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PEST CONTROL IN THE SCHOOL ENVIRONMENT

IMPLEMENTING INTEGRATED PEST MANAGEMENT (IPM)



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ACKNOWLEDGEMENTS

This is an update of “Pest Control in the School Environment: Adopting Integrated Pest Management,” originally published by the U.S. Environmental Protection Agency (EPA) in 1993. This edition incorporates additional concepts of integrated pest management (IPM) in schools, and addresses the roles of additional stakeholders within the school community in implementing a successful IPM program.

EPA would like to thank the individuals who contributed to the 1993 edition of this document. In addition, we appreciate the general thoughts and input from the school IPM community that helped us shape this updated publication.



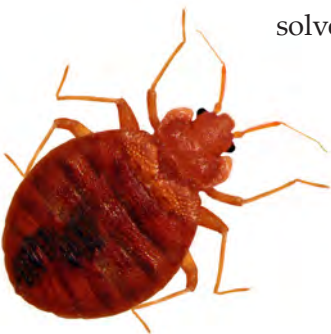
PROTECTING CHILDREN IN SCHOOLS FROM THE HEALTH RISKS ASSOCIATED WITH PESTS AND PESTICIDES

INTEGRATED PEST MANAGEMENT AND YOUR SCHOOL

Improperly managed pest problems and improper pesticide use can lead to health risks for children, given the significant time they spend in and around schools. Many schools have environmental conditions conducive to pest infestations. Reducing unnecessary exposures to pests and pesticides improves health and attendance, and leads to greater academic achievement. Healthier school environments enable children to learn and produce more in the classroom, which ultimately leads to a more productive, higher quality life.

Children face increased risks to their health when exposed to pests and over-use of pesticides. They may consume or come into contact with food and objects contaminated with diseases associated with rodent feces and urine; contract diseases spread by biting insects; suffer asthma when exposed to cockroach and rodent allergens; or be exposed to pesticides used improperly or unnecessarily. Children are more likely to experience adverse health effects than adults when exposed to these risks due to their small body size in relation to the amount of contaminant or pathogen. Not only are their brains and other organs still developing and more vulnerable, children's hand-to-mouth and ground contact behaviors increase the likelihood that they will come into contact with pests, pathogens, and pesticides.

Protecting the health of children is a top priority for EPA, and we recommend that all school districts consider implementing programs that promote integrated pest management (IPM). IPM encourages long-term, sustainable approaches to successfully manage pests. By developing a coordinated program, school leaders demonstrate their commitment to a healthy environment where students can thrive. IPM addresses not only the safety concerns of pesticide use, but also focuses on solution-based approaches that solve the reasons why pests are in schools.



EPA has prepared this booklet to introduce and acquaint readers with effective IPM. It presents recommendations for best management practices for IPM in schools. Throughout the nation, schools that have adopted IPM report long term, sustainable pest mitigation that both reduces the use of pesticides and is cost effective.

This booklet contains informative guidance only and **does not supersede federal, state, tribal or local requirements, where those requirements are more specific or stringent.** Please confer with your federal, regional, state, tribal, and/or local regulatory authorities for current requirements in your area.

The IPM principles discussed here can be applied to any urban pest management program and are not applicable just to school environments.

To find out more about sustainable approaches that lead to successful integrated pest management in schools, visit our website:

www.epa.gov/managing-pests-schools.

Children face increased risks to their health when exposed to pests and pesticides.



WHAT IS INTEGRATED PEST MANAGEMENT?



IPM is a smart, sensible, and sustainable approach to managing pests. It's smart because IPM creates a safer and healthier learning environment by reducing children's exposure to both pests and pesticides. It's sensible since practical strategies are used to reduce the sources of food, water and shelter pests need to infest school buildings and grounds. Finally, it's sustainable, as IPM emphasizes prevention rather than control, making it more cost-effective for long-term pest mitigation.

Simply put, IPM addresses the reasons why we have pests. Pests need food, water and shelter, and the goal of IPM is to deny them these necessities. IPM does this by instituting a combination of common sense practices that prevent pests from infesting school buildings and grounds by both limiting access and reducing their attractiveness. IPM targets pests when they are most vulnerable by combining a knowledge of the pest's biology with sound and proven pest management practices.

IPM is proactive rather than reactive, eliminating the need for routine and repetitive use of pesticides by focusing on a sequential decision making process. The IPM process includes:

- Developing pest management goals and objectives;
- Actively monitoring for pests and pest conducive conditions;
- Identifying the pest and knowing its biology;
- Selecting and implementing multiple, sustainable pest management strategies that emphasize improved sanitation, facility maintenance, pest exclusion, habitat modification, human activity modification, and the development and execution of preplanned approaches to deal with pest situations; and
- Recording and continually evaluating results to determine if objectives are being met.

Note that IPM does not exclude the use of pesticides, but rather encourages the use of multiple mitigation approaches—and when deemed necessary, the application of pesticides that pose the least risk to people and the environment. Since children are at the greatest risk from exposure to pesticides, EPA recommends a careful and judicious approach to the use of pesticides in schools.

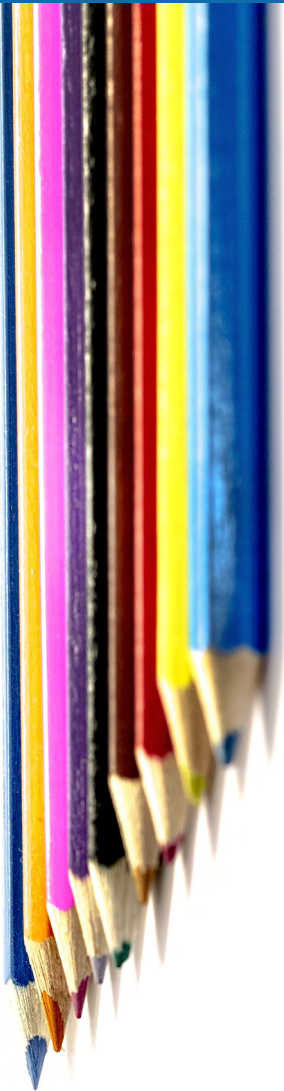
As stated previously, the best way to manage pests is to create an inhospitable environment by denying them access to food, water and shelter. This can be accomplished by removing the basic elements pests need to survive and/or by simply blocking pests' access to those things. Repairing water leaks, sealing around pipe and electrical entries into buildings, closing doors, cleaning food service areas daily, trimming trees that touch buildings, installing lids on waste receptacles, moving dumpsters away from buildings, removing excess equipment and clutter, selecting pest resistant construction materials, and other simple approaches limit a pest's ability to establish a foothold in and around schools. Not only do these methods control pests, they also add to the aesthetics of the human environment, conserve energy, and improve air quality. When pests are found through active monitoring, IPM encourages low-risk control methods that include manual, mechanical, and cultural tactics in addition to the judicious use of pesticides.

It is important to reiterate that IPM is not a single pest control approach, but rather a strategy of combined approaches that synergize to limit a pest's ability to survive and thrive.

The best way to manage pests is to create an inhospitable environment by denying them access to food, water and shelter.



ESTABLISHING A PESTICIDE SAFETY AND IPM PROGRAM IN YOUR SCHOOL



The great thing about an effective and efficient IPM program in your school is that it can be integrated into your other school activities, programs, and processes. This program can easily be incorporated into any existing environmental and coordinated health program with committee oversight and reporting requirements. The term “integrated” in integrated pest management also means that the strategies of a successful program are integrated into the daily routines of various school management activities, including custodial services, facilities management, cafeteria services, grounds and landscaping, safety and risk management, and new construction. To ensure everyone contributes to program success, they should be empowered with knowledge of its components and how their individual activities impact the program.

The following six steps are essential pillars that support IPM in schools:

STEP 1:

Develop an official IPM policy statement and a supporting plan that expresses commitment by the school leadership to provide a safe, clean and healthy environment for students and staff by implementing reduced-risk methods to limit pest problems and complaints. It is a commitment to eliminate the calendar-based application of pesticides and focus on preventing pest infestations by making school facilities and grounds unattractive to pests through improved sanitation and pest exclusion. This is an important first step in making the transition from a reactive program to a more sustainable and integrated approach to mitigating pests through best management practices. For further details, visit EPA’s webpage on Tools and Resources to Support IPM Implementation: www.epa.gov/managing-pests-schools.

STEP 2:

Designate pest management roles for everyone including students, teachers, and other school staff and leaders; ensure effective communication among them; and educate each group on its respective roles and how they contribute to program success.

STEP 3:

Set pest management objectives for specific activities and locations in the school. Each activity and type of location (classroom, cafeteria, sports field, etc.) will have differing pest management challenges and therefore differing pest management objectives. The types of pests and ways to manage them in each location should be outlined in the IPM plan.

STEP 4:

Inspect site(s) to identify and estimate the extent of pest problems. Actively monitor vulnerable areas for pests and pest conducive conditions. Document and report pest activity and any contributing conditions.

STEP 5:

Implement pest prevention strategies as part of daily activities and business practices. These include considering pests when redesigning and repairing structures, improving sanitation and waste management practices, employing landscape designs that deter pests, selecting pest-resistant plant varieties, altering watering and mowing practices, posting pest logs for staff to report problems, and judicious use of pesticides by designated and certified personnel.

STEP 6:

Keep records of pest management and associated activities. Evaluate results, activities, and processes to determine if pest management goals and objectives are being met.



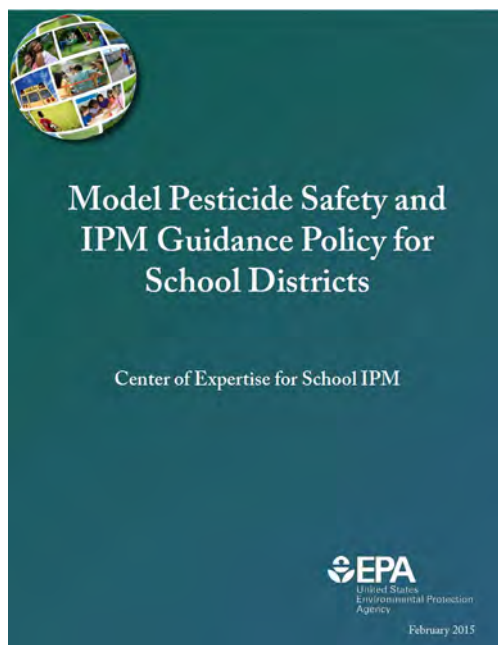


STEP 1: DEVELOP AN OFFICIAL IPM POLICY STATEMENT AND PLAN

The IPM policy and plan details the school leadership’s commitment to IPM, provides guidelines to be followed, and includes information about monitoring, inspections, pest thresholds, who can apply pesticides, how pest problems should be reported, who should be educated about the program, and how parents/guardians and staff should be notified prior to a pesticide application. A copy of the IPM policy should be sent home to all students and parents at the beginning of each school year. It should also be visibly posted in a common area, such as in the main office, and on the school website. EPA recommends that all school districts consider implementing a policy addressing the safest possible use of pesticides and the implementation of a coordinated IPM program as part of a long-term and sustainable approach to mitigating pests and their impacts on children’s health. By publishing a policy, the district leadership establishes a commitment to promoting a healthy student environment.

This model IPM policy addresses not only safety concerns when using pesticides, but also focuses on solution-based approaches to pest problems in our schools. This is a proactive rather than reactive approach. As a result, it provides the school district and its individual campuses a sustainable and long-term pest management alternative to conventional calendar-based, pesticide-only approaches.

A model IPM policy can be found at: www.epa.gov/managing-pests-schools.



STEP 2: DESIGNATE PEST MANAGEMENT ROLES FOR EVERYONE

Everyone has a role in managing pests, as everyone who frequents a building contributes to the conditions that attract and sustain pests. By working together as a team, students, employees and parents can create a healthy, pest-free environment in and around schools. The more team members “buy in” to their individual roles, the better the pest management system will work. The functions and responsibilities for various groups are identified below and should be outlined in the school’s IPM plan.

Oversight and Management – School leaders (superintendent, principal, facilities manager, etc.) may consider making an open commitment to IPM, stating their intended approach to managing the IPM program in and around the schools they represent. School leaders could then make resources available to the program based on their stated goals and objectives for pest management. To ensure effective oversight and management of the program, school leaders could rely on support from the three entities below:

- 1) IPM and/or Safety Committee:** Consider establishing a committee to advise the district’s leadership on enacting this policy and the risks, costs, and issues of various pest management approaches. These duties can be assigned to an existing committee, such as the school’s Environmental Health and Safety Committee. Pest management activities and their impact on student/staff health and safety cut across multiple school programs and functions. Membership examples include, but are not limited to: school nurse (environmental health, pest associated disease risks, asthma, pesticide poisonings), facilities management (pest control, structural integrity, grounds management), custodial services (sanitation and waste management), food service (sanitation and food protection), administration (policies, funding, resources, community relations), teaching staff (classroom clutter removal and student education), coaching staff (sports safety), parents (health and safety of students), pest management professionals (contracted services), and the community at large (impact of campus activities on the broader community).
- 2) IPM Coordinator:** Consider appointing a district-wide IPM coordinator to provide direct oversight of the day-to-day activities of the program. The IPM coordinator should be trained in the principles of IPM, pesticide safety, pest control contract oversight, record keeping, and pesticide regulations. EPA recommends a minimum of six (6) to eight (8) contact hours of training annually for the IPM coordinator from state, extension, or other agencies. The IPM coordinator is also the key advisor to the committee charged with program oversight and serves as the primary educator to the district and school staff on their responsibilities to the district policy and supporting program.

By working together as a team, students, employees and parents can create a healthy, pest-free environment in and around schools.





3) School Nurses: The school nurse is a key member of any effort that focuses on reducing health risks the school environment can pose to students. School nurses are the school's environmental health experts. They assess environmental health risks in and around schools, and make recommendations based on those assessments. They also contribute to the school's action plans for reduction of health-impacting pests and are keenly aware of the asthma incidences that may be affecting students in their learning environment. In addition, school nurses continually collaborate with students, staff, parents, and the community to keep students safe and promote healthy habits conducive to learning. As part of their critical role, school nurses may be engaged in any health risk communication, health risk assessment regarding pest issues, and the use of pesticides in and around schools. They accomplish this through participation on committees and advisory boards for the development of school policies and plans associated with pesticide safety and pest mitigation.


Staff, Students, and the Public – People are understandably concerned about the health of their school environment, and about any possible adverse effects pests and pesticides may have on human health as well as the effectiveness of pest control methods. Providing school staff, students, and their parents with information addressing these concerns and explaining each group's role in the school's IPM program can enhance the effectiveness of the program.

Everyone has a responsibility to identify and report pest problems and conditions that lead to pest infestations. Pest sighting logs can be placed near pest vulnerable and community use areas throughout the school for students, staff, and others to report pest sightings and conducive conditions.

Certified pesticide applicators and IPM coordinators have extensive and direct responsibilities related to pest management, but everyone can have positive or negative impacts on pest management in their daily activities and duties. Custodial and food service staff have a responsibility to remedy sanitation and solid waste management practices that attract and feed pests. Facilities management personnel have a responsibility to seal the building to prevent pests from entering, identify and repair water leaks immediately, close access ways properly after repairs, remove equipment and construction debris, and report pest conducive conditions and pest sightings in non-public areas (boiler rooms, crawl spaces, gangways, etc.). Teachers and administrative staff have a responsibility to reduce clutter from storage areas, improve classroom/office sanitation, and store food only in designated areas. Consider informing students and the general public about the district's program, and how they contribute to its success through individual sanitation, clutter management, and timely reporting of problems.

Parents' Special Roles – As the best advocates for their children's health, parents are key partners for a successful transition to an effective IPM program. This includes learning about the principles of IPM, and implementing them at home so that pests are not carried to school in backpacks, notebooks, lunch boxes, or clothing. Parents may also be informed of current pest management practices in their children's schools. School leaders should welcome questions from parents and encourage them to seek information on the school's program. Parents are encouraged to express their views and concerns to the school district superintendent, school board, principal, school management, and the school's Parent Teacher Associations (PTAs). Parents also have a role with school oversight committees that impact pesticide safety and IPM priorities and objectives.

Education and Training – A school's IPM program should include a commitment to education, offered to educators, school nurses, cafeteria employees, custodians, maintenance workers, grounds and landscape staff, administrative personnel, students, and parents. Everyone at the school can be given the opportunity to learn about the basic concepts of IPM and how these principles are being applied. It is very helpful for staff and students to understand how their own behavior can help to alleviate or contribute to pest problems. Specific instructions can be provided on what to do and what to avoid to manage pests. For example, staff should not bring pesticides from home to use in and around schools. All pesticide products, including those purchased at a retail store, should be applied only by designated and certified personnel.



Everyone has an opportunity to identify and report pest problems and conditions that lead to pest infestations.

Pest sighting logs can be placed near pest vulnerable and community use areas throughout the school.

STEP 3: SET PEST MANAGEMENT OBJECTIVES BY SITE AND ACTIVITY

Pest management objectives differ from site to site. For example, the objective for an athletic field would be to maintain a healthy turf, as well as a specific type of playing surface that reduces the risk of sports injuries. For ornamental plants, the objective would be to maintain an aesthetic environment that is conducive to learning. For buildings and other structures, the objective might be mitigating damage caused by termites and other wood-destroying organisms. Cafeteria objectives include producing and serving healthy and nutritious foods that are free of pests, disease, and unnecessary pesticide residues. School leaders should outline their specific objectives for each site in the school's IPM plan. Pest management objectives serve as a compass during the decision-making process for deciding on a course of action for a particular pest and form a benchmark to evaluate program success.

Examples of pest management objectives include:

- Manage pests that interfere with the learning environment of the students.
- Eliminate injury to students, staff, and other occupants.
- Preserve the integrity of the school's buildings or structures.
- Provide safe playground and athletic surfaces.



STEP 4: INSPECT, MONITOR AND IDENTIFY

An IPM program consists of a cycle of inspecting, identifying, monitoring, evaluating, and selecting an appropriate method of control. Routine inspection and accurate identification of pests are vital steps in IPM to ensure that control methods will be effective. Once the pest has been identified and the source of its activity pinpointed, habitat modifications may greatly reduce the pest's prevalence. The most common and effective habitat modifications are exclusion, repair, and sanitation. Monitoring includes inspecting vulnerable areas for pest evidence—such as entry points, food, water, and places where pests live—along with estimating pest population levels.

Without knowing what pest you are dealing with and how it lives, you will not know where to look for its activity. If you do not know if you have pests, how are you to determine if there is a problem? Do you want to prevent them, manage them at an acceptable level, or eradicate them? Once you have established processes to address the pests, how will you determine if they were successful? What worked and what did not? What strategies can you repeat, and which were not worth your time or money? The components of IPM assist in determining the answers to these questions.

MONITORING FOR RODENTS

Successful rodent control programs involve monitoring or inspecting for common signs of rodent infestations. Monitoring and inspecting not only allow for identification of the rodents present, but provide insight to the extent and severity of the infestation. Monitoring and inspecting also offer an opportunity to identify rodent-conducive conditions before an infestation occurs. Inspectors should monitor for rodent droppings, gnaw damage, burrows, runways, tracks, grease or rub marks, urine stains, sightings of live or dead rodents, rodent sounds, and rodent odors. Regardless of rodent evidence, inspectors should record conducive conditions that allow easy access to food, buildings and structures.

The presence of a pest does not, in itself, necessarily require immediate or resource intensive action. A single ant in the classroom should not trigger anything other than diligent sanitation. On the other hand, the signs or sighting of an individual rodent in the cafeteria, termites infesting facility structures, or stinging insects near playground equipment often require immediate action by pest management professionals that may include the use of pesticides.



Pest prevention strategies can be incorporated into both new construction design and preexisting structures.

STEP 5: IMPLEMENT PEST PREVENTION STRATEGIES

Prevention strategies may include sanitation and clutter management, redesigning and repairing structures, and establishing watering and mowing practices for lawns and sports fields. Pest prevention strategies can be incorporated into both new construction design and preexisting structures. Such preventive measures reduce the need for routine pesticide applications. IPM strategies for specific school sites are provided below.

IPM Strategies for Indoor Sites

Typical Pests: Mice, rats, cockroaches, ants, filth flies, wasps, hornets, yellow jackets, spiders, termites, carpenter ants, and other wood-destroying insects.

Entryways: Gaps around doorways and windows, open windows and doors, holes and cracks in exterior walls and floors, openings around pipes and electrical chases, or HVAC ducts:

- Keep doors and windows shut when not in use.
- Place weather stripping, door and bottom sweeps on exterior doors.
- Seal gaps around windows and place weather stripping where missing.
- Seal openings in walls and floors with pest resistant and structurally sound materials.
- Install or repair screens in doors, windows, and other exterior openings.
- Install air curtains above exterior doors near cafeterias and food storage areas.
- Keep vegetation, shrubs, and wood mulch at 12 inches or more away from structures.
- Trim tree branches to at least 6 feet or more from building exteriors and roof lines.
- Mount security lighting away from the building so that it shines on the building but attracts pests away from it.



Classrooms and Offices: Classrooms, laboratories, administrative offices, auditoriums, gymnasiums, and hallways:

- Allow food and beverages only in designated areas. Ensure areas are cleaned and waste removed immediately after meal periods.
- If indoor plants are desired, keep them healthy, do not overwater or keep plants in standing water. When small insect infestations appear, remove the plant from the facility until infestation is mitigated.
- Keep areas dry by removing standing water and water damaged or wet materials.
- If class pets are allowed, store animal food in tightly sealed containers and regularly clean habitats.
- Dust and vacuum regularly and remove clutter and debris.
- Routinely clean lockers, desks, cabinets, and storage closets.
- Have students with apparent public health pest infestations (head lice, scabies, bed bugs, etc.) report to the school nurse for evaluation and consultation. Discourage sharing, commingling, and storage of student coats, jackets, caps and other personal items.

*Allow
food and
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Sanitation is the first and most important step in controlling pests.

Food Preparation and Serving Areas: Cafeteria dining room, main kitchen, teachers' lounge, home economics kitchen, snack areas, vending machines, and food storage rooms/pantry:

- Sanitation is the first and most important step in controlling pests. Enforce stringent sanitation standards to reduce the availability of food and water for pests—remove food debris, sweep up all crumbs, fix dripping faucets and leaks, and dry out wet areas. Promptly clean food preparation equipment after use, and routinely remove grease accumulation from vents, ovens, and stoves.
- Store food in tightly sealed containers that are inaccessible to pests. Containers must have tight lids and be made of plastic, glass, or metal. Foods prepared for service and left-overs should be covered and stored in appropriate refrigeration/warming containers.
- Place all waste in plastic bag lined trash cans. Remove waste and place in dumpsters between services. Trash cans that are expected to hold waste for a significant portion of the day should be covered with lids. All trash cans should have all waste removed at the end of each day.
- Remove bulk products from cardboard boxes, and place cardboard in appropriate waste receptacles outside. Never store excess cardboard indoors.
- Place screens on vents, windows, and floor drains to prevent cockroaches and other pests from using unscreened ducts or vents as pathways. Floor drains should be cleaned weekly to remove grease and accumulated food waste.
- Install air curtains above exterior doors near cafeterias and food storage areas.
- Rodents are common problem for food service areas, but rodenticides pose a significant cross-contamination health risk to food. In food service and storage areas, capture rodents using mechanical or glue traps. *(Note: Place traps in areas inaccessible to children. Mechanical traps, including glue boards, used in rodent control must be checked daily. Dispose of killed or trapped rodents within 24 hours.)*



Areas with Plumbing: Bathrooms, rooms with sinks, locker rooms, dishwashing rooms, home economics classrooms, science laboratories, swimming pools, greenhouses, and maintenance areas:

- Promptly repair leaks and correct other plumbing problems to deny pests access to water. Even small leaks can support significant pest infestations.
- Routinely clean floor drains, strainers, and grates.
- Seal pipe chases.
- Keep areas dry. Avoid conditions that allow formation of condensation.
- Increase ventilation in humid rooms. Areas that never dry out are conducive to pest infestations and promote mold and fungi growth.
- Store paper products or cardboard boxes away from moist areas and direct contact with the floor or walls. Remove bulk products from cardboard boxes and place excess cardboard in appropriate waste receptacles outside.

Maintenance Areas: Boiler room, mechanical room, custodial-janitorial areas, IT server and communications rooms, and pipe chases:

- Keep all areas free of clutter. Remove excess equipment, construction materials, and waste promptly.
- In rooms with service sinks, promptly clean mops and mop buckets after each use; dry mop buckets and hang mops vertically on racks above floor drains.
- Install ventilation to reduce humidity and promote drying of items that frequently become wet.
- Install screens on ventilation to limit pest entry.
- Store and consume food in designated areas only.
- Place secure lids on trash cans and install plastic liners. Clean trash cans regularly.

Areas that never dry out are conducive to pest infestations and promote mold and fungi growth.





IPM Strategies for Outdoor Sites

Typical Pests: Structural and public health pests such as filth flies, stinging insects, mice, rats, birds, and wild animals. Turf pests include weeds, insects such as beetle grubs or sod webworms, diseases such as brown patch, and vertebrates such as moles. Ornamental plant pests include a variety of diseases and insects such as thrips, aphids, Japanese beetles, and bag worms.

Recycling, Solid Waste, and Raw Waste Collection Areas:

- Dumpsters, cooking oil waste containers, and raw waste receptacles can be appropriately designed for intended use and made of durable, pest-resistant materials.
- Dumpsters can be equipped with serviceable, self-closing lids. Cooking oil and raw waste receptacles should be equipped with access lids that can be completely resealed.
- Recycling containers should be exclusively dedicated for such use, and be designed to protect contents from the weather and pest infestation.
- All waste containers should be cleaned on a regular and scheduled basis. Both interior and exterior of dumpsters should be pressure washed with appropriate cleaners to remove spillage and accumulated waste.
- All bulk waste receptacles should be placed 50 feet or more from building exteriors.
- All waste receptacles should be placed on cleanable, hard surface pads. Pads should be cleaned on a routine basis to remove spillage and accumulated waste.
- All waste receptacles should be serviced at a frequency that does not allow contents to overflow or be placed on the ground. Outdoor trash cans should be serviced daily, with no waste allowed to stay overnight.



Playgrounds, Parking Lots, Athletic Fields, and Common Areas:

- Limit standing water by designing grounds, athletic fields, play areas, and parking lots to adequately drain water away from school buildings and property.
- Place appropriately designed trash cans/waste receptacles in high-traffic areas to limit garbage from being discarded onto the ground. Service receptacles daily as discussed above.
- Select materials, plantings, and equipment that are pest resistant.

Turf: Lawns, Athletic Fields, and Playgrounds:

- Maintain healthy turf by selecting a mixture of turf types (certified seed, sod, or plugs) best suited for the area. Check university cooperative extension services for recommended turf varieties, management practices, and other pertinent information.
- Frequently sharpen mower blades to limit turf damage during mowing.
- Vary mowing patterns to help reduce soil compaction. Top dress and mechanically aerate soils annually to reduce compaction and stimulate root systems.
- Water turf infrequently but sufficiently during early morning hours to let turf dry out before nightfall; let soil dry slightly between watering cycles.
- Improve drainage to limit standing water.
- Allow grass clippings to remain in the turf (use a mulching mower or mow often) or compost with other organic material.
- Manage thatch levels (periodically dethatch) to promote root stimulation and improve soil aeration.
- Have the soil tested to determine pH and fertilizer requirements. Time fertilizer applications appropriately and adjust pH with lime or other additives.
- Depending on location and turf variety, over-seed, as needed, in fall and early spring.

*Water turf
infrequently
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let turf dry
out before
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*Actively
monitor
plant health
and pest
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Ornamental Plants, Trees, and Shrubs:

- Select pest-resistant varieties best suited for your area. Consult with university cooperative extension specialists for recommendations.
- Keep vegetation, shrubs, and wood mulch 12 inches or more away from structures.
- Trim tree branches to at least 6 feet or more from building exteriors and roof lines.
- Apply fertilizer and nutrients to annual and perennial flowers during active growth and to shrubs and trees during their dormant season or early in the growing season.
- Water properly based on plant variety needs. Plant varieties should be consistent with your local climate and natural precipitation patterns.
- Prune branches to improve woody plant health.
- Reduce soil compaction and aerate soil surrounding plants with mechanical tillers or hand tools.
- Actively monitor plant health and pest infestations.
- Remove diseased or susceptible plants if a disease recurs and/or requires too many resources to address.



Applying Pesticides

IPM programs take advantage of all appropriate pest management strategies, including the judicious use of pesticides. Pests that pose significant risk to human health and safety, structural integrity, or economic loss should be controlled immediately. This often requires the use of pesticides to quickly but temporarily knock down pest populations. Since children are at the greatest risk for pesticide exposure, EPA recommends a managed approach where pesticides are only used when and where pests are present or expected to be present as determined by monitoring. The use of pesticides should be approved by the IPM coordinator and only applied by state or tribally certified pesticide applicators that are knowledgeable in IPM. Students and staff should be notified 24-48 hours in advance of all pesticide applications, except in emergencies. Treated areas should be marked with highly visible signs, and pesticides should not be applied when people are present or expected to be present per the pesticide's labeled re-entry requirements or for at least eight hours after application, whichever is greater.



The following general recommendations should minimize exposure to people and other non-target species when applying pesticides:

- Read and follow all label instructions. The label is the law.
- Choose a pesticide that is labeled for the specific site and pest you are trying to control.
- Use a spot-treatment method of application to treat only the infested areas.
- Limit the use of liquid sprays, foggers, or volatile formulations. Instead, use bait formulations and crack and crevice treatments when possible. These maximize pesticide exposure to the pest while minimizing human exposure.
- Place all rodenticides into tamper-resistant bait boxes in locations not accessible to students.
- Apply pesticides only when occupants are not present or in areas where they will not be exposed to the material applied. Note any re-entry time limits listed on the pesticide label, and be aware that some residues can remain long after application.
- Use proper protective clothing and equipment when applying pesticides.
- Properly ventilate areas after pesticide application.
- Notify students, staff, and interested parents of pending pesticide applications. Pay special attention to individuals with increased vulnerability to pest and pesticide exposure (asthma, etc.).
- Keep copies of pesticide labels, consumer information sheets, and Safety Data Sheets (SDS) in easily accessible locations (IPM coordinator's office, nurse's office, facilities manager's office, etc.).

Store all pesticides in their original containers, and secure lids tightly.

Storing Pesticides: Store pesticides offsite or in buildings that are locked and inaccessible to unauthorized personnel. Be sure adequate ventilation is provided to the pesticide storage area. Segregate and store herbicides, insecticides, rodenticides and baits separately to avoid chemical reactivity and to limit pest avoidance of baits that absorb chemical smells. Avoid storing pesticides in places where flooding is possible or in open places where they might spill or leak into the environment. Store flammable liquids away from an ignition source. Check for state recommendations and requirements for pesticide storage.

If pesticides are stored in occupied buildings, take special care to ensure that the air in the occupied spaces does not get contaminated. Place a notice outside the designated storage area. Store all pesticides in their original containers, and secure lids tightly. Make sure that childproof caps are properly fastened. Store pesticides only in spaces that are physically separated and closed off from occupied spaces and with adequate exhaust ventilation (i.e., the air is vented directly to the outside). Ensure that the air in the pesticide storage area does not mix with the air in a centralized ventilation system.

Posting and Notification: Some states and localities require schools to notify students and staff of impending pesticide applications. Even in the absence of specific laws, school leadership should consider adopting the practice of informing school staff and students' parents of upcoming pesticide treatments. If notification and posting is a new practice at the school, the new policy should be explained so that it will not be misinterpreted that more pesticides are being applied than previously. When good IPM practices are followed, concerns raised by notification and posting activities should be minimized.

Notification can be accomplished by posting notices around the school, sending notices to parents through email and/or text alerts, or posting them to the school website in advance of pesticide applications. Schools should consider posting notices in areas that will be or have been treated. The IPM coordinator and pesticide applicator should be prepared and available to provide more specific information when questions arise.

A registry of individuals who could be adversely affected by exposure to pesticides should be kept at the school's health offices. Information on how to contact the local poison control center and emergency personnel should be kept readily accessible. The school may also wish to consider informing the adjacent community in advance of planned outdoor pesticide applications.



STEP 6: EVALUATING RESULTS AND RECORD KEEPING

Record keeping is critical to determining the efficacy of any IPM program. Well maintained and accurate records provide a means to verify that the policy is being followed, identify historical trends and repetitive issues, and justify decisions and actions taken to mitigate pests.

Successful IPM relies on accurate record keeping. Record keeping allows the school to evaluate the results of practicing IPM to determine if pest management objectives have been met. Keeping accurate records also leads to better decision-making and more efficient procurement of pest control materials (monitors, traps, pesticides, etc.). Accurate records of inspecting, identifying, and monitoring activities document changes in the site environment (reduced availability of food, water, or shelter), physical changes (exclusion and repairs), pest population changes (increased or reduced numbers, older or younger pests), or changes in the amount of damage or loss.

A complete and accurate pest management log should be maintained for each property and kept in the office of the IPM coordinator or school facility manager. Pesticide use records should also be maintained to meet any requirements of the state regulatory agency, school board, and/or applicable local oversight entity. The log book should contain the following items:

- A copy of the IPM policy and plan.
- Pesticide use and service schedules for each property/site.
- A copy of the current EPA-registered label and the current Safety Data Sheet (formerly MSDS) for each pesticide used on school property.
- Pest surveillance data sheets to record, in a systematic fashion, the type and number of pests or other indicators of pest population levels revealed by the monitoring program for the site. Examples include date, number, location, and rodent species trapped or carcasses removed as well as date, number, and location of new rat burrows observed.
- Diagrams of pest vulnerable areas that note historical pest activity, including the locations of all traps, trapping devices, and bait stations in or around the site.
- Listings and diagrams of environmentally and/or culturally sensitive areas where pesticide use must be avoided or extremely limited.
- Copies of pesticide applicator state certifications.
- Copies of all pest management contracts.



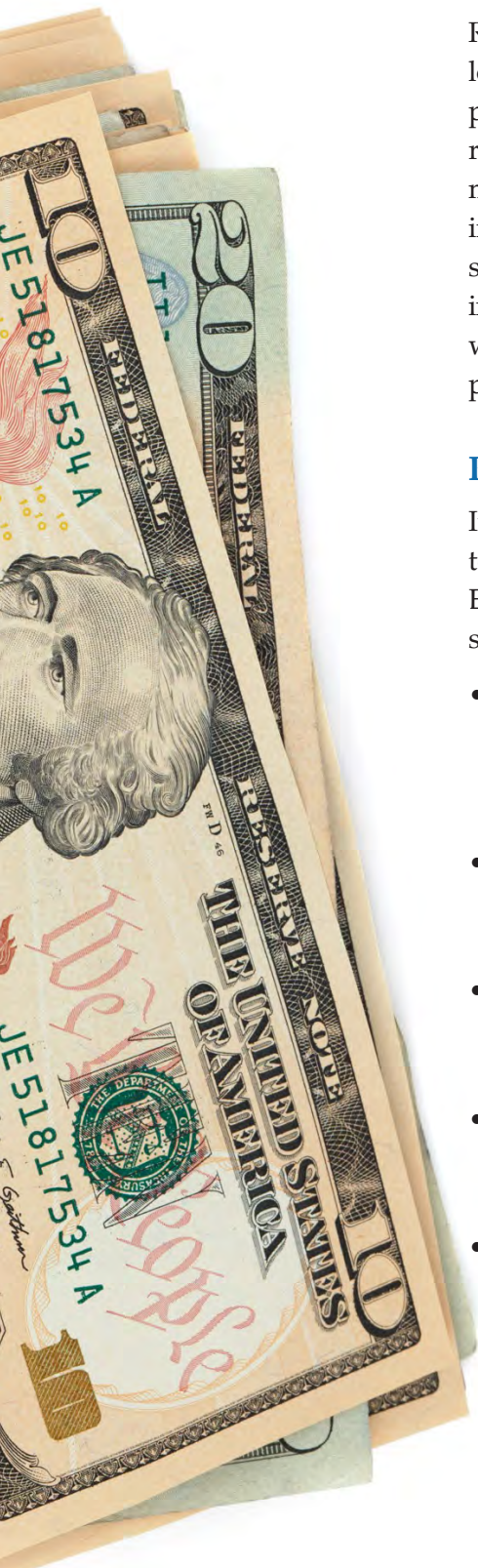
EVALUATING THE COSTS

Results from IPM programs in school systems across the nation indicate that long-term costs of IPM are less than conventional calendar-based pest control programs that rely solely on the use of pesticides. Whether an IPM program raises or lowers costs depends in most part on the nature of current custodial, maintenance, cafeteria, grounds, and pest management operations. The costs of implementing an IPM program can also depend on whether pest management services are contracted, performed in-house, or both. To fit an IPM program into the existing budgetary framework, school administrators should consider what additional and redistributed expenditures are involved. As with any program, insufficient resources could jeopardize the success of IPM.

POTENTIAL OFFSET COSTS

Initiating an IPM program may require repair and maintenance activities to prevent pest entry and eliminate sources of shelter, food, and moisture. Examples of these one-time expenses that may result in future budgetary savings include:

- Improving waste management by moving trash or garbage containers away from school buildings to reduce the opportunity for pest invasion. This will result in fewer pest problems and reduce the need for other pest control procedures.
- Installing physical barriers such as air curtains over the outside entrances to kitchens to reduce flying insect problems. This results in fewer flying insect problems and savings in years to come.
- Focusing on preventative maintenance and repairs to correct such situations as leaky pipes. This effort reduces future maintenance problems, reduces utility costs (electric and water), and prevents pest problems.
- Training on pesticide safety and IPM. When everyone understands and does their part, the need for comprehensive pest management is significantly reduced.
- Adjusting the landscaping adjacent to buildings to discourage pests. This includes moving or trimming plants so they do not touch buildings, directing water away from foundations, and choosing mulch carefully.



These repair and maintenance activities will reduce overall costs of the pest control operation, as well as other maintenance and operating budgets. Whether these costs are actually budgeted as a pest control expense or under a different category depends on the budgetary format of the school system. School systems with active maintenance and repair programs may be able to absorb these activities within their current budgets, and reap cost efficiencies through energy use reductions associated with the same or similar activities.

FOR MORE INFORMATION

To find out more about how to establish an IPM program that provides a smart, sensible, and sustainable approach to managing pests in your school, please visit: www.epa.gov/managing-pests-schools.



www.epa.gov/managing-pests-schools



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