

<b>Course</b>	Agricultural Science II
<b>Unit</b>	Entomology
<b>Lesson</b>	Integrated Pest Management
<b>Estimated Time</b>	50 minutes

### Student Outcome

Outline an IPM plan.

### Learning Objectives

1. Define IPM (Integrated or Insect Pest Management).
2. Describe why IPM is important.
3. Describe what the economic threshold indicates.
4. Identify the steps involved in developing an IPM plan.
5. Describe a crop calendar.

### Grade Level Expectations

SC/EC/1/B/09-11/a	SC/EC/1/B/09-11/b	SC/EC/1/C/09-11/b
SC/EC/1/D/09-11/b	SC/EC/3/C/09-11/b	SC/ST/1/B/09-11/a

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

#### Resources

1. *Entomology* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1991.
2. *Entomology Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

#### Supplemental Information

1. Internet Sites
  - ❑ Integrated Pest Management (IPM) Principles. U.S. Environmental Protection Agency. Accessed January 30, 2008, from <http://www.epa.gov/opp00001/factsheets/ipm.htm>.
  - ❑ Integrated Pest Management and Missouri's Agriculture. University of Missouri Extension. Accessed January 30, 2008, from <http://extension.missouri.edu/explore/agguides/pests/ipm1003.htm>.
  - ❑ Conservation Services Notes: Integrated Pest Management. Missouri Secretary of State. Accessed January 30, 2008, from <http://www.sos.mo.gov/archives/localrecs/conservation/notes/pestmanagement.asp>.

### Interest Approach

Students should review the information they have prepared for their individual insects. Have students think about the ways they would control insects if they became a problem.

This lesson will enable students to complete question 14, Outline of an IPM plan, on their Insect Fact Sheet (AS 1, Lesson 3).

### Communicate the Learning Objectives

1. Define IPM (Integrated or Insect Pest Management).
2. Describe why IPM is important.
3. Describe what the economic threshold indicates.
4. Identify the steps involved in developing an IPM plan.
5. Describe a crop calendar.

Instructor Directions	Content Outline
<b>Objective 1</b>  <i>Discuss why insect management is an important part of one's life.</i>	<b>Define IPM (Integrated or Insect Pest Management).</b>  The letters "IPM" are used to refer to two different programs. The most general program is Integrated Pest Management. If the pest in question is specifically insects, then the letters can stand for Insect Pest Management.
<b>Objective 2</b>  <i>Discuss why IPM is important. Explain what the economic injury level (EIL) is.</i>	<b>Describe why IPM is important.</b>  The basic goal in insect pest management is to prevent insect populations from attaining the economic injury level (EIL). The economic injury level is the level of damage insects do to a crop that is equal in value to the cost it requires to use measures that suppress the insects.
<b>Objective 3</b>  <i>Discuss why it is not always necessary to start insect control measures when insects are seen on a crop.</i>	<b>Describe what the economic threshold indicates.</b>  The economic threshold indicates the level of damage done by an insect that is used to warn the agriculturalist of potential problems.
<b>Objective 4</b>  <i>List and describe the specific steps in developing an IPM plan.</i>	<b>Identify the steps involved in developing an IPM plan.</b>  <ol style="list-style-type: none"><li>1. Identify the problem</li><li>2. Assess the damage</li><li>3. Prepare cost/benefit analysis</li><li>4. Select a management strategy</li><li>5. Implement the management strategy</li><li>6. Follow-up on the plan</li></ol>

Instructor Directions	Content Outline
<p><b>Objective 5</b></p> <p><i>Discuss why an Integrated Pest Management program begins by focusing on the crop. The different management plan possibilities can be better evaluated by making a crop calendar.</i></p>	<p><b>Describe a crop calendar.</b></p> <p>A crop calendar is an outline of the crop's growing season. It provides a systematic and efficient way of looking at the components in a cropping system.</p> <ol style="list-style-type: none"> <li>1. Set up a table with the 12 months across the top. The left column will indicate crop information such as the following:             <ol style="list-style-type: none"> <li>a. Crop growth stages</li> <li>b. Insects (be specific)                 <ul style="list-style-type: none"> <li>- If different insect stages affect the crop at different times, indicate what stage the insect is in and when it causes damage.</li> <li>- Indicate the period when insects are most likely to be present and when populations are most likely to cause economic damage.</li> </ul> </li> <li>c. Tillage operations</li> <li>d. Fertilizer applications</li> <li>e. Herbicide applications</li> <li>f. Harvesting</li> </ol> </li> <li>2. Now, look at the crop calendar to see when each particular insect will most likely cause the most damage. Look at the growth stage of the crop at this time and think about the following questions.             <ol style="list-style-type: none"> <li>a. Is the insect attack happening at a critical time in the growth of the crop?</li> <li>b. Will the crop be able to grow out of any damage?</li> <li>c. Can the insect damage be prevented?</li> <li>d. What insect control measures can be used?</li> <li>e. What are the advantages and limitations of each of these methods?</li> <li>f. How much insect control is needed at this time, considering both the growth stage of the crop and the insect's life cycle?</li> <li>g. How will each of the methods affect the rest of the crop calendar?</li> <li>h. How much will it cost?</li> <li>i. When should the selected measures be started?</li> <li>j. What other factors should be considered in selecting a management plan?</li> </ol> </li> </ol>

Instructor Directions	Content Outline
<b>Application</b>	<p>Other activities:</p> <ol style="list-style-type: none"> <li>1. Talk to a local producer about what type of pest management plan he or she uses and how it was selected.</li> <li>2. Look in a local pest management guide book and compare how the economic threshold, damage assessment, economic injury level, and cost-benefit analysis are determined for different crop and insect species.</li> </ol>
<b>Closure/Summary</b>	<p>An integrated pest management plan is an efficient and effective way to evaluate the needs and methods of pest control.</p>
<b>Evaluation: Quiz</b>	<p>Answers:</p> <ol style="list-style-type: none"> <li>1. d</li> <li>2. b</li> <li>3. b</li> <li>4. c</li> <li>5. a</li> <li>6. d</li> <li>7. a</li> <li>8. c</li> <li>9. c</li> </ol> <p>Note: Part of the evaluation will be the completed IPM plan for the student's individual insect on their Insect Fact Sheet (AS 1, Lesson 3).</p>