

Course	Agricultural Science II
Unit	Crop Science
Lesson	Managing the Crop
Estimated Time	50 minutes
Student Outcome	

The student will be able to describe good crop production practices.

Learning Objectives

1. Identify the three nutrient elements that are applied to most crops.
2. Identify when fertilizer can be applied.
3. Describe why soil pH is important in crop production.
4. Describe how soil pH can be altered.
5. Explain how plant residues should be managed.
6. Explain how plant pests can be controlled.
7. Identify the irrigation methods that are used in crop production.

Grade Level Expectations

SC/EC/1/B/09-11/a	SC/EC/1/B/09-11/b	SC/ES/3/A/09-11/b
SC/ES/3/A/09-11/c	SC/ES/3/A/09-11/g	SC/ST/1/B/09-11/a
SC/ST/1/C/09-11/a	SC/ST/3/B/09-11/a	SC/ST/3/B/09-11/b
SC/ST/3/B/09-11/c	SC/ST/3/D/09-11/a	

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. *Crop Science* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1992.
2. *Crop Science Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplemental Information

1. Internet Sites
 - ☐ Crop Fertilizer Recommendation Calculator. Department of Agronomy, Purdue University. Accessed January 16, 2008, from <http://www.agry.purdue.edu/mmp/webcalc/fertRec.asp>.
 - ☐ Crop Nutrition and Fertilizer Requirements. Alberta Agriculture and Food, Canada. Accessed January 16, 2008, from [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex3791](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex3791).
 - ☐ Crop Production/Field Crops. University of Nebraska-Lincoln Extension. Accessed January 16, 2008, from <http://www.ianrpubs.unl.edu/epublic/pages/index.jsp?what=subjectAreasD&subjectAreasId=9>.
 - ☐ Crops Publications. University of Missouri Extension. Accessed January 16, 2008, from <http://extension.missouri.edu/explore/agguides/crops/>.

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- ❑ Missouri Irrigation. Agricultural Electronic Bulletin Board, University of Missouri. Accessed January 16, 2008, from <http://agebb.missouri.edu/irrigate/index.htm>.
 - ❑ Missouri Pest Management Guide: Corn, Grain Sorghum, Soybean, Winter Wheat, 2008. University of Missouri Extension. Accessed January 16, 2008, from <http://extension.missouri.edu/explore/manuals/m00171.htm>.
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Interest Approach

Ask students what the term “management decisions” means to them. Briefly discuss the effects of good and poor decisions on crop production. Describe how crop yields have changed over the past century due to commercial fertilizers, hybrid seeds, and other technological advances.

Communicate the Learning Objectives

1. Identify the three nutrient elements that are applied to most crops.
2. Identify when fertilizer can be applied.
3. Describe why soil pH is important in crop production.
4. Describe how soil pH can be altered.
5. Explain how plant residues should be managed.
6. Explain how plant pests can be controlled.
7. Identify the irrigation methods that are used in crop production.

Instructor Directions	Content Outline
Objective 1 <i>In order for plants to grow properly and produce good yields, they need to have essential nutrient elements for proper growth and development. Ask students to identify the kinds of fertilizers and the amount that should be applied to locally grown crops.</i>	Identify the three nutrient elements that are applied to most crops. <ol style="list-style-type: none">1. Nitrogen (N)2. Phosphorus (P)3. Potassium (K)
Objective 2 <i>The most common method of maintaining adequate levels of essential nutrients in the soil is through application of commercial fertilizers. After a soil test is taken, analyzed and recommendations are made, appropriate amounts and grades of fertilizers can be applied.</i>	Identify when fertilizer can be applied. <ol style="list-style-type: none">1. At planting time, starter fertilizer2. After plants have emerged from soil, side dressing3. After plants are established, top dressing

Instructor Directions	Content Outline
<p>Objective 3</p> <p><i>Optimum plant growth is dependent on the presence of essential nutrient elements. Optimum plant growth also depends on the degree of acidity or alkalinity of the soil, commonly referred to as soil pH. Extremely acid or alkaline soils reduce crop yields. Crop production is usually maximized when soil pH is near neutral or slightly acidic.</i></p>	<p>Describe why soil pH is important in crop production.</p> <ol style="list-style-type: none"> 1. Crops grow and produce the best within a pH range of 5.0 to 7.5. 2. Soil pH affects the availability of nutrients for plant uptake.
<p>Objective 4</p> <p><i>Soil nutrient deficiencies can be corrected through application of fertilizers. Soil pH can also be adjusted to improve plant growth.</i></p>	<p>Describe how soil pH can be altered.</p> <ol style="list-style-type: none"> 1. Application of lime reduces soil acidity. 2. Application of sulfur or aluminum sulfate will reduce soil alkalinity.
<p>Objective 5</p> <p><i>Once a crop is harvested, the producer is left with the decision of what to do with the plant residue left on the field. Plant residue can be beneficial in several ways depending on how it is managed. Sometimes plant residues are also removed for use as animal feed or bedding.</i></p>	<p>Explain how plant residues should be managed.</p> <ol style="list-style-type: none"> 1. Mixed/tilled into the soil to provide organic matter 2. Left on the field surface to reduce soil erosion due to wind and water
<p>Objective 6</p> <p><i>Pest control in crop production is important. Crop pests cost producers billions of dollars annually. Control measures should be taken to reduce the damage caused by crop pests.</i></p>	<p>Explain how plant pests can be controlled.</p> <ol style="list-style-type: none"> 1. Mechanical pest control 2. Cultural pest control 3. Biological pest control 4. Genetic pest control 5. Chemical pest control
<p>Objective 7</p> <p><i>In many states, rainfall may be inadequate to reach a crop's</i></p>	<p>Identify the irrigation methods that are used in crop production.</p> <ol style="list-style-type: none"> 1. Aerial sprinkler systems (center pivot) 2. Surface (flood, drip, furrow)

Instructor Directions	Content Outline
<p><i>potential yield. Water is vital for plant growth. Irrigation is a mechanical technique of supplying water to plants. Farmers use specialized techniques of irrigation to supply water for growing crops.</i></p>	
<p>Application</p>	<p>Other activities</p> <ol style="list-style-type: none"> 1. Using several examples of fertilizer bags (different grades), demonstrate to the students how to calculate the amount of nutrients in each bag. 2. Demonstrate or have students demonstrate a soil pH test. Then demonstrate how to alter the soil with agricultural lime, sulfur, or aluminum sulfate as needed.
<p>Closure/Summary</p>	<p>Proper crop management involves taking a soil test to analyze and determine the nutrient needs and pH of the soil. Once these facts are known, more informed management decisions can be made. Decisions that involve pest control measures and the use of irrigation depend on factors such as the crop grown, geographical location, and soil type.</p>
<p>Evaluation: Quiz</p>	<p>Answers:</p> <ol style="list-style-type: none"> 1. False 2. True 3. False 4. True 5. a 6. b 7. b 8. c