

Unit D: Controlling Pests and Diseases in the Orchard

Lesson 2: Using Pesticides in the Orchard

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Identify the types of pesticide exposure.
2. Identify the safety practices that should be followed when applying pesticides.
3. Discuss how insects can be controlled in fruits and nuts.

Recommended Teaching Time: 2 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has been developed for use with this lesson plan
- <http://aces.nmsu.edu/pubs/h/h-150.pdf>

List of Equipment, Tools, Supplies, and Facilities

Writing surface
PowerPoint Projector
PowerPoint Slides
Copies of Student Worksheets
Transparency Masters

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide #2):

Oral exposure
Dermal exposure
Inhalation exposure
Eye exposure
Applicator
Toxicity
Organic production

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Set various fruits and nuts in front of the class. These fruits and nuts should be of high quality with very few blemishes. Ask the students, “Why does this fruit look so good?” and also “What do you think was done to make it look this good?” Point out that there is no insect damage or diseases apparent on the fruit. Discuss with the students how they think the insects were controlled. Use this discussion to lead into Objective 1.

Summary of Content and Teaching Strategies

Objective 1: Identify the types of chemical exposure.

(PowerPoint Slide #3)

- I. Controlling pests in the orchard will improve fruit quality and yield. The main concern is with insects which are killed with insecticides. The orchard grower needs to be very careful around these chemicals.
 - A. Before a pesticide can harm anyone, the person must first be exposed. There are four main routes that a pesticide can enter the body. They are:

(PowerPoint Slide #4)

1. **Oral exposure**—(through the mouth and digestive system) may occur because of an accident, but is more likely to be the result of carelessness.
 - a. Blowing out a plugged nozzle with your mouth or smoking or eating without washing contaminated hands can result in oral exposure.
2. **Dermal exposure**—(through the skin) This type of exposure can occur anytime a pesticide is mixed, applied, or handled.
 - a. The severity of dermal exposure depends on the dermal toxicity of the material, the rate of absorption through the skin, the size of the skin area contaminated, and the length of time the material is in contact with the skin.

(PowerPoint Slide #5)

3. **Inhalation exposure**—(through the nose and respiratory system) This type of exposure results from breathing pesticide vapors, dusts, or spray particles.
 - a. In some cases, inhalation can be more serious than oral or dermal exposure due to the uptake of blood via the lungs and other membranes.
4. **Eye exposure**—(through the eye) Eyes are very sensitive to most pesticide materials.
 - a. Eye protection should be worn when working with any pesticide.

Use TM: D2-1 to show how quickly chemicals can absorb into the body. Discuss the importance of covering your body when spraying chemicals and use this to lead into the next objective.

Objective 2: Identify the safety practices that should be followed when applying pesticides.

(PowerPoint Slide #6)

- II. Pesticides are a useful and productive tool used in production agriculture and horticulture; however, pesticides can pollute the environment and contaminate water and food supplies if not used properly. These chemicals can be dangerous to the applicator and other people and animals in the area if a few simple safety practices are not followed. The following is a general list of safety practices to follow when using pesticides.

(PowerPoint Slide #7)

- A. Know the pesticide—The **applicator** (person who applies the pesticide) must be informed about all aspects of the chemical.
1. Labels on the containers provide much of the needed information. Use the pesticide according to the directions.
 2. Do not use pesticides for uses that they were not intended for.
 3. Use a pesticide with low **toxicity**—Toxicity refers to how poisonous the pesticide is.
 4. Use the pesticide that will do what needs to be done, but that is no stronger than needed.

(PowerPoint Slide #8)

- B. Use pesticides only when needed—Pesticides should only be used when pests need to be controlled.
1. Using a pesticide without need damages the environment and wastes money.
- C. Do not contaminate resources—Pesticides can pollute the environment.
1. They should never be dumped into streams or on the ground.
 2. Leftover pesticides should be disposed of properly by ensuring they do not leak into the ground.

(PowerPoint Slide #9)

- D. Wear protective clothing—Applicators need to protect themselves from pesticides when they are applying them.
1. They should always wear protective clothing such as rubber gloves, a respirator, and any other protective gear called for on the label.
 2. The clothing should be properly washed after it is worn.
 3. Dispose of empty containers properly—Empty containers should never be thrown into creeks or gullies.
 4. Some manufacturers take empty containers back.
 5. Generally, empty containers should be rinsed out three times and returned for recycling or sent to an approved solid waste facility.

(PowerPoint Slide #10)

- E. Apply in good weather—Pesticides should be used when they will be most effective.
1. Wind causes pesticides to drift. Sometimes drifting pesticides can damage other crops, water, or livestock.
- F. Use the correct equipment—This includes funnels to help in pouring, measuring, and mixing.
1. Spraying equipment should be adjusted properly so it applies no more than is needed.
 2. This is important not only to protect the environment, but to save the producer as well.

- G. Know the right emergency measures—Anyone who applies, or is around people who are applying pesticides should know what to do in case of an accident.

Present the proper dress required when spraying insecticides. If possible acquire some of the equipment used when spraying chemicals. If all parts cannot be acquired, use TM: D2-2 as an illustration. Ask the students “What would happen if a person applied these chemicals all the time without wearing protective equipment?” Stress the importance of properly applying chemicals in the orchard.

Objective 3: Discuss how insects can be controlled in fruits and nuts.

(PowerPoint Slide #11)

- III. There are hundreds of insects that can affect the growth and yield of fruit and vegetable crops. These pests can cause damage in a number of different ways.
- A. The most obvious way insects can affect plants is by consuming the foliage or fruit of the plant.
1. This can not only affect the growth of the plant, but also result in poor quality and contamination of the edible parts of the fruit or vegetable crop.
 2. Insects can also do damage by piercing the plant and sucking nutrients from it. Insects also spread disease.
 3. Finally, the consumer does generally not tolerate the presence of insects on or in fruit or vegetables.
 4. Most products must be free of insect pests to be marketable.

(PowerPoint Slide #12)

- B. Control of insect pests can be accomplished by using a number of practices. These include the following:
1. Chemical or biological insecticides.
 - a. Organic methods are also an option in fruit production.
 - i. **Organic production** does not use chemicals to control insects, weeds or diseases but rather relies on natural ingredients like soaps and oils to reduce the populations or prevent further outbreaks.
 - ii. There are numerous mixes used which use ingredients like liquid soap, essential oils from citrus fruits, and even beer.
 - iii. Recipes for these organic pest controls can be found on the internet or in books.

(PowerPoint Slide #13)

2. Scheduling plantings to avoid times when insects are present in greatest number.
3. Use resistant or tolerant varieties.
4. Enhancement of beneficial insect populations.

Have the students use the internet and books or other printed sources to located “recipes” for organic pesticides. The document listed under the “Recommended

Resources” section of this lesson plan describes some organic pesticides. They should locate a pesticide for insects, weeds and diseases. Once they have located these “recipes” compile them into one book for each student to have for use at home.

Review/Summary: Use the student learning objectives to summarize the lesson. Have the students explain the response to the anticipated problem of each objective. Student responses can be used to determine which objectives need to be reviewed. Questions on **PowerPoint Slide #14** can be used as review.

Application: Have the students conduct a survey of insects around the school or in an orchard or garden. They should complete student worksheet WS: D-2 “Insect Survey.”

Evaluation: Evaluation should focus on student achievement of this lesson’s objectives. A sample written test is attached.

Answers to Sample Test:

Matching

1. E
2. A
3. F
4. G
5. B
6. D
7. C

Short Answer

1. Why is it important to control pests in the fruit and nut orchard?

Consumers demand high quality fruits and nuts without damage from insects or diseases. Any damage can lower quality and length of storage

2. List and describe four safety practices used when applying pesticides in the orchard.

Any of the points from Objective 2 can be used to answer this question.

Sample Test

Name _____

Test

Unit D Lesson 2: Using Chemicals in the Orchard

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- a. Oral exposure b. Dermal exposure c. Inhalation exposure
d. Eye exposure e. Applicator f. Toxicity g. Organic production

- _____ 1. This is the person who is placing the pesticide on the crop.
_____ 2. This type of exposure occurs through the mouth
_____ 3. Refers to how poisonous a pesticide is.
_____ 4. does not use chemicals to control insects, weeds or diseases but rather relies on natural ingredients like soaps and oils to reduce the populations or prevent further outbreaks.
_____ 5. This type of exposure occurs through the skin.
_____ 6. This type of exposure occurs through the eyes.
_____ 7. This type of exposure occurs mainly through the mouth and nose.

Part Two: Short Answer

Instructions. Provide information to answer the following questions.

1. Why is it important to control pests in the fruit and nut orchard?

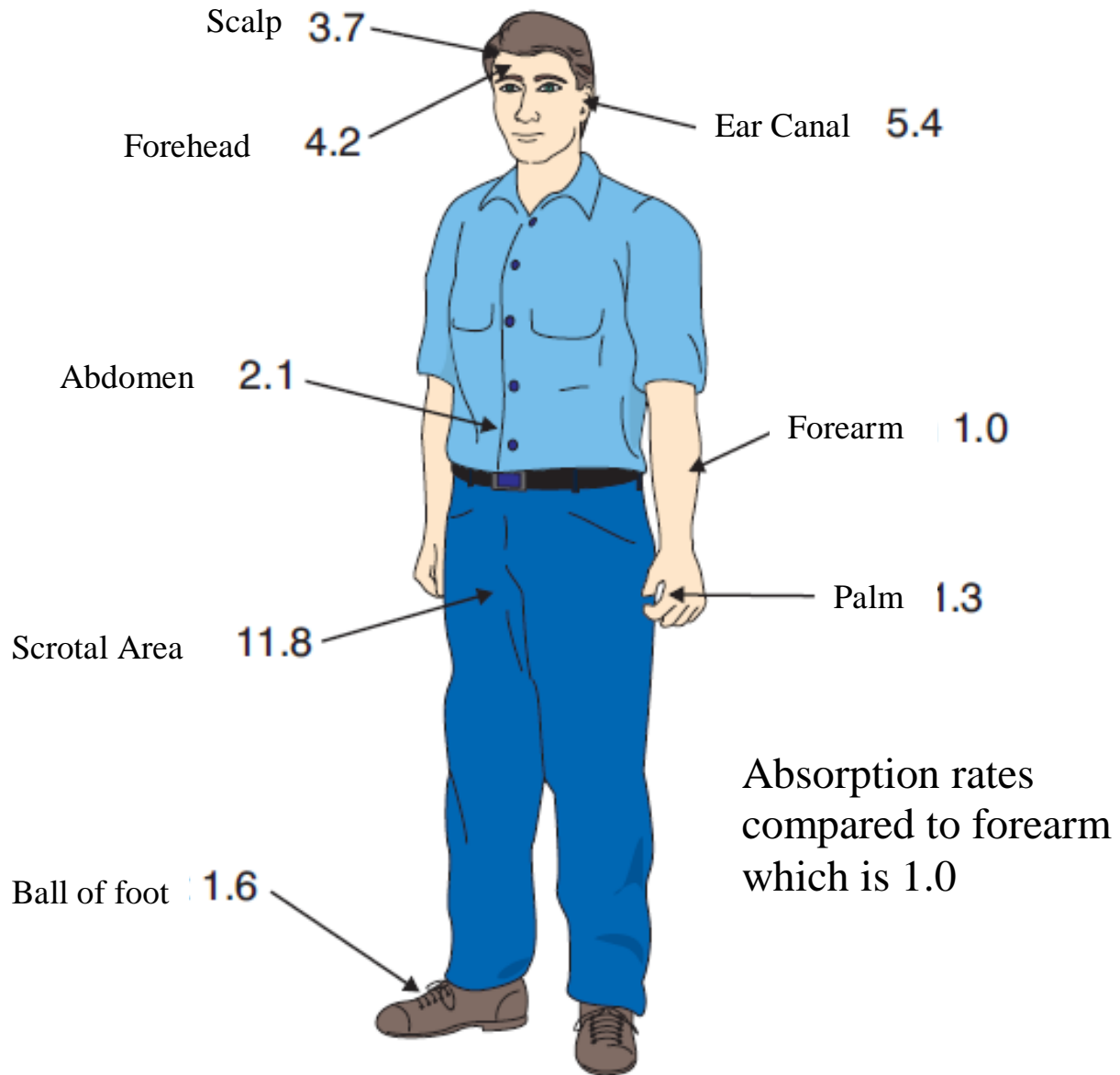
2. List and describe four safety practices used when applying pesticides in the orchard.

Insect Survey

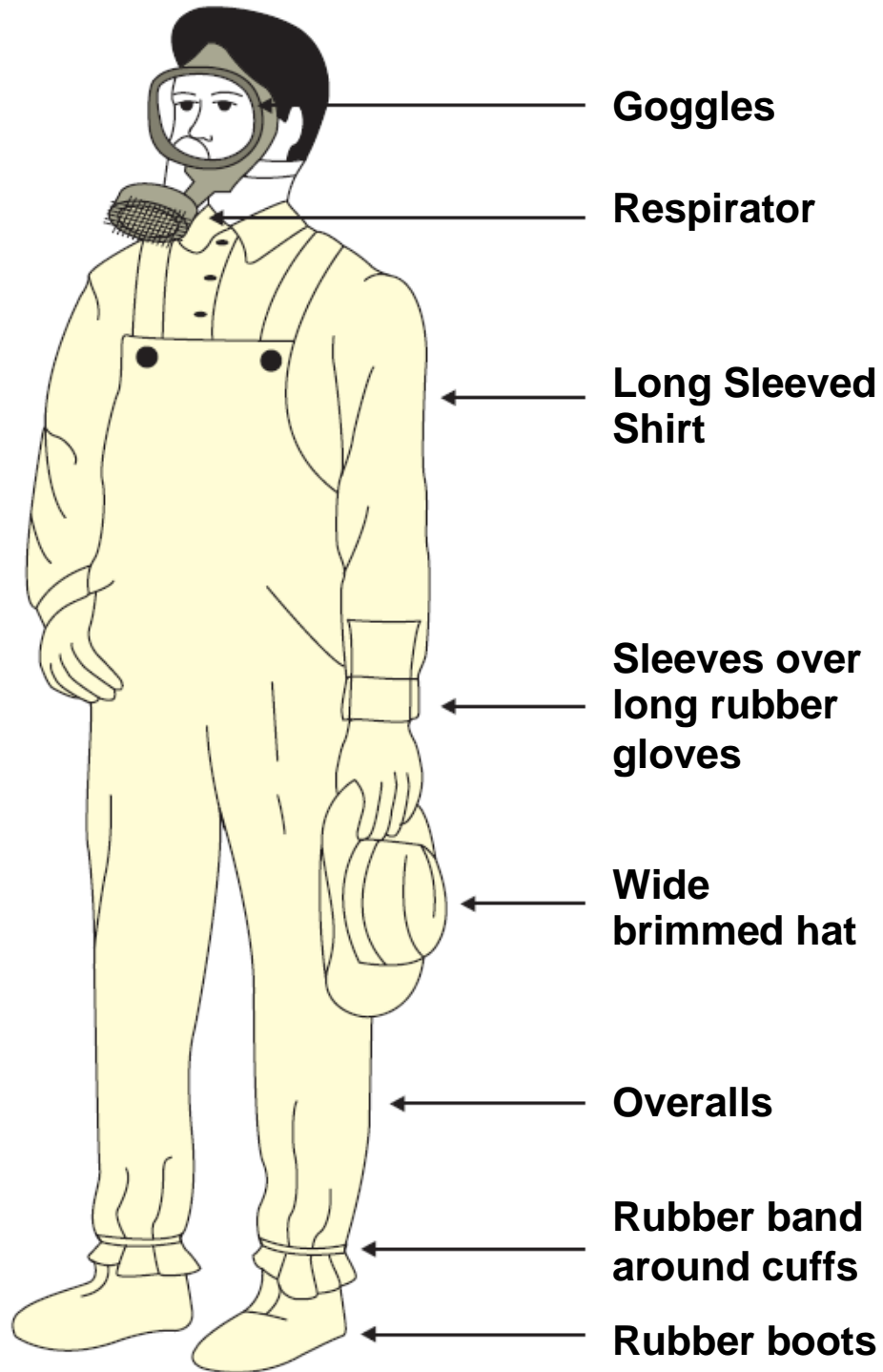
Instructions: Search around the school, in a garden and/or in an orchard for insects. Fill out the following table. If you need more spaces use the back of this piece of paper.

Insect	Description of your insect	How would you control it?

Exposure Rates



Proper Clothing for Pesticide Application



(Courtesy, Interstate Publishers, Inc.)