

### **Lesson 3 – Taking a Closer Look at Pests (monitoring)**

#### **Introduction**

This lesson teaches students about monitoring (and scouting) pest populations. It also briefly introduces the concept of tolerance for pests. Students scout for their pest, in doing so they look for specific symptoms and signs. Monitoring is an essential component to any IPM program. It helps pest managers determine pest population density, and pest location. Knowing the biology, habitats, and habit is an important part to a monitoring program. With this information, pest managers can assess the pest life stage for virulence and potential resource damage. Information about pest habitat and habits make monitoring programs more efficient, providing pest managers with clues about to where to locate pests. Monitoring programs help pest managers determine injury and tolerance levels. If injury or tolerance levels increase during the monitoring program, the pest manager will then implement management tactics. Up to this point, the students should be familiar with symptoms and signs, but in this lesson they will be looking for them specifically. The students will also gain a better understanding of tolerance; what it is and what it means.

#### **Appropriate SC Science Standards for the Following Outlined lessons**

##### Grade 2:

- I. Inquiry  
A – Process Skills, 1a – Observe, 2a – Classify 4a – Communicate  
B – Inquiry, 1abd
- II. Life Science,  
A – Characteristics of Organisms, 1a, 2ab  
C – Organisms and their Environments, 1a

##### Grade 3:

- I. Inquiry,  
A – Process Skills, 1a – Observe, 2ab – Classify 4a – Communicate 6a – Predict  
B – Inquiry, 1abcde
- II. Life Science, A – Characteristics of Organisms, 1ab 2a  
B – Life Cycles of Organisms, 1a

##### Grade 4:

- I. Inquiry  
A – Process Skills, 1a – Observe, 2ab – Classify, 4a – Communicate, 6a – Predict  
B – Inquiry, 1abde
- II. Life Science, A – Characteristics of Organisms, 1bc  
B – Organisms and Their Environment 1b, 2ab, 3abcd

##### Grade 5:

- I. Inquiry  
A – Process Skills, 1a – Observe, 2ab – Classify, 5ab – Infer, 6ab – Predict,  
B – Inquiry, 1abcdef

##### Grade 6:

- I. Inquiry

- A – Abilities to do Scientific Inquiry, 1 – Identify process skills that can be used in scientific investigations a1, b1, d1, e1  
2 – Design and conduct a scientific investigation bcgh  
7 – Communicate scientific procedures and explanations, abd

Grade 7:

- I. Inquiry  
A – Abilities Necessary to do Scientific Inquiry  
1 – Identify process skills that can be used in scientific investigations, a1, 2; d1; e1  
2 – Design and conduct a scientific investigation bcgh  
4 – Develop descriptions, explanations, predictions, and models using evidence, b  
7 – Communicate scientific procedures and explanations abcd
- II. Life Science  
B – Regulation and Behavior, 1ab

### **Resources for the following Activities**

Barbara Bromley

<http://www.princetonol.com/groups/mg/monitoring.html>

Virginia Cooperative Extension

<http://www.ext.vt.edu/schoolipm/pages/establish.htm>

University of California

<http://www.ipm.ucdavis.edu/PMG/r280390211.html>

Maryland Department of Agriculture – Action Thresholds in School IPM

[http://schoolipm.ifas.ufl.edu/doc/MD\\_thres.pdf](http://schoolipm.ifas.ufl.edu/doc/MD_thres.pdf)

University of Massachusetts – Setting thresholds for school IPM

[http://www.umass.edu/umext/schoolipm/school\\_daycare/school\\_ipm\\_sch03a4.html](http://www.umass.edu/umext/schoolipm/school_daycare/school_ipm_sch03a4.html)

“Inspecting the School” Exploring Urban Integrated Pest Management by Jenkins.

<http://www.pested.msu.edu/CommunitySchoolIPM/Curriculum>

**Duration** 3.5 hours for all of the following lessons

### **Objectives**

Students will:

- Review what they have learned about pests so far.
- Use information about pests previously learned and put it into practice
- Scout the school for pests
- Use communication and interviewing skills
- Establish an IPM monitoring program using scouting skills
- Understand tolerance levels in relation to pests
- IPM objective – Through the establishment of a monitoring program make decisions about when management tactics may be necessary

### **Vocabulary**

Pests

Symptoms

Signs

Scouting

Monitoring

Control

Tolerance

### **Discussion/Review**

Take a few moments to review with your class what they have learned thus far. Ask them questions such as:

- What pests have we discovered in our school or at home? (Animals, insects, fungi, etc.)
- Where did we discover them? (Ask for specific details, e.g. in the dark closet, near a crack in the wall, close to moisture)
- What do we know about them? Such as: What are their eating habits? How do they grow? How do they communicate (if they are not insects)?

Begin to ask students more details about how they discovered their pests.

- Did they see any *signs* such as droppings, eggs, cast skins, or the pest itself?
- Did they see any *symptoms* such as chewed areas, holes, scratch marks or any other evidence of a pest?

### **Summary**

This is a good opportunity for students to gain a better understanding of the difference between symptoms and signs. *For review refer to teacher information sheet – symptoms and signs at the end of Lesson 1.* Signs are biological evidence of the pest, something that must come from the pest, such as droppings, eggs, hair, whiskers, cast skins, or the pest itself. Symptoms are abiotic bits of evidence created by the pest such as chewed holes, burrowed or bored holes, or scratch marks.

### **Activity 1 – Scavenger Hunt part 2: Preparing to hunt**

Be sure to obtain permission from the proper individuals before beginning this activity. Explain that you and your students will be scouting the school for pests and their symptoms and signs.

Have students refer to their worksheets from their first scavenger hunt and their notes from their interviews with the custodians and teachers. This will give them some background information for their scouting and monitoring activity. Students should work in groups to fill out the new worksheets that combine all of their pest information. Be sure to stay to the original pests, because adding new pests to your list could be confusing. After each group has filled in their charts, discuss the charts as a class making sure everyone has the same information. You may even choose to have students make one large classroom chart, on the board, overhead, or as a poster.

#### **Materials**

Paper for worksheets  
Pencils  
Overhead projector and sheets  
Poster board  
Markers

### **Activity 2 – The Hunt**

*Note:* Make copies of the following worksheet for this activity. It will help students as they scout the school.

Working in groups, students should scout the school looking for pests and their symptoms and signs. Adult supervision is recommended for grades 2-4.

Before students begin scouting, be sure to review with them the difference between symptoms and signs. Remind them that they are not to collect or disturb any pests and that they are only observing. Tell them to take detailed notes, on their worksheets, because it will help them later. Students may then work in pairs (or small groups) scouting for their pests.

When students have finished hunting, ask them to return to the classroom and present to the class all of the information they found on one pest.

- Each group should present their findings for a different pest. Again you may choose to make a classroom chart of these findings.
- Ask your students how often they believe they should scout the pest infested areas (How many times per week, month, year) and why?
- Be sure they understand that regular scouting is necessary to monitor pest populations.

#### **Assessment**

Have students repeat this activity at home.

### **Follow-Up**

Discuss with students their findings at home. Review the classroom chart from the previous day. Up to this point students have learned a great deal about the environment in which they fulfill some role every day. They have learned that they are not the only living organisms in their school or their home. They have discovered where these other organisms live, how they live, what they eat, how they develop, how they communicate, and perhaps some important role they fulfill in the environment.

Begin to talk with them about tolerance, or how many of a particular pest can you stand to see or live with before you feel that you need to manage the population. Ask them questions like, if they see one cockroach, would they kill it? How many cockroaches would they need to see before they investigated some management procedure?

### **Materials**

Paper for worksheets

Pencils

Overhead projector and sheets

Poster board

Markers

### **Activity 3 – How many is too many?**

In this activity your students will begin to understand what tolerance means, as far as pests populations are concerned, and begin to think about types of management tactics. Also encourage students to think about how and which management tactics they could use simultaneously.

For grades 2-4 arrange for adult volunteers to help your students with the interviews. Your students will interview each other in order to determine some pest threshold i.e. some level at which a pest population is no longer tolerable and must be managed. They will ask each other questions about how many is too many, and what have you done to manage this problem? They will ask each other why they choose those amounts. Students will also ask one another, how much control is necessary, i.e. how much impact is needed to manage the pest population? What management tactic is easiest, i.e. most efficient to use?

After they have interviewed each other, have a class discussion about their findings. Have the class determine what they think is a reasonable tolerance level for each pest before they should take some measure action to manage the pest population. Also have the class determine how much control is necessary for a pest population.

### **Enrichment**

Contact your local University pest management extension specialist and ask him or her if they would be willing to visit your class for an interview. Have your class interview this person in the same manner as they previously interviewed the school officials and each other. Discuss with them any new information.

**Materials**

Paper for interview sheets

Pencils

Black board

Chalk

Name \_\_\_\_\_

**Activity 1 – Lesson 3**  
**Scavenger Hunt part 2: Preparing to Hunt & The Hunt**

| <b>School Pests</b><br>(drawing or description) | <b>Pest Habitat</b><br>(where it was found) | <b>Pest Evidence</b><br>(Symptoms and signs) | <b>Pest Numbers</b> | <b>Monitoring</b><br>(how often and when) | <b>Management</b><br>(when, how, with what) |
|---|---|--|---------------------|---|---|
|   |   |  |                     |   |   |
|   |   |  |                     |   |   |
|   |   |  |                     |   |   |
|   |   |  |                     |   |   |
|   |   |  |                     |   |   |
|   |   |  |                     |   |   |

**Activity 3 – Lesson 3**  
**Student Interview: How Many is Too Many?**

**Name of Interviewer** \_\_\_\_\_

**Name of Person Interviewed** \_\_\_\_\_

**Q:** Recently you have been learning about pests in your school and home. Which pests have you discovered?

**A:** \_\_\_\_\_  
\_\_\_\_\_

**Q:** What time of day did you discover these culprits?

**A:** \_\_\_\_\_

**Q:** What have you learned about these pests?

**A:** \_\_\_\_\_  
\_\_\_\_\_

**Q:** Let's focus on the pest that you find the most annoying. What interesting fact have you found out about it?

**A:** \_\_\_\_\_  
\_\_\_\_\_

**Q:** Now that you know more about this irritating pest, do you still find it as disgusting? Is it more tolerable or less tolerable to you? Are you more able to live with it?

**A:** \_\_\_\_\_  
\_\_\_\_\_

**Q:** When you discovered this particular pest, how many did you find? If you didn't find the pest did you find any symptoms or signs of the pest? What were they?

**A:** \_\_\_\_\_  
\_\_\_\_\_

**Q:** How often would you scout for this pest? Would you expect your findings to be the same every time you scouted? Why or why not?

**A:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

**Q:** How many of these pests do you think you could tolerate before you would have to take action? Why?

**A:** \_\_\_\_\_  
\_\_\_\_\_.

**Q:** Now that you know something about the pest biology and its living habits, what kind of drastic measures would you take in order to manage this pest population? How much of a drastic measure would you use on your pest population? Why?

**A:** \_\_\_\_\_  
\_\_\_\_\_.

**Q:** Which management tactic, do you think, would be the easiest to use?

**A:** \_\_\_\_\_  
\_\_\_\_\_.

**Q:** If you could use more than one tactic which would you use? When? How? Why?

**A:** \_\_\_\_\_  
\_\_\_\_\_.

**Q:** Thank you for your time. This has been a fun interview.