# Pest Private Eye

PEST PRIVATE EYE

AND THE CASE OF IPM IN SCHOOLS

# Teacher's Guide

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# Acknowledgments:

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# Introduction to Integrated Pest Management in Schools

Hello, I'm Penny Poe, Pest Private Eye's Assistant, and I'll be taking you through this Teacher's Guide. I'll be telling you more about how you can use the Pest Private Eye (Pest PI) game in your classroom, including activities about Integrated Pest Management (IPM) in general and activities that can be done in conjunction with the game itself. You can also contact the Pesticide Education Office for more information about IPM and the Pest PI game. Their contact information can be found in the "Resources" section at the end of this guide.

Before we talk about the game, however, I'd like to give you an overview of IPM. Let's take a closer look at what IPM is and why it's important.

## What is IPM?

How do you define a pest, and what is Integrated Pest Management or IPM? Simply speaking, a pest is an animal or plant that is out of place or living where it's not wanted. Pests, like all living things, need food, water, and shelter in order to survive.

Taking away one or all of these things is a first step to solving your pest problem! Usually pests compete with humans for space and resources, or they damage our homes and schools. Some pests cause allergies and have been found to be asthma triggers. Others carry bacteria and transmit diseases.

Integrated Pest Management (IPM) is a strategy for controlling pests through a variety of methods including, but not limited to, sanitation, exclusion, trapping, baiting, and pesticides. It emphasizes the use of non-toxic or low-toxic methods before considering the use of pesticides. If pesticides are used, IPM suggests that less toxic pesticides be used before those that are higher in toxicity.

With increasing public concern about pesticide use, it has never been more important for us to reevaluate pesticide use in and around our schools. Keeping our children safe should always be our first priority. Pests in schools can also cause concern. These are certainly good reasons to manage pests in your schools. This is where IPM can help you.

IPM is an approach that has been around for several decades but has received more attention recently. In the last 10 years effective, low-toxic controls have been developed that are much safer to humans than many older pesticides. Many of these low-toxic controls are now available for pests in and around schools. The person who does pest control in your schools should be using IPM and these low-toxic controls whenever possible.

Some steps for setting up a successful IPM program:

- Who Should Be Involved?
- Monitor for Pests
- Identify Target Pests
- Make Management Decisions
- Choose Control Methods
- Notification
- Evaluation
- Official Written IPM Policy

## Who Should Be Involved?

The first step in beginning an IPM program is to determine who in your school will be involved in implementing it. This could include one or two designated people, or it could involve an "IPM team," consisting of administration, teachers, custodians, and other school staff who would like to contribute to the IPM effort. A pest management professional should also be included as a valuable member of the team.

There are also opportunities to involve the entire school, including the students, in IPM. Children are naturally curious and want to learn. Activities included in this Teacher's Guide can help you incorporate IPM into your own curriculums, such as in a math or science class. By getting children involved in the IPM effort, they will know better what to look for and can help monitor the health of their school by reporting what they find to their teachers or other adults.

## Monitor/Identify Target Pests

Before implementing any IPM methods, you need to find out what kind of pest you have. This can be done by capturing a live specimen or setting out sticky or other traps to catch pests and determine how great the infestation is. Catching a single roach overnight will probably require a slightly different control approach than if you caught twenty. Also, control varies among species so determining what kind of roach you have will be important in successfully controlling the pest infestation. Thus, monitoring and identifying is a very important part of the overall IPM effort.

## Make Management Decisions/ Choose IPM Control Methods

There are many IPM methods to choose from, and depending on the kind of pest you have and the place where the problem is occurring, you may choose to use one or a combination of the following methods. Your management decisions should be made after a thorough monitoring and identification process.

**Education:** Although not technically an "IPM method," education is a good precursor to implementing IPM. You can familiarize people with pests and how to manage them using IPM through presentations, posters, displays, and other educational materials.

**Habitat modification:** You can change a pest's environment to make it undesirable to the pest. Examples would be sealing cracks and crevices to keep pests out of preferred habitats or preventing available water by fixing leaky faucets.



Sealing holes is a good example of habitat modification and exclusion as it reduces available hiding places for pests.

**Sanitation:** This is one of the first and most important steps in IPM. It's easy, non-toxic, and both adults and children can contribute to the effort. Sanitation is keeping things clean, such as by mopping, cleaning counters, and reducing clutter. It also includes keeping trash cans and dumpsters emptied. Dumpsters should be located away from buildings to prevent flying insects or rodents that are attracted to these areas from entering your school.

**Exclusion:** Good techniques for keeping pests from getting into the building in the first place are screening windows, sealing holes, keeping tree branches from touching a building, and using door sweeps.

**Moisture Control:** Too much humidity can encourage mold growth. Drippy faucets can provide enough water to sustain many different pests. It's important to watch for signs of too much moisture. You can use dehumidifiers if needed and fix leaks. Pests need water to survive so don't make it easily accessible!

**Mechanical controls:** These are non-toxic, physical ways to capture or kill pests. Some examples might include trapping mice with snap traps, glue boards, or multi-catch traps; using a fly swatter; or stomping on a pest with your shoe!



**Example of a mechanical control. Snap traps are effective at catching rodents, but should be placed in bait stations to make them inaccessible to children and to prevent tampering.**

**Biological controls:** Using a pest's natural enemies, such as praying mantids, parasitic wasps, or ladybugs, can be a good way to control a pest population.

**Chemical controls:** This includes the use of pesticides, especially low-toxic ones such as gels or baits, to control pests.

## Notification

One important element of IPM is to notify parents, students, and staff about what control methods are going to be used.

Although not necessary for non-toxic measures, if a school is going to apply a low-toxic pesticide, it is recommended that letters are sent to parents to make them aware of an upcoming treatment.

Other forms of notification could include posting flyers, announcements over the intercom by teachers before class, or school news articles. Communication is an integral part of making an IPM program successful!

## Evaluation and Official IPM Policy

After learning about and implementing IPM for a pest problem, your school may want to evaluate what methods did or didn't work and determine what might be done differently next time. From this, you can develop an official IPM policy as a guideline for addressing future pest problems. It should outline what worked best and steps school personnel should follow to identify and control pests. In this way, the school can provide a safer and healthier environment for students and staff.

## Why IPM?

I have mentioned what IPM is and how it works. But why is it important to teach this concept? The children you teach are the stewards of the future. If they learn about the advantages of IPM, including how it helps improve their health and safety and that of their friends and family, and how it protects the environment and the world's valuable natural resources, they will pass this message along to their parents, teachers, and friends. They will also remember it as they grow older and become the ones responsible for pest management and the education of future generations.
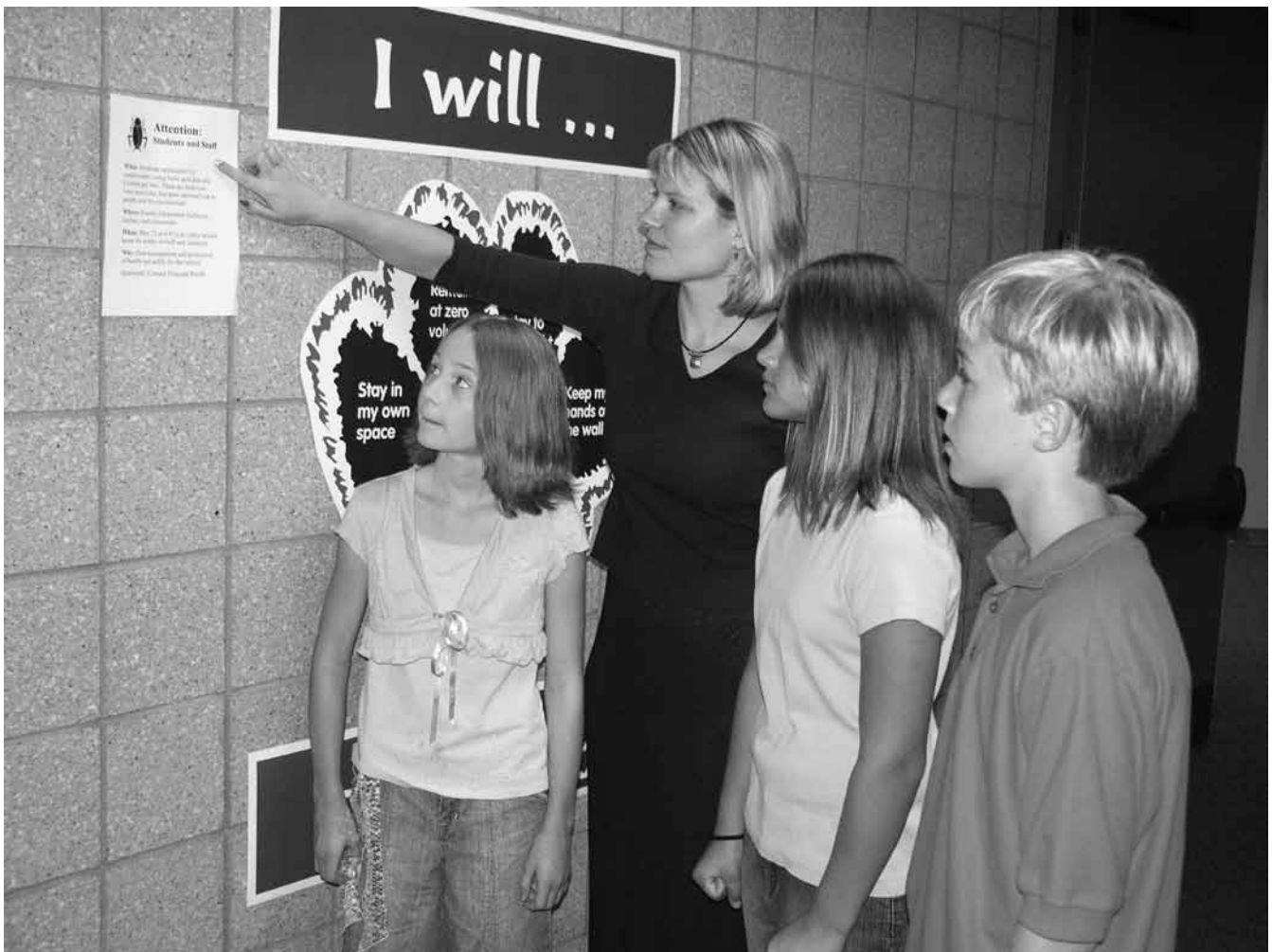
# About the Game

Pest Private Eye is a first person role-playing game aimed at upper elementary/middle school age, where students assume the role of Pest PI to solve puzzles based on Integrated Pest Management (IPM) concepts.

The main plot of the game follows Pest PI as he visits Eureka Elementary School to help fix its pest problems. By talking to the principal and other staff members around the school, players, as Pest PI, gather data about what pests have been seen. Then, using tools in the inventory and knowledge gained about how to identify pests, players are able to solve the pest problems presented in each room or area.

As Pest PI's assistant, I narrate and guide players throughout the game. I also reiterate important concepts as players solve each problem.

**KEY ASPECTS OF PEST PI VIDEO GAME:**
- Targets 4th through 6th grade level but can be played by almost anyone
- Teaches about pests and IPM through a point-and-click, first person role-playing game
- Creates additional interest with music, character voices, and animations.
- Offers closed-captioning
- Provides detail with close-up windows
- Available on CD; online demo: *http://pestgame.unl. edu*

**KEY CONCEPTS OF PEST PI VIDEO GAME:**
- Emphasizes pest identification, biology, and behavior
- Emphasizes correct identification of pests before implementing control measures
- Emphasizes teamwork: "IPM team" includes the pest management professional, school nurse, custodian, principal, teachers, and head cook

**BEGINNING THE GAME**
- **Players Learn**
  - Over 30 insect and vertebrate pests
  - General navigation within the game
  - IPM concepts
- and
  - Pick up tools needed later in the game
  - Receive an overview of Eureka's pest problems through an animated scene between Pest PI and the principal

- **Characters**
  - Players must talk to characters upon entering a new room to get pest history for the room.
  - Characters provide more clues if clicked on later in game play.
  - Characters often provide players with additional tools or hints
- **Exploring Rooms**
  - Move mouse over everything to gather clues!
    - "Hand" icon indicates a tool
    - Highlighted areas indicate an interaction is necessary
    - Pest PI, other characters, and I (Penny Poe) will give clues and review important concepts.

**SOLVING THE GAME**
- As each room is completed, the room will grey out. Once all pest problems in the school have been solved, the game will launch into an end sequence.

**PEST PI WEBSITE** (*http://schoolipm.unl.edu/pestpi/*)
- The website links to the online demo version of the game, a case study that expands on the storyline, and a survey. It also lists IPM resources for kids and teachers, such as pest profiles, online books, other games, and websites.

**SURVEY** (*http://elkhorn.unl.edu/dealsurvey/pages/ survey.jps?surveyId=17*)
- Encourage children to take the survey after they have finished the game. The survey is available from the Pest PI website.

## USING THE GAME

*Pest Private Eye* can be used in the following curriculums (relevant Nebraska and National Science Standards and suggested activities provided in next section):

- Science
- Living Organisms and Environmental Science
- Environmental
  - Good fit for "Green" or "Environmental" programs
  - Introduces and encourages environmentally friendly ways to control pests
- Problem Solving
  - *Pest Private Eye* can be used to develop logic and problem solving skills
  - Teaches deductive reasoning skills
  - Encourages application of IPM methods to real-life pest situations
- Social Skills
  - Encourages social skills needed to work with others toward a common goal.
- In the Classroom
  - Demonstrate how to play the game, possibly using volunteers.
  - Game can either be played on-site or CDs distributed for play at home.
  - Show Pest PI website (*http://schoolipm.unl.edu/pestpi/*)
  - Provide handout with relevant URLs such as the Pest PI site and survey.

# Pest Private Eye Activities and Corresponding Science Standards (Nebraska and National)

## Grades 2-4

**Nebraska:**
4.1    Unifying Concepts and Processes
*4.1.2*  By the end of fourth grade, students will develop an understanding of evidence, models, and explanation.
**National:**
Evidence, models, and explanation
**Associated Pest PI Activity:**  *Other Activities for Pest PI*

**Nebraska:**
4.2    Science As Inquiry
*4.2.1*  By the end of fourth grade, students will develop the abilities needed to do scientific inquiry.
**National:**
Abilities necessary to do scientific inquiry
**Associated Pest PI Activity:**  *School Staff IPM Interview*
*Other Activities for Pest PI*

**Nebraska:**
4.4    Life Science
*4.4.1*  By the end of fourth grade, students will develop an understanding of the characteristics of living things.
**National:**
Characteristics of organisms, Life cycles of organisms, Organisms and environments
**Associated Pest PI Activity:**  *Pest Pets*
*Other Activities for Pest PI*

*4.4.2*  By the end of fourth grade, students will develop an understanding of the life cycles of living things.
**National:**
Characteristics of organisms, Life cycles of organisms, Organisms and environments
**Associated Pest PI Activity:**  *Create a Pest!*
*Pest Pets*

*4.4.3*  By the end of fourth grade, students will develop an understanding of living things and environments.
**National:**
Characteristics of organisms, Life cycles of organisms, Organisms and environments
**Associated Pest PI Activities:**
*Around the World with Pest Private Eye!*
*Pest Private Eye Pre- and Post-Tests*

**Nebraska:**
4.6    Science and Technology
*4.6.1*  By the end of fourth grade, students will develop an understanding of technological design.
**National:**
Abilities of technological design
**Associated Pest PI Activity:**  *Other Activities for Pest PI*

**Nebraska:**
4.7    Science in Personal and Social Perspectives
*4.7.4*  By the end of fourth grade, students will develop an understanding of how science and technology helps communities resolve problems.
**National:**
Science and technology in local challenges
**Associated Pest Private Eye Activity:**
*Pest Private Eye Pre- and Post-Tests*
*Other Activities for Pest PI*

## Grades 5-8

**Nebraska:**
8.1    Unifying Concepts and Processes
*8.1.2*  By the end of eighth grade, students will develop an understanding of evidence, models, and explanation.
**National:**
Evidence, models, and explanation
**Associated Pest Private Eye Activity:** *I, Pest Private Eye*

**Nebraska:**
8.2    Science as Inquiry
*8.2.1*  By the end of eighth grade, students will develop the abilities needed to do scientific inquiry.
**National:**
Abilities necessary to do scientific inquiry
**Associated Pest PI Activity:**  *Other Activities for Pest PI*

**Nebraska:**
8.8    History and Nature of Science
*8.8.2*  By the end of eighth grade, students will develop an understanding of the nature of science.
**National:**
Nature of science
**Associated Pest Private Eye Activity:** *I, Pest Private Eye*

## Grades 9-12

**Nebraska:**
12.1   Unifying Concepts and Processes
*12.1.2* By the end of twelfth grade, students will develop an understanding of evidence, models, and explanation.
**National:**
Evidence, models, and explanation
**Associated Pest PI Activity:**  *Evaluate the Game*

# Pest Private Eye

# Classroom Activities

# Where Do I Begin?

The remainder of this Teacher's Guide includes classroom activities about IPM and Pest Private Eye that you can do with your students as part of your science curriculum. Some of these activities are intended to supplement the game, while others can be done after teaching students about IPM whether or not you play Pest Private Eye.

Each activity includes an outline that includes the science standards in which the activity fits, grade level (mostly 2nd-4th or 5th-6th, with one activity for high school age), and procedures for running the activity. In many cases you introduce IPM through a PowerPoint presentation or lecture (example: *http://schoolipm.unl.edu/pestpi/teachipm.shtml*) and then students play the game (either in the classroom or as a homework assignment). Activities are used to expand upon and test knowledge learned from the game about pests and IPM. Please note, however, that these outlines only offer suggestions for how you might conduct these activities. You can modify them according to your time availability, class size and age, and curriculum needs. A number of resources are also available to help you and are included either after individual activities or at the end of this guide.

# Pest Private Eye Pre- and Post-Tests

**SCIENCE STANDARDS COVERED: 4.4.3, 4.7.3**

**AGE GROUP: 3rd-4th**

**PROCEDURE:**
- Before introducing IPM concepts or playing the game, give students a pre-test to learn what they already know about IPM (even if they have never heard it called that before!) After playing the game, follow up with a post-test and see what knowledge they have gained from Pest PI. You can find versions of these tests after this activity.

**ACTIVITY:**
- Compare and discuss the differences between the pre- and post-tests. Examine any problem areas and further explain them to make them clear. Emphasize the importance of using various tools in IPM (such as those discussed in the game and the pre- and post-tests) and how working as a team to utilize those tools helps solve pest problems in homes, schools, and the community.

# Pest Private Eye PRE-Test

**Date:**_____ **Location:**_____

## Integrated Pest Management (IPM) Survey (PRE)

1.  **Integrated Pest Management (IPM) is a process that uses a variety of methods to control pests, including pesticides.**

    ⭘   True

    ⭘   False

2.  **List three (3) things you think are pests (not including younger sisters, brothers, or other people who annoy you!):**

    _____

    _____

    _____

3.  **List three (3) methods you think can be used to control pests:**

    _____

    _____

    _____

4.  **I would encourage others to use IPM at home or school.**

    ⭘   Totally agree

    ⭘   Agree

    ⭘   Undecided

    ⭘   Disagree

    ⭘   Totally disagree

5. **I have a good understanding of pests and pest management.**

- ○ Totally Agree
- ○ Agree
- ○ Undecided
- ○ Disagree
- ○ Totally disagree

6. **How old are you? Pick one:**

- ○ 6-8
- ○ 9-10
- ○ 11-12
- ○ 13-15
- ○ 16+

7. **What grade are you in? Pick one:**

- ○ 1st-2nd
- ○ 3rd-4th
- ○ 5th-6th
- ○ 7th-8th
- ○ 9th+
- ○ Other _____

# Pest Private Eye POST-Test

Date:_____  Location:_____

## Integrated Pest Management (IPM) Survey (Post)

1.  **Integrated Pest Management (IPM) is a process that uses a variety of methods to control pests, including pesticides.**

    ○  True
    ○  False

2.  **List three (3) things you think are pests (not including younger sisters, brothers, or other people who annoy you!):**

    _____

    _____

    _____

3.  **List three (3) methods you think can be used to control pests:**

    _____

    _____

    _____

4.  **I would encourage others to use IPM at home or school.**

    ○  Totally agree
    ○  Agree
    ○  Undecided
    ○  Disagree
    ○  Totally disagree

5.   **I have a good understanding of pests and pest management.**

  ○   Totally Agree
  ○   Agree
  ○   Undecided
  ○   Disagree
  ○   Totally disagree

6.   **How old are you? Pick one:**

  ○   6-8
  ○   9-10
  ○   11-12
  ○   13-15
  ○   16+

7.   **What grade are you in? Pick one:**

  ○   1st-2nd
  ○   3rd-4th
  ○   5th-6th
  ○   7th-8th
  ○   9th+
  ○   Other _____

# Create a Pest!!

**SCIENCE STANDARDS COVERED: 4.4.2**

**AGE GROUP: 2nd-3rd**

**PROCEDURE:**
- Talk to the students about what a pest is (an animal or plant that is out of place, or living where it's not wanted), why it might become a pest, and how it can be controlled.

**ACTIVITY:**
- Students should design their own "pest." Make sure to have a variety of paper materials available and tell them to be creative! They should also write a short description to accompany their pest that tells about what it eats, what it looks like, why it's a pest (what it does that is pest-like), and how it can be controlled.

**MATERIALS NEEDED:**
- Scissors, paper, crayons, pens and pencils, glue, paper plates, pipe cleaners, other art/craft supplies.

**ALTERNATIVES:**
- Students could make a predator instead of a pest that could serve as "biological control." They would include in their description information about what the animal looks like and what pest it is supposed to control and how it controls it (eats it, stings it and lays eggs, etc.)
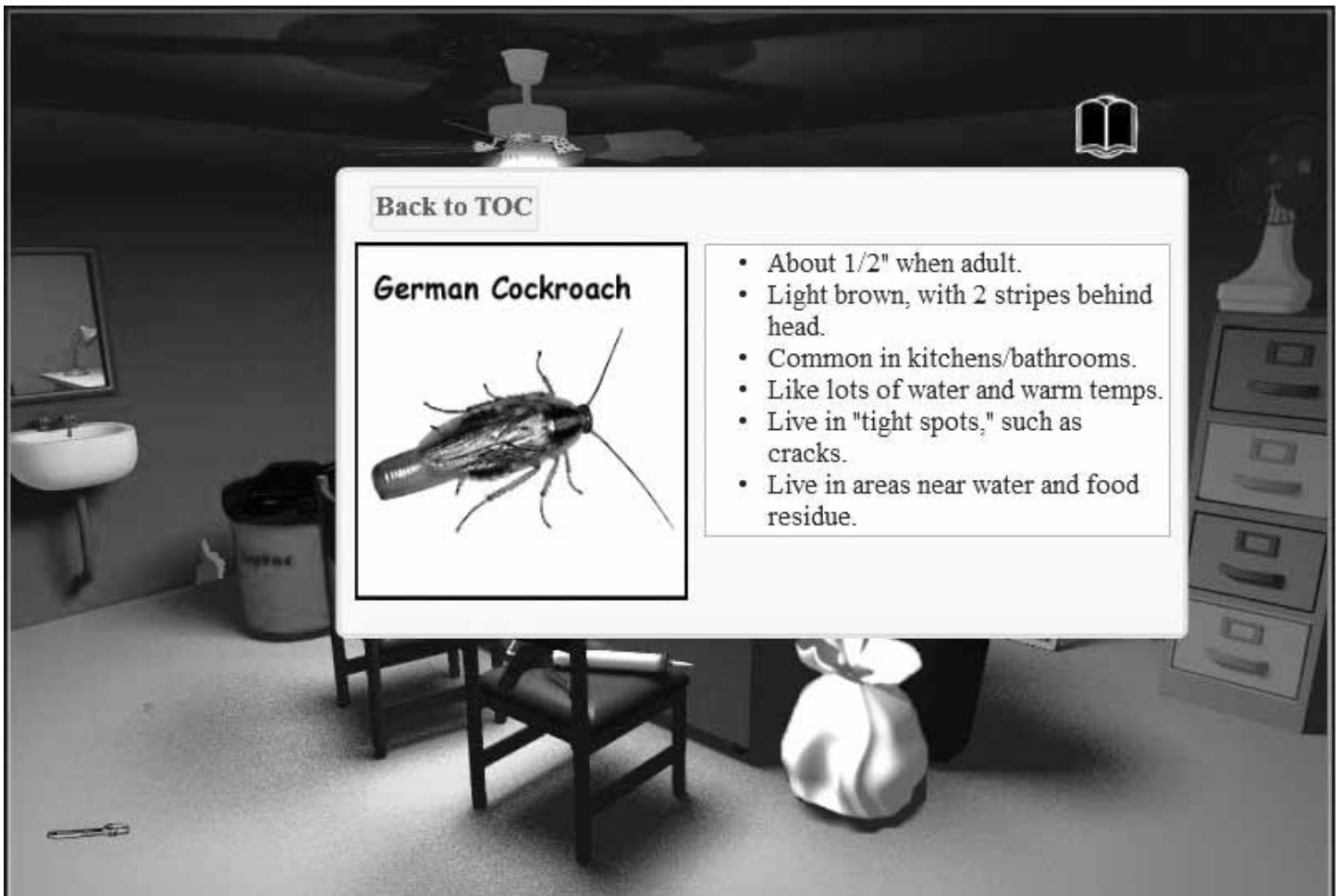
# Pest Pets

**SCIENCE STANDARDS COVERED: 4.4.1, 4.4.2**

**AGE GROUP: 2nd-4th**

**PROCEDURE:**
- Many animals that are normally pests or species related to pests can be raised as pets in the classroom to observe life cycles, biology, and behavior. Potential choices might include rats, Madagascar hissing cockroaches (not pests themselves but can be used as an example of cockroach biology), hornworms, or fruit flies. Animals used as predators of pests may also be a good choice. An example of this would be praying mantids.

- Animals used for pets in the classroom can be obtained through pet stores, supply companies that specialize in selling biological control species, or possibly the local university entomology department. Either you as the instructor or as a class can choose what animal you'd like to have. Upon making the decision, you can read "Care sheets" through the pet store, books, or the internet about your chosen pet to find out what will be required for housing, food, and other general maintenance for that animal. After buying these supplies, you'll be ready to obtain your new pet!

**ACTIVITY:**
- Once the pet is established in the classroom, have the students make observations on a daily or weekly basis of behaviors and/or life cycle of the animal, making note of what it eats, how to care for it, and changes that occur as it grows (sample observation sheet included after this activity). Students might be responsible for taking turns in daily care (feeding, watering, changing bedding) of the pet. After keeping the pet for about a month and recording what they see, students can write a description about their observations or make a report to the class. This should include not only what they observe about its biology but also how its habits and behaviors make it a pest.



**An example of one possible classroom pet, a Madagascar Hissing Cockroach.**

# Pest Pet Observation Sheet

**Your Name:** _____

**Today's Date:** _____

**What type of animal is the pet?** _____

**Daily Observations:**

- What does the pet eat?


- Is the pet active during the day or does it sleep?


- Does the pet follow a daily routine?


- Watch the pet for 5-10 minutes. What things does it do?


- What does the pet look like? Did it look the same when it was a baby as it does now when it is grown up?


- Draw a picture of the classroom pet.

# School Staff IPM Interview

**SCIENCE STANDARDS COVERED: 4.2.1**

**AGE GROUP: 3rd-4th**

**PROCEDURE:**
- First, develop your own PowerPoint or lecture about IPM or use the one from the UNL Pesticide Education Office's webpage at *http://schoolipm.unl.edu/pestpi/teachipm.shtml*, which is also listed in the "Resources" section at the end of this guide.
  - Talk about pests, what they are, and why they are considered undesirable to have around

- Talk about IPM strategies: Education, Sanitation, Habitat Modification, Exclusion, Biological Controls, Mechanical Controls, Chemical Controls. Explain how to implement these in a school or home.

- Examine how people can work together toward the IPM effort. Talk about the various school staff who may want to get involved (principal, janitor, nurse, cook, teachers, students, parents)

**ACTIVITY:**
- Develop your own interview questionnaire about pests and pest management or use our example at the end of this activity.

- Have students interview someone in the school who would know about what pests have been seen in the school and how they have handled similar problems in the past.

- After all interviews are completed, discuss the results and see if the students feel the staff is using good IPM practices. Students should be able to do the following:
  - Explain how they think the staff and school could better use IPM than what they are currently doing.
  - Make recommendations about how to resolve pest problems they discovered.
  - Suggest ways in which staff members can work together to solve pest problems

# IPM Interview Questionnaire

**Your name:** _____

**Name of Interviewee:** _____

**Date of Interview:** _____

**Questions:**

1. What is your job at this school?




2. What pests have you seen in the school?




3. How do you get rid of pests?




4. Have you heard of Integrated Pest Management or IPM?




5. If you have heard of IPM, how do you use it?




6. Do you work with others in the school or elsewhere to get rid of pests?

# Around the World with Pest Private Eye!

**SCIENCE STANDARDS COVERED: 4.4.3**

**AGE GROUP: 3rd-4th**

**PROCEDURE:**
- Tell the students you'll be playing a game to test their knowledge after today's lesson. Develop your own PowerPoint or lecture about IPM or use the one from the UNL Pesticide Education Office's webpage at *http://schoolipm.unl.edu/pestpi/teachipm.shtml*, which is also listed in the "Resources" section at the end of this guide. Explain what IPM is and what elements (education, habitat modification, sanitation, exclusion, biological controls, mechanical controls, chemical controls) are included. Also mention that changes made to the environment can affect the behavior and survival of pests (i.e. having clutter encourages pests while sanitation discourages them). Photos or real life examples can be used to demonstrate each point.

- Use review questions about IPM elements and pests to test student knowledge (you can use and add to the examples that follow this activity or develop your own).

**ACTIVITY:**
- Have students stand up by their desks. Go around the room to every student and ask them to answer a question about Pest PI, pests, or IPM. If a student is correct, he or she remains standing, if the student answers incorrectly, he or she sits down. Continue until there is only one student left standing.

# IPM Review Questions

**What is a pest?**
(An animal or plant living where it is not wanted and competing for human space and food. Also something that bites or stings you or damages property)

**Why is it important to know what pest you have before trying to control it?**
(Different pests need to be controlled in different ways…a sweet loving ant won't take bait meant for a protein loving ant, for example. You would need to know what kind of ant you have in order to control it effectively)

**Name 3 different kinds of pests.**
(Ants, cockroaches, flies, mice and rats, mold, pigeons, spiders, millipedes, silverfish, wasps, etc.)

**What is IPM?**
(Integrated Pest Management. Using a variety of methods to get rid of pests)

**Name 3 different IPM methods.**
(Sanitation, exclusion, moisture control, education, habitat modification, mechanical controls, biological controls, chemical controls)

**Name two people who should be involved in IPM.**
(Teacher, cook, nurse, principal, custodian, pest management professional, parents, students)

**What are some examples of habitat modification?**
(Sealing holes, fixing leaky sinks)

**What are some examples of sanitation?**
(Cleaning up clutter, taking out trash, cleaning desks and counters)

**What are some examples of exclusion?**
(Screening windows, sealing holes)

**What can you do to reduce moisture in your home or school?**
(Fix leaks, use a dehumidifier)

**What are some mechanical controls?**
(Snap traps, sticky traps, fly swatter)

**What are some biological controls?**
(Parasitic wasps, praying mantids, ladybugs)

**What are some low-toxic chemical controls for pests?**
(Gels, baits)

**If you found roaches in the kitchen, what would be a good way to get rid of them?**
(Clean up crumbs, put out sticky traps and roach bait)

**If you found a mouse in the locker room, how would you get rid of it?**
(Pick up clothes, clean out lockers, put out a snap trap in a bait station)

**There are ants in the classroom. How can you get rid of them?**
(Vacuuming, putting out ant bait, cleaning up crumbs and trash)

**What should you wear before cleaning up mouse or bird poop or mold?**
(Mask and gloves)

# I, Pest Private Eye

**SCIENCE STANDARDS COVERED: 8.1.2, 8.8.2**

**AGE GROUP: 5th-6th**

**PROCEDURE:**
- After students have played the Pest PI game, divide them into groups and assign them characters from Pest Private Eye (i.e. Pest PI, Principal Smith, Custodian, Nurse, etc.). Role-play is a very hands-on approach for testing student knowledge and a fun way for children to demonstrate what they have learned about pests and pest control. It also encourages teamwork among the students, which is representative of how real school staff might work together to solve a pest problem.

- Have students work together in twos (Pest PI and Principal Smith or Pest PI and the Custodian, for example) and develop a short "skit" based on what IPM methods should be used for what pests. For example, someone playing the Cook and Pest PI may have a conversation about how to control roaches in the kitchen with sticky traps. The students will have to explain how to identify the pest they found as well as why they chose a certain IPM strategy. Depending upon what character the student has, these will vary. A sample skit can be found at the end of this activity.

**ACTIVITY:**
- After all their hard work preparing the skit, have all the groups present (read or perform) their skits to the class. For added "realism," encourage students to bring costumes if they wish or provide simple props (such as a magnifying glass for investigation or a hand drawing or photo of the pest involved) to enhance their roles. Perhaps old clothes from a parent or makeshift paper hat can add to the fun. When the entire class is finished, review all the pests and IPM methods that were covered.

**ALTERNATIVES:**
- As an entire class, work on writing a Pest PI play that incorporates pests and IPM techniques the students have learned about. This could then be performed at a parent night or other school function as a way to spread knowledge about IPM to others.

- Students could film their skits using school camcorders or cameras from home if available, edit using iMovie or other simple editing software, and present these movies in class. These films could also be shared outside of class or posted on the internet using a publicly accessible media site (YouTube, etc.).

# I, Pest Private Eye Sample Skit

**Pest PI:**  Hi, I'm Pest Private Eye.

**Cook:**  I'm the School cook for [insert school name here]

**Pest PI:**  I heard you have some pest problems in the kitchen.

**Cook:**  Yeah. I've seen all these brown bugs running around. I don't want them to get in the food!

**Pest PI:**  Let me take a look. (takes magnifying glass out) Ah! It has brown stripes on its back, is brown, and just ran under the stove.

**Cook:**  What is it?

**Pest PI:**  A German cockroach!

**Cook:**  Cockroach! How do we get rid of it?

**Pest PI:**  You should keep the floor and counters clean. Roaches like crumbs. Also, put a sticky trap out. They'll get stuck when they run across it.

**Cook:**  OK! Where should I put it?

**Pest PI:**  Along walls where the roaches like to run at night.

**Cook:**  I'll do that. Thanks Pest Private Eye.

# Evaluate the Game

**SCIENCE STANDARDS COVERED: 12.1.2**

**AGE GROUP:** Freshmen or Sophomore Science class

**TIME:**

Allow 30 minutes for IPM introduction and 2 hours for in class game play if desired. Give 15 minutes for filling out the evaluation. Leave time to discuss the results during the next class period. If the game and evaluation are assigned as homework, do the 30 minute IPM introduction and examine and discuss the results of the evaluation during the next class period.

**PROCEDURE:**

- First, develop your own PowerPoint or lecture about IPM or use the one from the UNL Pesticide Education Office's webpage at *http://schoolipm.unl.edu/pestpi/teachipm.shtml*, which is also listed in the "Resources" section at the end of this guide. Explain what IPM is and what elements (education, habitat modification, sanitation, exclusion, biological controls, mechanical controls, chemical controls) are included. Use photos or real life examples to demonstrate each point.

- Tell the students that they will be evaluating the game. The less they know about the game the better.

- Hand out game CDs and evaluation forms (copy included after this activity). The evaluations will measure student's response about game play, usability, story, and mechanics. Explain that they should be looking for how well the game fits into the 4th-6th grade age range and how they think it could be improved to be more age appropriate (such as challenge level, dialogue, length, graphics, music, etc.)

- Play the game in the classroom as a one- or two- class period activity, or send home with the students as a homework assignment.

- Collect the evaluation forms after playing the game, and spend some time discussing what the students thought of the game and what they learned. Ask if they have a better feel for IPM having played the game.

- Calculate results of the evaluations for your own use and/or share them with the Pesticide Education Office.

**ALTERNATIVES:**

- You may choose to hand out the games with little or no previous introduction to IPM. This way, your discussions later can test what students learned about IPM from playing the game.

**TECHNICAL ISSUES:**

- CDs should launch automatically on your computer (this game is playable on both PCs and Macs).

- If the game does not begin automatically after inserting it into the CD drive, the "auto function" feature may be turned off. If this is the case, students will have to manually click the CD drive. To do this, go to "My computer" and click on the CD drive that contains the game disc (an icon for Pest PI should appear in the proper disc drive). This will launch the game.

- If no icon appears on the disc drive where you have inserted the game CD, click on the CD drive and you should see a selection of folders. Choose the *PestGame.html* file and the game should begin from there.

# Evaluation Form for Pest Private Eye Educational Video Game

*Please evaluate the Pest Private Eye game in the following areas. Answer "Yes" or "No" to each question. If "No," please indicate what might be improved to meet the criteria.*

**Game Play** (*Set of problems and challenges users must face to win the game*)

1. Was game play appropriate for the intended audience? (target = 4th - 6th grade)

2. Were key concepts effectively conveyed (obvious) during game play?

3. Was the game reasonably complex?

4. Did the pacing of the game and the varying activities included in it minimize boredom and fatigue during game play?

5. Was there an interesting and absorbing tutorial that introduced game play?

6. Would the game be enjoyable to replay?

7. Did you learn skills early that were required in later game play?

8. Did you discover (recognize, understand and follow) the story as part of game play?

9. Did the game penalize you repeatedly for the same failure?

10. Were your first player actions (movements) obvious and did they result in immediate positive feedback?

11. Were challenges positive, rather than negative? (i.e. you wanted to play more, rather than quitting?)

## Game Story (*Plot and character development*)

1. Did you feel immersed in the atmosphere and setting of the game?

2. Did you feel motivated to reach the game's end objective (solving all pest problems)?

3. Did you feel "connected" to your character?

4. Were the characters realistic and believable?

5. Did you have a sense of control over your character and were you able to use tactics and strategies?

6. Did the game transport you into a level of personal involvement emotionally (e.g., scare, threat, thrill, reward, punishment) and viscerally or instinctively (e.g., sounds of environment)?

7. Were you interested in the characters because (1) they were like me, (2) they were interesting to me, (3) the characters developed as action occurred.

## Game Mechanics (*Programming used to provide structure by which units interact with their environment*)

1. Was the music appropriate for the game setting and did it enhance game play?

2. Did the game speed allow for smooth playability?

3. Were the graphics appropriate for the game setting and did they enhance game play?

4. Did the game react in a consistent, challenging, and exciting way to your actions (e.g., appropriate music with the action)?

5. Were you provided with controls that were basic enough to learn quickly yet expandable for advanced options (such as sound inventory, etc.)?

## Game Usability (*The interface and elements used to interact with the game, such as the mouse, keyboard, etc.*)

1.  Was the game easy to use and was the navigation clear and straightforward?

2.  Did you receive immediate feedback for your actions?

3.  Could you easily turn the game off and on, and were you able to save games in different states?

4.  Did you experience the menu as a part of the game?

5.  When initially turning the game on, did you have enough information to get started in game play?

6.  Were you given context sensitive help while playing so that you did not get stuck or have to rely on the instructions?

7.  Did sounds from the game provide meaningful feedback or did they make you feel a particular emotion?

8.  Did you need to use the instructions to play the game?

9.  Were the menus well-organized and minimalist; in other words were the menu options intuitive?

10. Was the art recognizable, and did it speak to its function?

Any other comments you'd like to share with us?

Adapted from: Desurvire, H., Caplan, M. and Toth, J.A, 2004. "Using Heuristics to Evaluate the Playability of Games," CHI 2004, April 24-29, 2004.

# Other Activities for Pest Private Eye

- A short essay, description, or presentation about pests, pest management, or a specific pest control tool (i.e. snap trap) **(Standards 4.2.1, 4.4.1)**

- Short description from the first person perspective of one of the characters in the game about how he or she would help future "pest detectives" learn about IPM **(Standard 4.7.4)**

- Science Fair projects about IPM or pests **(Standards: 4.1.2, 4.6.1)**

- Website hunt for general resources about IPM or a specific pest and problem that can be solved using IPM that students can research and compile into a complete list to share with classmates. **(Standard 8.2.1)**

# Resources

## Pesticide Education Office Contacts
**Clyde L. Ogg**, Extension Educator
cogg@unl.edu
**Erin Bauer**, Extension Assistant
ebauer2@unl.edu
Pesticide Education Office
Lincoln, NE 68583-0971
Phone: (402) 472-1632 or
(800) 627-7216 FAX: (402) 472-3574

## Websites:

Pest Private Eye online demo game: *http://pestgame.unl.edu*
      Online abbreviated version of the Pest PI game

Pest Private Eye website: *http://schoolipm.unl.edu/pestpi/*
      Includes Pest PI flash movie, survey, and other IPM online links

Pesticide Safety Education Program: *http://pested.unl.edu*
      Variety of pest and pesticide online resources from the UNL Pesticide Education Office

UNL IPM Learning Modules: *http://schoolipm.unl.edu/modules/*
      Flash or PDF format learning modules that teach about a variety of pests (including mice, insects, mold, and weeds) and
      how to manage them through IPM

UNL IPM Powerpoint Presentation: *http://schoolipm.unl.edu/pestpi/*
      Available in flash or PDF format, this presentation can be used to teach an introduction to IPM before conducting IPM or
      Pest PI classroom activities.

UNL IPM in Schools: *http://schoolipm.unl.edu*
      The main school IPM site for UNL-Extension

UNL IPM in Schools How-To Manual: *http://schoolipm.unl.edu/manual/*
      Online manual in PDF format for UNL's IPM in Schools How-To Manual