner to make sure the horse has the proper nutrition at all times.</p>

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Evaluation: Quiz	<p>Answers:</p> <ol style="list-style-type: none"> 1. c 2. b 3. a 4. d 5. d 6. c 7. a 8. c 9. c 10. c 11. a 12. a 13. b 14. a 15. d