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| <b>Course</b>         | Agricultural Science II    |
| <b>Unit</b>           | Entomology                 |
| <b>Lesson</b>         | Introduction to Entomology |
| <b>Estimated Time</b> | Two 50-minute blocks       |

### Student Outcome

Discuss the significance of entomology.



### Learning Objectives

1. Define entomology.
2. Describe why entomology is important.
3. Define the role of insects in society.
4. Identify the educational requirements of some careers in entomology.
5. Identify some career areas enhanced by a working knowledge of entomology.

### Grade Level Expectations

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

#### Resources

1. Handout  
 HO 1 – Facts About Insects
2. Activity Sheet  
 AS 1 – Interview
3. *Entomology* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1991.
4. *Entomology Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

#### Supplemental Information

1. Internet Sites
  - ☐ Smithsonian National Museum of Natural History, Department of Entomology. Accessed November 13, 2007, from <http://entomology.si.edu/>.
  - ☐ Bugbios. Dexter Sear at I/O Vision. Accessed November 13, 2007, from <http://www.insects.org/>.

### Interest Approach

Distribute HO 1, a list of “fun facts” about insects and entomology. Discuss how entomology affects our lives. To help students relate insects to their lives, ask questions such as “Why is food cooked?” or “Why is food stored at certain temperatures?”


Break down a common product into its basic components. Point out the different careers involved in the production of the product. Also point out how entomology is involved in those careers.


### Communicate the Learning Objectives

1. Define entomology.
2. Describe why entomology is important.
3. Define the role of insects in society.
4. Identify the educational requirements of some careers in entomology.
5. Identify some career areas enhanced by a working knowledge of entomology.

| Instructor Directions   | Content Outline  |
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| <b>Objective 1</b><br><br><i>Discuss with students what entomology is. Explain that insects are small, six-legged animals. Emphasize the extensive insect activities in the world and in our lives.</i> | <b>Define entomology.</b><br><br>Entomology is the study of insects. The study of insects includes their development, anatomy, physiology, life history, behavior, environment, and classification.  |
| <b>Objective 2</b><br><br><i>Discuss why entomology is important. Point out that insects can have a positive or negative effect on plants, people, and the environment.</i>                             | <b>Describe why entomology is important.</b> <ol style="list-style-type: none"><li>1. Insects are the most numerous animals in the world.</li><li>2. They have an enormous impact on people’s lives.</li><li>3. Entomology gives people a better understanding of the environment, biology, and the world in which they live.</li><li>4. Entomology can be used to help reduce the extensive economic losses in damage caused by insects each year.</li><li>5. Entomology helps improve human and animal health.</li></ol> |
| <b>Objective 3</b><br><br><i>Discuss how insects are involved in different industries. Encourage students to think of ways in which insects are beneficial and harmful.</i>                             | <b>Define the role of insects in society.</b> <ol style="list-style-type: none"><li>1. Agriculture<ol style="list-style-type: none"><li>a. Agriculture is a major industry in the U.S. and the world.</li></ol></li></ol>  |

| Instructor Directions   | Content Outline   |
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|   | <ul style="list-style-type: none"> <li>b. Insects play an important part in the food chain by providing food for other animals.</li> <li>c. Some insects destroy other insects that are considered harmful.</li> <li>d. Insects pollinate crops.</li> <li>e. Insects damage or destroy crops, food and fiber products, and wood.</li> <li>f. Insects provide food (honey from the honey bee) and fiber (silk from the silk worm).</li> </ul> <ol style="list-style-type: none"> <li>2. Environmental sciences – the study of the forces and conditions that surround and influence living and nonliving things; includes any studies in ecology <ul style="list-style-type: none"> <li>a. Insects break down organic and nonorganic materials in the environment. Insects are nature’s own recycling program.</li> </ul> </li> <li>3. Medicine <ul style="list-style-type: none"> <li>a. Insects transmit diseases to humans, animals, and plants.</li> <li>b. Insects are used extensively in many kinds of research because of their small size and rapid reproduction.</li> </ul> </li> <li>4. Construction <ul style="list-style-type: none"> <li>a. Knowledge about insects is used when selecting the type of construction material.</li> <li>b. Insects, such as termites, can cause damage to wooden structures.</li> </ul> </li> <li>5. Product development – insects used in the research and development of products such as cosmetics, cleaning materials, food preservatives, and medicines</li> </ol> |
| <p><b>Objective 4</b></p> <p><i>Discuss how studying insects can lead to many different career choices. Entomologists are scientists who specialize in the study of insects. A wide variety of careers are available. These careers require different levels of education and training. Entomologists can be grouped by their area of specialization, and these areas often overlap. Have</i></p> | <p><b>Identify the educational requirements of some careers in entomology.</b></p> <ol style="list-style-type: none"> <li>1. Agricultural entomologists <ul style="list-style-type: none"> <li>a. Study insects that affect the production of foods and fibers</li> <li>b. Work in all industries in agriculture</li> <li>c. Educational requirements vary from some training in entomology to a doctoral degree in entomology.</li> <li>d. Examples of careers in this area include: crop scout, agricultural product dealer, insecticide applicator, researcher, forester, greenhouse manager, pest controller.</li> </ul> </li> </ol>  |

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| <p><i>students interview someone who uses entomology directly or indirectly in his or her work. Students should use AS 1 as an outline when conducting the interview.</i></p> <p> AS 1 – Interview</p> | <ol style="list-style-type: none"> <li>2. Entomology instructors               <ol style="list-style-type: none"> <li>a. Teach entomology at different levels (high school, junior college, and university)</li> <li>b. Educational requirements will vary depending on job</li> </ol> </li> <li>3. Medical and veterinary entomologists               <ol style="list-style-type: none"> <li>a. Are concerned with insects that influence the health of people and animals in any way</li> <li>b. Develop insecticides to protect crops and reduce diseases</li> <li>c. Many jobs require a graduate degree in the area of medical specialization with additional training or classes in entomology. Some jobs may only require a 2-year degree.</li> <li>d. Include doctors, assistants, and technicians</li> </ol> </li> <li>4. Industrial entomologists               <ol style="list-style-type: none"> <li>a. Involves the research and manufacture of many types of products for industrial and domestic use</li> <li>b. Work in many product development laboratories</li> <li>c. Some jobs require only a high school diploma and some technical training, while other jobs require additional training</li> </ol> </li> <li>5. Ecological entomologists               <ol style="list-style-type: none"> <li>a. Concerned with protecting and sustaining the environment and health standards</li> <li>b. Regulate proper waste treatment and chemical disposal</li> <li>c. Usually a bachelor's degree or higher is necessary</li> </ol> </li> </ol> |
| <p><b>Objective 5</b></p> <p><i>Discuss with students how a general knowledge of insects and insect behavior can be useful in many job areas. Many times a minor emphasis in entomology is an excellent combination with another major field.</i></p>                                   | <p><b>Identify some career areas enhanced by a working knowledge of entomology.</b></p> <ol style="list-style-type: none"> <li>1. Landscaping and turf management               <ol style="list-style-type: none"> <li>a. Turf management involves the care and maintenance of landscaped areas.</li> <li>b. This field is very diverse depending at what level and how you want to work.</li> <li>c. Entomology is an excellent minor in this area.</li> <li>d. Pesticide applicator's certification may be necessary.</li> </ol> </li> <li>2. Animal and human medical care               <ol style="list-style-type: none"> <li>a. Assistants and technicians in all areas need some training in insect management.</li> </ol> </li> </ol>   |

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|  | <ul style="list-style-type: none"> <li>b. There are many openings at lower levels in these areas.</li> <li>3. Food science               <ul style="list-style-type: none"> <li>a. Food production is a very large area in which insect control is necessary at all levels.</li> <li>b. An important part of food production is the preservation and the transportation of food items throughout the U.S. and the world.</li> </ul> </li> <li>4. Biological science – There are many areas in the biological and natural sciences that are enhanced by the study of insects.</li> </ul>                                    |
| <b>Application</b><br><br> AS 1 – Interview | <p>Answers to AS 1:<br/>The instructor will need to evaluate this activity sheet.</p> <p>Other activities:</p> <ul style="list-style-type: none"> <li>1. Have students list all the different products they find that contain insecticides. They can check their homes, local grocery stores, and garden supply stores for items.</li> <li>2. Students can talk with people who work with the environment and get their opinion on insects and insect control.</li> <li>3. Invite someone who uses entomology in his or her work to be a guest speaker. A greenhouse manager and a landscaper are two examples.</li> </ul> |
| <b>Closure/Summary</b>   | <p>Entomologists study insects. They study their development, anatomy, physiology, life history, behavior, environment, and classification. The study of entomology is necessary in many aspects of society.</p>   |
| <b>Evaluation: Quiz</b>  | <p>Answers:</p> <ul style="list-style-type: none"> <li>1. The study of insects</li> <li>2. A scientist who specializes in the study of insects</li> <li>3. Harmful insects are those that cause damage to food and fiber crops and transmit diseases. Beneficial insects destroy the harmful insects, provide food and fiber products, and enhance the environment.</li> <li>4. Any four of the following: agricultural entomologists, entomology instructors, industrial entomologists, ecological entomologists, or medical and veterinary entomologists</li> </ul>  |

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