

SCHOOL IPM FOR TEACHERS



Lesson 1 of 2

Self-Guided Training Module

Learning Objectives

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1. Understanding the importance of removing or eliminating clutter in the classroom.
2. Examples of proper food storage procedures. (i.e., storing food items, including art supplies and pet food, in in sealed plastic containers).
3. Proper sanitation methods for pests in the classroom.
4. Describe students' roles and responsibilities in implementing IPM in the classroom.



Learning Objectives

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5. Understanding the importance of communicating to parents the health and safety issues associated with pests and pesticides.
6. Understanding the importance of annual notification and special notification of parents and students when pesticide applications are scheduled/made.
7. Managing classroom pets.



Teachers and IPM



- Teachers and students share the same environment and are exposed to the same risks.
- Teachers are very important links in a school IPM program.
- Teachers have a chance to influence how future generations manage pests in their homes and places of work.



Everything a teacher learns about school IPM will help them manage pests in their own homes.

Teachers and IPM



Teacher involvement in a school IPM program is important because:

- Teachers have the closest contact with students.
- Teachers have first-hand information on student sensitivities and tendencies.
- Teachers influence students, who influence parents, who change social norms.



Image courtesy of Paul Goodby / FreeDigitalPhotos.net

What is IPM? Science Based Pest Management



A sensible, environmentally friendly, and effective way to solve pest problems.

- Pests are managed by the most cost-effective means and always with the least possible risk to people, property and the environment.



IPM is Not an Additional Item on Your to-do List



- Teachers have one of the most demanding jobs with little spare time.
- IPM does not add to your responsibilities.
- IPM only involves making slight changes in your daily activities at work and home, that will make your life and your teaching environment healthier!
- IPM is not your job alone, it is everyone's job.



Why Pests?



- What do pests need to survive?
 - Food
 - Water
 - Shelter
- No food, no water, no shelter = ?
 - No pests!



Pests feeding on food crumbs and seeking shelter under water container



Pests Pose Risks



- Everyone has trouble with pests at some point!
- Common pests in school classrooms include:
 - Cockroaches
 - Ants
 - Spiders
 - Mice
 - Crawling invaders that enter under external doorways
- Risks caused by pests go beyond their mere presence.

Pests Pose Risks



Allergies and asthma

- Pest allergens can trigger asthma or allergic reactions. Sensitive persons may react to dust mite, cockroach, and/or rodent allergens.
- Cockroach allergens are a leading cause of asthma and allergies in children and youth.



Pests Pose Risks



- Allergens are substances produced by cockroaches and spread in the environment in their feces, molts and body parts.
- Asthma reduces student achievement and results in lost school days and health-care dollars.



Pests Pose Risks



- Cockroaches, filth flies and rodents can contaminate food, which can cause food poisoning and upset stomachs.
- Rats bite more than 45,000 people annually in the US, most are infants, children and the sick.

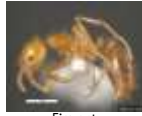


Pests Pose Risks

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Pests can cause student injuries and sadly even some fatalities. Be aware of the following pests:

- Fire ant stings
- Wasp stings
- Bee stings
- Mosquito bites



Fire ant.
Pest and Diseases Image Library,
Australia. Bugwood.org



Fire ant mounds are common near turf edges, where the turf meets the pavement or curb.
Jake Forum, Bugwood.org

Pests Pose Risks

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- Stinging and venomous arthropods commonly occur on school campuses.
- Between 0.5-4.0% of the US population are prone to developing an allergic reaction to bee, ant or wasp stings, and therefore on most campuses there is the potential for a student, staff member or teacher to have a hypersensitivity reaction to a sting.
- Venomous arthropods also include scorpions and spiders.



Paper wasp.
Jerry A. Payne, Bugwood.org

Pests Pose Risks

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- Mosquito vectors can cause flu-like symptoms or more severe symptoms such as brain inflammation, the most common example is West Nile Virus.
- Ticks are the primary cause of Lyme disease.



Pesticides Pose Risks Too



- Pesticides are designed to kill, so pose inherent risks for humans.
- A “pesticide” is any substance or mixture of substances that can prevent, destroy, repel or mitigate a pest.
- They may be harmful to the environment.
- Pesticides should be applied only by authorized individuals, and never by teachers, parents, students or unauthorized school personnel.

Pesticides Pose Risks Too



Many household products are considered pesticides:

- Cockroach sprays and baits
- Mosquito repellents
- Rodent poisons
- Flea and tick products
- Kitchen and bathroom disinfectants/sanitizers
- Mold and mildew eliminators
- Weed killers
- Some swimming pool chemicals



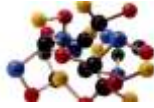
Pesticides Pose Risks Too



- It’s important to recognize that pesticides may pose:
 - Health risks
 - Environmental risks
 - Economic risks
 - Liability risks
- For these reasons school districts may adopt their own restrictions on pesticide use on campus. If your district has an IPM policy, make sure you are familiar with the details.



Pesticides Pose Risks Too



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Health risks:

- Exposure to pesticides can have:
 - Irritant effects: Skin, eye and nose irritation, burning and/or respiratory distress.
 - Acute effects: Fatal or harmful if inhaled, swallowed or contacted on skin.
 - Chronic (delayed effects): Cancer, birth defects, nervous or circulatory system disorders.

Pesticides Pose Risks Too

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- Children play on the floor or ground where they are more likely to be exposed to pesticides.
- Children are more susceptible than adults to environmental toxicants because they are still developing and have frequent hand-to-mouth contact.



Pesticides Pose Risks Too

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Environmental risks:

- Pesticides may negatively affect pollinators (insects that pollinate flowers and crops), beneficial arthropods (insects and spiders that play an important part in reducing pest species), and non-target plants and animals.



Pesticides Pose Risks Too

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- The over-use of pesticides may lead to pests developing resistance to the products. Eventually, the pesticides become useless.
- Some pesticides persist in the environment for years, while some can move through water into rivers and ground water.



Pesticides Pose Risks Too

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Economic risks:

- If pesticide treatment is routine and scheduled to occur every month (not an IPM approach), unnecessary pesticide applications can increase the cost of a management program.
- Emergency repairs/treatments due to lack of preventive maintenance commonly cost more.



Pesticides Pose Risks Too

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Liability risk:

- Improper use, misapplication or excessive use can result in legal action against individuals responsible as well as the school district.



Image courtesy of Balami Cho Joo Young / FreeDigitalPhotos.net

Pesticides Pose Risks Too

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You can reduce risks by practicing IPM!

- IPM reduces pests.
- IPM reduces pesticide use and exposure.
- IPM fits well with your existing activities and tasks.
- IPM gives you opportunities to interact with and influence other school personnel and parents.
- Start IPM in your classroom today!



Practicing IPM in Your Classroom

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Clutter control

- Reduce clutter!
- Clutter provides pests with ample shelter and makes cleaning and monitoring very difficult.
- Ensure that class supplies are stored neatly organized after each class activity, with edible items securely stored in air-tight containers – this not only reduces pests but also makes class activities easier and fun!
- Encourage your students to be good custodians of their classroom environment.

Practicing IPM in Your Classroom

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- Remember, clutter makes it impossible for cleaning professionals to effectively clean the area!
- Clutter can also affect fire safety, allergen reduction and pest prevention.
- Have a regular de-cluttering policy in your classroom.



Practicing IPM in Your Classroom



Proper storage

- Always keep food (candies, cookies) in closed air-tight containers.
- Always keep edible supplies (cereal, pet food, rice, pasta, etc.) used for class activities in sealed containers.
- Avoid storing open personal food or drink items in classrooms.



Practicing IPM in Your Classroom



- See-through storage totes can reduce and prevent ant and cockroach problems.



Practicing IPM in Your Classroom



Sanitation

- Clean up! Make your classroom the best in the school.
- Ensure clean up after class activities, especially those involving pet animals or food.
- Anything with food remains (used plates and cups, wrappings, soda cans, etc.) should be placed in trash cans, bagged and taken to outside dumpsters before the day ends.



Practicing IPM in Your Classroom

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Remember: Cleanliness discourages pests to enter.



No pests = No pesticides

Practicing IPM in Your Classroom

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- Never bring over-the-counter pesticides or homemade remedies to your classroom.



Pesticide aerosol in teacher's desk

Practicing IPM in Your Classroom

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- Never leave supplies or cleaning materials unattended or in open, child-accessible places.



- Always keep these items in locked, child-safe cabinets.

Practicing IPM in Your Classroom



Improperly stored cleaning materials and pesticides in sink cupboard in classroom

Practicing IPM in the Teachers Lounge



- Clean up! The teachers lounge is your place to rest and recover during the day. Keep it clean and welcoming!
- Ensure clean up after eating, drinking or food prep. and encourage your colleagues to do the same.
- Anything with food remains (used plates and cups, wrappings, soda cans, etc.) should be placed in trash cans, bagged and taken to outside dumpsters before the day ends.



Teachers lounge

Practicing IPM in the Teachers Lounge



- Ensure that common food and drink items (coffee, sugar, creamer, cookies, candy) are stored in sealed containers and encourage your colleagues to do the same.
- Have a policy to clear out unused food items from refrigerators and cabinets on a regular basis.
- Clean up promptly and thoroughly after a spill.



Practicing IPM in the Teachers Lounge



- Ensure clean up after use! Make sure there are no food remains left to fester.



Microwave in teacher's lounge

Practicing IPM in the Teachers Lounge



Furniture food: Crumbs collect under couch cushions and in chairs, attracting cockroaches, ants and mice.



Couch in teacher's lounge

Practicing IPM in the Teachers Lounge



- Always keep personal food and drink items in sealed containers.
- Do not bring in home-made remedies for pests or other pest management tools from home.



Mouse traps in teachers desk drawer

Practicing IPM in the Teachers Lounge

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- Never bring or use pesticides in your lounge.
- These products can worsen pest problems by interfering with or reducing the effectiveness of treatments made by pest management personnel.
- Always keep cleaning supplies in locked cabinets **separate** from food cabinets.

Practicing IPM in the Teachers Lounge

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Improper storage of contraband pesticide in a teachers lounge cabinet

Be Aware, Get Involved!

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Ready to step outside your class and teachers lounge?

- Get to know your school IPM coordinator or pest-management personnel.
- Communicate with them, show interest in their work, ask questions, help them to help you.
- Let them know what pests you observe, when and under what situations (e.g. cockroaches were noticed after a new supply of art material in cardboard boxes).
- Follow their recommendations and directions.



Be Aware, Get Involved!



- Observe and make note of pest occurrences and report them to the school IPM coordinator or pest-management personnel.



German cockroach: a pest to be reported



Torn mesh on drain cover must be reported

Be Aware, Get Involved!



- Use pest-sighting logs, an excellent way to record and report.



Be Aware, Get Involved!



Know what to look for and report:

1. Pests
2. Signs of pests
3. Pest entry points
4. Pest conducive conditions - pest opportunities inviting pests for food, water, and harborage



Gap under doorway



Wrappers and decomposing food in athletic locker

Be Aware, Get Involved!



What to look for:

- 1. Clutter in storage areas
- 2. Cardboard boxes
- 3. Open food items
- 4. Warm walls with penetrations
- 5. Unsealed floors and floor to wall junctures
- 6. Undisturbed containers
- 7. Moisture



Be Aware, Get Involved!



- Learn more about IPM from experts.
- Ask questions.
- Consider discussing IPM and its advantages with your colleagues, principal and parents of students at suitable venues such as a PTA meeting or faculty meeting.
- Get involved with your Environmental Health Committee activities.
- Set an example, demonstrate your success with IPM.



Can we use this?

Success Story from Texas



Source: IPM for Texas Schools and Teachers, Texas A&M Agrilife Extension

"I panicked when I saw mouse droppings on the floor.

I knew about IPM from an in-service training, so the IPM Coordinator and I looked for a reason why the mouse might be coming to my room.

I found chips I use as rewards open inside my cabinet. The bag had been chewed through!

Now, I put all of my food and snacks in containers with tight fitting lids. The mouse has not been back!

I was proud to tell the other teachers about my mouse and how I handled it."

Involve Students in IPM



Students role

- Catch them young! Lessons learned at a young age will remain with children for life.
- Emphasize the importance of clutter control, good sanitation and proper storage of food and pest edible items.
- Emphasize that IPM is everyone's job, not the teacher's alone.



Involve students in IPM



- Engage your students in reducing clutter and organizing the classroom.
- If there is too much going on in a class, some students find it difficult to focus.



Involve Students in IPM



- Have students clean up after class activities, so they realize the importance and skills needed to maintain good sanitation.
- Show them the importance of proper storage of food and other items in sealed containers.
- Introduce students to pests commonly found in schools, encourage students to report pests, pest signs or pest conducive conditions.



Involve Students in IPM

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- Ensure that students
 - Do not leave food in lockers, classrooms and common areas.
 - Do not eat or drink in areas not designated for food consumption.
 - Dispose of trash inside trash cans only.



Parents and IPM

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Informing parents

- As a teacher, you connect the school community to parents of students.
- Help them realize their role in keeping their children safe from pests and pesticides.
- Inform them about IPM practices that you implement in your school and how it benefits their children.



Parents and IPM

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- Inform parents how pests can be introduced to the classroom from homes on and in student belongings such as backpacks and clothes.
- Make parents aware of the importance of preventing the spread of pests, especially panic pests such as bed bugs.
- If pests are found hitchhiking in on students, deal with them discreetly to avoid embarrassment to parents and students.



Make sure panic pests are correctly identified. Many parents have not seen bed bugs and may confuse them with other pests.

Parents and IPM

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- Separating student belongings reduces transition risks.



Parents and IPM

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- Inform parents that schools are rarely transition locations for head lice.
- Most children obtain head lice during sleepover parties through shared bedding.
- **There is absolutely no need to send students with head lice home, but be knowledgeable on the subject of head lice and encourage corrective action.**



Adult head louse

Parents and IPM

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- Parents should use IPM practices in their homes to extend the benefits of IPM.
- Parent support can motivate and reinforce your efforts to implement IPM in your classroom.



Parents and IPM

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- Inform parents about the risks associated with pests and pesticides.
- Inform parents that they should not volunteer to provide or use pesticides on the campus.
- Inform parents about the rules for pesticide applications in school, including who can apply them and **notifications to watch out for and follow.**



Notification

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Facility Management staff will ensure:

- All parents and staff to be notified of a pesticide application **at least three business days** prior to any pesticide applications in buildings or on grounds, with the exception of exempt or emergency applications.
- Parents may be notified each time a non-exempt pesticide is applied, or given guidance documents when students are enrolled.

Posting

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- Signs will be posted on facility doors and near the site of planned applications at least three business days in advance of pesticide use, or at the time of application if it's an emergency application



Posting



- Outdoor application areas may be cordoned off and flagged.
- Signs shall remain in place for 72 hours after a pesticide application, or a longer period of time if specified by the pesticide label.



Managing Classroom Pets



- Ensure that pet food and bedding is cleaned and stored properly, so that ants, roaches and mice don't become class pets also.
- Animals are effective and valuable teaching aids, but safeguards are required to reduce the risk of supporting pests.
- **Some animals, bedding or feed may be asthma triggers.**



Teachers Show the Way!



"I want my classroom to be a welcome, safe, and comfortable learning environment, free of pests"
 Alison Stoltman



Check In!



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In this lesson you learned:

1. Importance of clutter control
 2. Proper storage of food and supplies
 3. Proper sanitation methods
 4. Students' roles and responsibilities in IPM
 5. Communicating with parents about pest and pesticide risks
 6. Importance of noting pesticide application notifications
- Congratulations, you have completed the School IPM for Teachers Module – Lesson 1! Next you will learn about using IPM in your curriculum in Lesson 2.**

Resources

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- ▶ National School IPM Information Source: IPM for School Faculty and Staff. <http://schoolipm.ifas.ufl.edu/Florida/Faculty.htm>
- ▶ Texas AgriLife Extension Southwest Technical Resource Center for IPM Schools and Child Care Facilities and Texas Integrated Pest Management Affiliate for Public Schools. IPM for Teachers. http://schoolipm.tamu.edu/files/2010/11/Teacher_IPMSmall.pdf
- ▶ eXtension. (2014). School Integrated Pest Management for Teachers. <http://www.extension.org/pages/21012/school-integrated-pest-management-for-teachers#U9h98rHLUlea>
- ▶ Texas AgriLife Extension. IPM for Texas Schools and Teachers. Online course material.

SCHOOL IPM FOR TEACHERS



Lesson 2 of 2

Self-Guided Training Module

Learning Objectives

2

1. Describe how IPM can be used to meet common core requirements for biology/biodiversity, ecology, evolution, problem solving, teamwork, etc.
2. Describe a lesson plan that incorporates IPM into science-related curriculum.



What is IPM?

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IPM focuses on discovering and fixing the fundamental reasons why pests are a problem. *IPM is a sensible, science based, environment-friendly, and effective way to solve pest problems.*

- IPM involves an **active investigation** and **problem solving process**.
- Ultimately pests are managed by the most **cost-effective** means and always with the **least possible risk** to people, property and the environment.

IPM = Integrated (Intelligent) Pest Management



- IPM does not rely on one single method to control pests but uses a combination of methods that are:
- Location specific
- Dynamic, can be changed to suit the situation
- Low risk
- Cost effective



IPM works indoors and outdoors

IPM = Integrated (Intelligent) Pest Management



- IPM is a **pollution prevention strategy**. Pesticides are used judiciously only when required, and applied in a manner than minimizes non-target exposure and environmental impact.
- IPM is a **pesticide resistance strategy**. Pesticides are used judiciously and rotated so pests are not exposed to heavy selection pressures.
- IPM is a **risk reduction strategy**. The least hazardous approaches are used to reduce pests.

IPM in Your Curriculum



Why should IPM be included in your curriculum?

- IPM is common sense!
- IPM helps students realize the importance of protecting their environment and themselves.
- IPM gives everyone a role to play.
- IPM helps students appreciate all jobs involved in creating a safe and healthy learning environment.
- IPM teaches sharing, teamwork and respect for the Earth.
- IPM is a real world problem solving process.



IPM in Your Curriculum



Does IPM fit common core requirements?

“Building on the best of existing state standards, the Common Core State Standards provide clear and consistent learning goals to help prepare students for college, career, and life. The standards clearly demonstrate what students are expected to learn at each grade level, so that every parent and teacher can understand and support their learning.”

<http://www.corestandards.org/read-the-standards/>

IPM in Your Curriculum



Does IPM fit common core requirements?

- ✓ Yes! IPM can give students exposure to a broad range of subjects and concepts in science, and can be linked to math, language, arts and social studies.



IPM in Your Curriculum



IPM involves

- Biology
- Chemistry
- Math
- Economics
- Psychology
- Ecology



While learning IPM concepts, children gain lessons in all the above subjects and more!

IPM in Your Curriculum

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Key elements of IPM

- Monitoring and inspection
- Proper identification
- Establishing thresholds
- Preventing pests
- Action (least-risk)
- Keeping records
- Education, communication
- Constant evaluation



IPM in Your Curriculum

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Key elements of IPM	➔	Subjects/skills involved
<ul style="list-style-type: none"> <input type="checkbox"/> Monitoring and inspection <input type="checkbox"/> Proper identification <input type="checkbox"/> Establishing thresholds <input type="checkbox"/> Preventing pests <input type="checkbox"/> Action (least-risk) <input type="checkbox"/> Keeping records <input type="checkbox"/> Education, communication <input type="checkbox"/> Constant evaluation 		<ul style="list-style-type: none"> <input type="checkbox"/> Observation and analysis <input type="checkbox"/> Biology, biodiversity, logic <input type="checkbox"/> Math, <input type="checkbox"/> Biology, ecology, engineering <input type="checkbox"/> Science based decision-making <input type="checkbox"/> Documentation <input type="checkbox"/> Writing, speaking, art <input type="checkbox"/> Self-improvement, analysis

IPM in Your Curriculum: Biology

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Pests are **biological entities**, each adapted to thrive under a specific set of conditions.

Discussion point: how do biotic and abiotic conditions affect animals and plants?

Remember:

- What do pests need to survive?
 - ✓ Food
 - ✓ Water
 - ✓ Shelter
- No food, no water, no shelter = ?
 - ✓ No pests!



IPM in Your Curriculum: Biology

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Example 1: A class outline for Grades K-2 students:

- What are the different animals and plants you see at school? (describe the different forms of life in and around your school?)
- Where can you find them? What and how do they eat? What and how do they drink?
- How are they beneficial?
- Can they be harmful?
- Ask students to characterize and draw their own fictitious insects, and class them as beneficial or as pests.



IPM in Your Curriculum: Biology/Biodiversity

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Example 2: A class outline for Grades 6-8 students:

- Place sticky monitoring traps around the school 4 weeks prior to class.
- Have the students explore the school and look at the trap catches making lists of pests you find in different locations (investigate the species).
- Have the students describe the resources available to each pest in the locations they were found.
- Discuss why different pests are found in different locations (life cycle requirements).
- How can this information be used to help manage them?



IPM in Your Curriculum:
Environmental Science/Ecology

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Example 3: A class outline for Grades 9-12 students:

- Analyze your school environment as an ecosystem.
- What kinds of organisms might you find?
- Describe microhabitats on the school campus.
- Why do some organisms outnumber others and when do they become a problem for the school? (talk about action thresholds)
- Describe possible management measures for key pests (define an IPM strategy).



IPM in Your Curriculum: Problem Solving

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Example 4: A class outline for Grades 6-8 students:

- Problem: Set up a fruit fly infestation in a classroom where fruits were brought in for a project and allowed to attract and support fruit flies (fruit flies can be purchased on-line or in many pet supply shops).
- Solution: Students learnt about the life cycle and habitat needs of fruit flies, and why they thrived in the classroom environment.
- Approach: The students sought out and corrected the conditions that allowed the fruit flies to breed in the classroom. Rotting fruits were removed and disposed of properly. Counters and containers were wiped clean.

IPM in Your Curriculum: Problem Solving

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Example 4: A class outline for Grades 6-8 students:

- Approach: All garbage was promptly removed and disposed of regularly. The nearby drains were cleaned with bacterial agents to remove breeding areas.
- Outcome: After four weeks, and no use of pesticides, there are no more fruit flies in the classroom.

Source:

http://www.ipminstitute.org/School_IPM_Week/schoolipmweek_ideas_for_ambassadors.htm#College

IPM in Your Curriculum: Problem Solving/Biology

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Example 5: A class outline for Grades K-2 students :

- Explain about different insect life cycles to students with pictures.
- Provide students with cut-outs or pictures of different life stages of different insects.
- Have them find all life stages of their insect and put them in the correct developmental order.
- Discuss where the insects are found (indoors/outdoors) and what they do.



IPM in Your Curriculum: Teamwork

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Example 6: A class outline for Grades 10-12 students:

- Consider the pest management in your school. Find out which staff or personnel are involved in each aspect (custodial, grounds maintenance, food service, school nurse, teachers, technicians, etc.).
- Divide students into groups and let each group work with a staff or personnel member for a fixed time and find out what they do.
- Let the groups reassemble and share their findings. Discuss how each staff member contributes to pest management in the school environment.

IPM in Your Curriculum: Teamwork

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Example 6: A class outline for Grades 10-12 students:

- Discuss how each member's role in IPM is critically important for a pest-free school.
- Discuss what would happen if any one member did not cooperate or do their job properly.
- Have students work as a team to design their own school IPM plan based on their findings.



IPM in Your Curriculum: Biology/Evolution

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Example 7: A class outline for Grades 6-8 students:

- List different pests found in your school environment (weeds, insects, spiders, scorpions, rodents).
- Where are each of them found? (habitat).
- How do they reproduce (sexual, asexual)?
- How many young ones do each produce? (introduce the concept of r vs. k strategy).
- What are the adaptations that help each of them survive in their habitat? (survival of the fittest).
- Discuss the concept of resistance and evolution.

IPM in Your Curriculum

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- IPM is not an additional item to cover in your curriculum.
- IPM can be used as a real world example of a problem-solving process.
- IPM helps you and your students to combine knowledge from different subjects.
- IPM provides excellent examples to enhance your class time and hands-on science labs.



IPM in Your Curriculum

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- A weed is merely a plant out of place (plant biology).
- A pest is merely any animal that competes with humans for food, water and shelter (animal biology).
- IPM is merely an ecological approach to pest management (requiring an understanding of pest ecology).
- Monitoring for pests can become an in-depth investigation.
- Excluding pests can include discussions on weatherproofing and energy saving buildings.
- Sanitation improvements to avoid attracting pests can be appreciated if students have watched ants trailing to food substances placed on index cards (outside the classroom).
- Clutter control can be appreciated understanding how mice nest.

IPM in your curriculum

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- IPM can be a valuable classroom topic because it can address several current global issues
- Pesticide pollution
 - Invasive species and biodiversity
 - Environmental safety and health tradeoffs
 - Food security
 - Role of government in environmental decision-making
 - Genetic engineering as a pest management tool
 - Human and animal infectious diseases
 - Quarantine
 - Pesticide resistance problems
 - and many more...

A Lesson Plan with IPM



25 **Title: Human environmental impacts**

- Grade level: 8 – 10
- Lesson length: Two 50 minute classes
- Activities: Lecture, discussion, student poster presentations

Basic purpose of this lesson:

- Develop student interest in global issues
- Develop student ability to gather, interpret, evaluate and use information to explain phenomena in the natural world and predict future outcomes that result from human interventions
- Develop student ability to read, write, discuss and present coherent ideas about science

A Lesson Plan with IPM

26 **Learning objectives:**

- Understand the different ways human activities influence the environment (deforestation, agriculture, industrialization, urbanization, advances in medicine, increasing population, etc.).
- Understand problems due to human interventions (environmental pollution), and a source of this pollution (pesticides).
- Understand reasons for increased pesticide use (to produce food for growing populations).
- Understand the benefits of reduced pesticide use, alternate methods of pest management and IPM.

A Lesson Plan with IPM

**Materials:**

- Computers with internet access
- Library research materials (journals/magazines)
- Poster paper and boards
- Stationery (scissors, markers, glue, etc.)

Preparation:

- Students must have covered different dimensions of the environment prior to this class. They should know about basic plant and animal biology and ecology. Before this class, the teacher will ask students to read up about human environmental impacts, agriculture, how pests affect crop production, and how they can be controlled.

A Lesson Plan with IPM

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Activity:

1. The teacher will begin with a leading question about human activities influencing the environment.
2. Students will provide answers based on what they know or have read.
3. The teacher will then discuss problems due to human activities, with emphasis on environmental pollution and specifically, pesticides.



A Lesson Plan with IPM

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Activity:

4. The teacher will explain why excessive use of pesticides occurred in earlier days, and how it affected the environment (Silent Spring).
5. The teacher will briefly cover alternate methods of pest management and the benefits of reducing dependence on pesticides.



A Lesson Plan with IPM

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Activity:

6. Students will form groups of 3-5.
7. Each group will be assigned to research a pest management problem and determine the advantages and disadvantages of the available control methods.
8. They will have one week to produce a poster with their findings.
9. The teacher will provide help with resources.



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A Lesson Plan with IPM

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Activity:

- 10. During the next class period, each group will present their poster to their classmates.
- 11. Peers will ask questions and provide feedback.
- 12. The teacher will point out that while IPM itself is a "human intervention" it relies on natural processes to work and IPM has less of an impact on the environment.



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Safety:

- There are no safety issues for this class.

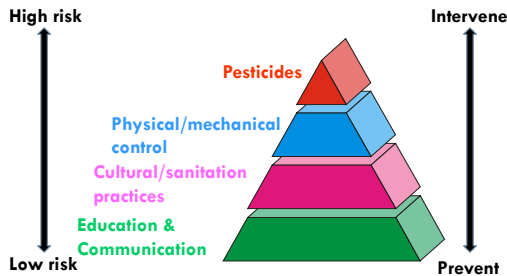
Concept discovery:

- Students will be introduced to **the concept of IPM**. They will receive a handout with the IPM pyramid (next slide), explaining different steps involved.

Independent activity:

- The teacher will pose a question: Where in our everyday environments, do you think we can apply IPM, use non-ag examples? Students will write 5 paragraphs on their ideas as a homework assignment.

IPM pyramid



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Conclusion/wrapping up:

- The teacher will conclude the class with a short PowerPoint presentation/story with pictures/video demonstrating the benefits of IPM.
- Students can ask questions about the concepts learnt.

Assessment/grading:

- Students will be assigned grades on their posters based on content, teamwork and involvement in the project.



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Connections to other subjects:

- **Social studies:** Students connect harmful and beneficial human interventions in the environment with economic development (economics), history of crop production (history) and movement of pests between geographic regions (geography), impact of pathogen vectors on human history (malaria).
- **Math:** Students who are interested can calculate pest population explosions and cost benefits of management methods.
- **Language arts:** In researching and presenting their findings about pest management methods, students refine their language skills and artistic talents.

Check In!

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In this lesson you learned:

1. Utilizing IPM concepts to meet common core requirements.
2. IPM in common core requirements for biology, biodiversity, ecology, evolution, problem solving, teamwork, etc.
3. Developing a sample lesson plan that incorporates IPM into science-related curricula.

Congratulations, you have completed the School IPM for Teachers Module – Lesson 2!

Resources

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- National School IPM Information Source: IPM for School Faculty and Staff.
<http://schoolipm.fas.ufl.edu/Florida/faculty.htm>
- IPM Institute of North America. Ideas for classroom activities.
http://www.ipminstitute.org/School_IPM_Week/schoolipmweek_ideas_for_ambassadors.htm#College
- Texas A&M University. Insects in the classroom: Bugs as teaching tools for all ages. Lesson plans.
http://itrc.tamu.edu/1998and2000/lesson_plans.html
- eXtension. (2014). School Integrated Pest Management for Teachers.
<http://www.extension.org/page/21012/school-integrated-pest-management-for-teachers#19h98iHlNap>
- PennState Extension. IPM for Teachers Curriculum.
<http://extension.psu.edu/pesty/ipm/schools/educators/curriculum/contents/when-to-pest>
