

Best Management Practices for Athletic Fields & School Grounds

#1 Goal—Reduce human pesticide exposure!

- ◆ Minimize pesticide use
- ◆ Maintain healthy plants
- ◆ Choose pest resistant plant varieties
- ◆ Apply spot treatments whenever possible
- ◆ Choose products proven to be effective at low application rates
- ◆ Choose products that leave little or no residue
- ◆ Apply when school is not in session or over extended vacations
- ◆ Keep people off treated areas for as long as possible
- ◆ Check product label for minimum reentry time

Other Key Points for Maintaining Quality Grounds and Reducing Risks

- ◆ Maintain good communication between staff and contractors involved in grounds maintenance and the IPM coordinator
- ◆ Emphasize practices that improve turf density and help minimize need for pesticides
- ◆ Identify pests specifically and confirm a pest exceeds threshold levels before authorizing any treatments
- ◆ Make sure all pest control products (weed, insect, rodent or plant disease controls) are labeled for use on school grounds and applied by licensed commercial pesticide applicators
- ◆ Confirm that all contracts for grounds maintenance services follow these BMPs and the guidelines shown on the opposite side of this bulletin
- ◆ Develop a maintenance schedule for the more intensively managed areas so that key steps aren't missed
- ◆ Keep detailed records of soil tests, aeration, seeding, top dressing, nutrients and pesticides applied for at least two years

Introduction

In 2011, The Maine Legislature directed the Board of Pesticides Control to evaluate the use of pesticides on school grounds and to develop Best Management Practices (BMPs) for pesticide use with a goal of minimizing human exposure to pesticides. This brochure explains how schools should implement these BMPs. Applying these recommendations should also help schools keep maintenance costs down while improving the safety and appearance of school grounds.

Getting Started

Schools should identify the employees who are involved in school grounds maintenance decisions, including the IPM coordinator, the facilities manager, the athletic director and varsity coaches. The IPM coordinator must be included so that management decisions involving pesticides will be consistent with state law and all notification requirements will be followed.

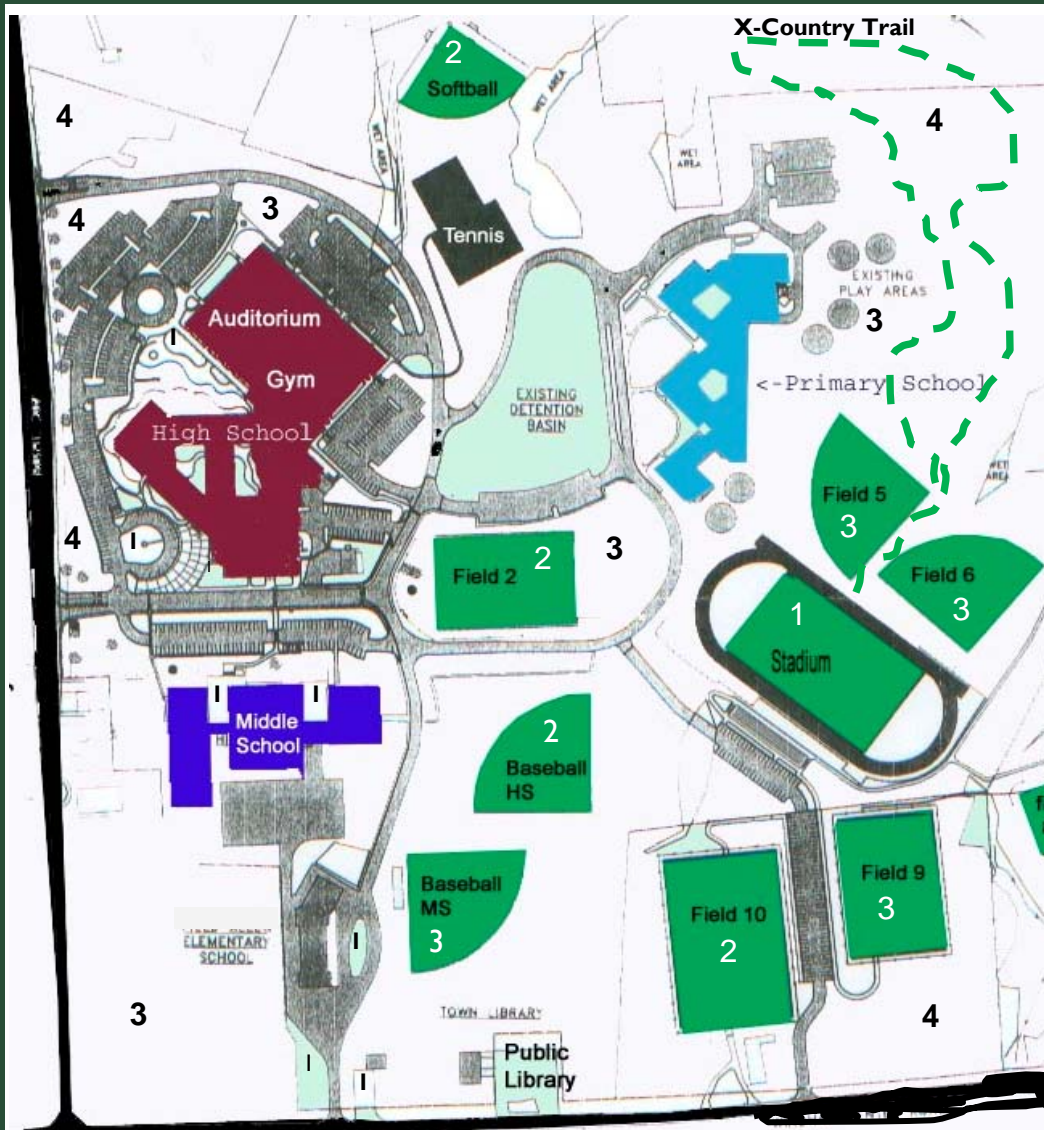
These grounds maintenance decision makers should assign a Grounds Maintenance Priority Level to all school grounds.* How fields are classified will vary by school and by district, based on use, priorities and available funds.

Assigning Grounds Maintenance Priority Levels

The grounds care BMPs are separated into four levels that roughly correspond to the intensity of use and aesthetic importance of each area. High impact varsity athletic fields may be Level 1 or Level 2. Due to the intensity of use, practice fields that need a high level of maintenance are usually designated Level 2 or 3. Lawn areas and playgrounds generally won't warrant a high level of maintenance and will be assigned to Level 3 or 4. Making a simple map of the maintenance levels for future reference will be helpful to both maintenance personnel and the decision makers (*see map example on opposite side and attached Level-Specific BMPs*).

**School grounds means: land associated with a school building including playgrounds, athletic fields and agricultural fields used by students or staff of a school and any other outdoor area used by students or staff including property owned by a municipality or a private entity that is regularly utilized for school activities.*

Grounds Maintenance Priority Levels



Numbers indicate the grounds maintenance priority level

Grounds Maintenance Priority Levels

Level 1—Highest care areas, e.g., some varsity playing fields

Level 2—High care areas, e.g., practice fields or multipurpose fields. May include varsity fields or high visibility lawn areas depending on the school

Level 3—Moderate care areas, e.g., playgrounds, low-use areas, common areas. May include practice fields and some lawn areas depending on the school

Level 4—Lowest care areas, e.g., most lawn areas, natural areas, fence lines, property edges, slopes, utility areas, ditches or trails

Other Important Guidelines

Informed Product Choice

- ◆ Read labels and MSDS thoroughly prior to making a choice
- ◆ Choose products with proven efficacy at low use rates
- ◆ Choose products that pose the lowest exposure potential (watered into the soil, little to no surface residues, low volatility & low drift potential)
- ◆ Choose selective products that affect a narrow range of organisms
- ◆ Avoid products like weed and feed that require broadcast application

Grounds maintenance contracts should clearly establish:

- ◆ The goals of the IPM program
- ◆ What services are provided and how they are implemented
- ◆ Posting and notification responsibilities
- ◆ Consultation with the IPM coordinator
- ◆ The population levels of specific pests that can be tolerated without treatment
- ◆ Appropriate least-risk procedures to correct pest problems
- ◆ The restrictions on pesticide use: types of applications, timing of applications, restricted locations, materials that can be used
- ◆ The pest management actions that are the responsibility of the school district

FOR MORE INFORMATION:

Maine Department of Agriculture, Food and Rural Resources

- ◆ Maine Board of Pesticides Control
thinkfirstspraylast.org
 - ◆ Maine School IPM Program
thinkfirstspraylast.org/schoolipm
- 28 State House Station, Augusta, ME 04333-0028 • 207-287-2731

The University of Maine Cooperative Extension

umaine.edu/ipm/
491 College Ave, Orono, ME 04469-5741 • 207-581-3880



Level Specific BMPs for Athletic Fields and School Grounds

	Level 1 – Highest Care	Level 2 – High Care	Level 3 – Moderate Care	Level 4 – Lowest Care
	High impact athletic game fields, e.g. varsity football, soccer, field hockey fields	<ul style="list-style-type: none"> • Low impact athletic game fields, e.g. baseball, softball • Multipurpose fields • Athletic practice fields 	<ul style="list-style-type: none"> • High visibility lawns • Moderate use areas • Playground fields 	<ul style="list-style-type: none"> • Utility areas, slopes, ditches • Natural areas • Fence lines/property edges • Lawns
Field Use Restrictions	<ul style="list-style-type: none"> • Whenever possible restrict field use when soils are saturated and surface water is present • If field size allows, move goal areas regularly 			
Soil Test	<p>At establishment and before renovation and every 1-3 years when pH needs to be adjusted Every 2 – 5 years otherwise Soil test should determine:</p> <ul style="list-style-type: none"> • Nutrient levels • pH • Level of compaction • Soil texture and structure (Level 1 only) • Percent organic matter • Thatch depth • Rooting depth 		<p>At establishment and before renovation or repair and every 1-3 years when pH needs to be adjusted Every 3 – 5 years other wise</p> <ul style="list-style-type: none"> • test for nutrient levels and pH 	<p>At establishment and before renovation test for nutrient levels and pH</p>
Irrigation for Maintenance of Established Turf	<ul style="list-style-type: none"> • Supplement rainfall when needed to provide a total of 1” of water per week when grass is actively growing (April – November) • Water turf early in the morning 	<ul style="list-style-type: none"> • As needed to promote active turf growth and prevent summer dormancy • Water turf early in the morning 	<p>Only required during renovation or repair, otherwise allow summer dormancy</p>	
Aeration	<ul style="list-style-type: none"> • 2-6 times/year at a depth of 3-12 inches using a combination of hollow core, solid tine, or shatter aeration • At least one of the aerations should be deep tine or shatter to a depth of at least 8 inches • Intense use areas require the most aeration • Avoid spring aeration when seeding of crabgrass or other summer annuals is a threat 	<ul style="list-style-type: none"> • 1-2 times/year as needed • Use a combination of hollow core, solid tine, or shatter aeration at a depth of 3 – 8 inches • Avoid spring aeration when seeding of crabgrass or other summer annuals is a threat 	<ul style="list-style-type: none"> • Once every two years or as needed • Avoid spring aeration when seeding of crabgrass or other summer annuals is a threat 	<p>Never</p>

	Level 1 – Highest Care	Level 2 – High Care	Level 3 – Moderate Care	Level 4 – Lowest Care
Fertilization and Nutrients	<ul style="list-style-type: none"> • Only apply amendments and nutrients as indicated by soil test, including phosphorus and potassium • Follow soil test recommendations when establishing new seed • Apply N at a rate of 2-4 lbs per 1,000 sq.ft per year in several applications rather than all at once • Fertilize frequently (7 to 10 applications) throughout the season • Apply no more than 0.5 pound of soluble nitrogen per 1,000 square feet per application • Slow release nitrogen (N) fertilizers that are 40-60% water insoluble can be applied at higher rates and less often • Fertilizer rate should be reduced or fertilization eliminated during hot and dry periods unless irrigation is available • Sand based fields may require additional fertilizer • Apply calcitic or dolomitic limestone in spring and/or fall to maintain soil pH within the 6.0 – 6.5 range and to meet soil test requirements for calcium or magnesium 	<ul style="list-style-type: none"> • Only apply amendments and nutrients as indicated by soil test, including phosphorus and potassium • Follow soil test recommendations when establishing new seed • Apply N at a rate of 1-3 lbs per 1,000 sq.ft per year with 2/3 in the fall and 1/3 in the spring • Apply in several applications rather than all at once • Apply no more than 0.5 pound of soluble nitrogen per 1,000 square feet per application • Slow release nitrogen (N) fertilizers that are 40-60% water insoluble can be applied at higher rates and less often • Apply calcitic or dolomitic limestone in spring and/or fall to maintain soil pH within the 6.0 – 6.5 range and to meet soil test requirements for calcium or magnesium 	<ul style="list-style-type: none"> • Only apply amendments and nutrients as indicated by soil test, including phosphorus and potassium • Follow soil test recommendations when establishing new seed • If the turf begins quality is not acceptable, apply N at a rate of 1-2 lbs/1,000 sq.ft per year with 2/3 in the fall and 1/3 in the spring • Apply no more than 0.5 pound of soluble nitrogen per 1,000 square feet per application • Slow release nitrogen (N) fertilizers that are 40-60% water insoluble can be applied at higher rates and less often • Apply calcitic or dolomitic limestone in spring and/or fall to maintain soil pH within the 5.5 – 6.5 range and to meet soil test requirements for calcium or magnesium 	<ul style="list-style-type: none"> • Follow soil test recommendations when establishing new seed • Seldom to never after establishment
Mowing	<ul style="list-style-type: none"> • Proper mowing height and frequency prevents weeds • Mow to greatest height tolerable for the sport, e.g. 1 to 3 inches depending on type of sport and required playing schedule • Mow to 3 inches or higher during off-season and gradually lower to desired height for play over several mowings • Do not remove more than 1/3 of plant height at each mowing • Keep mower blades sharp • Unless the turf has an active fungal disease or play will be interrupted, return the grass clippings • Use a mulching mower 	<ul style="list-style-type: none"> • Proper mowing height and frequency prevents weeds • Mow to a height of not less than 3 inches • Do not remove more than 1/3 of plant height at each mowing • Keep mower blades sharp • Whenever possible return the grass clippings • Use a mulching mower 	<ul style="list-style-type: none"> • Proper mowing height and frequency prevents weeds • Mow to a height of not less than 3 inches • Do not remove more than 1/3 of plant height at each mowing • Keep mower blades sharp • Whenever possible return the grass clippings • Use a mulching mower 	<ul style="list-style-type: none"> • Mow as needed to maintain function of area • Do not remove more than 1/3 of plant height at each mowing when appropriate for the site, use and grasses present • Keep mower blades sharp • Whenever possible return the grass clippings • Use a mulching mower • Utility and low maintenance turf areas need only be mowed in late fall

	Level 1 – Highest Care	Level 2 – High Care	Level 3 – Moderate Care	Level 4 – Lowest Care
Seeding	<ul style="list-style-type: none"> Depending on level of management available, athletic fields should be either a 100% blend of Kentucky bluegrass cultivars, or a 100% blend of improved turf-type tall fescue cultivars, or a mix of Kentucky bluegrass and perennial ryegrass Maintain vegetative cover by repeated seeding any time soil is exposed. This may be 4-8 times/year Mid-August-early October is ideal timing Mid-April-early June to repair worn areas Select hardy, wear-, pest-, and drought-tolerant grass seed species and cultivars including: tall fescues, perennial ryegrass and Kentucky bluegrass Use a variety of seeding strategies: <ul style="list-style-type: none"> Drill seed in 2 to 4 directions Use pre-germinated seed and sand mix to fill worn areas and divots Broadcast seed before each game to allow players to "cleat-in" the seed Broadcast seed prior to dragging aeration cores 	<ul style="list-style-type: none"> Lawns should be primarily mixtures of fine fescue or tall fescue with limited Kentucky bluegrass or perennial ryegrass Higher traffic areas should be seeded with mixes that contain a low percentage of fine fescues Mid-August through early-October as needed April to repair worn areas or establish new grass areas Drill seed or broadcast seed and drag in combination with aeration Select hardy, wear-, pest-, and draught-tolerant grass seed mixture including tall fescues, perennial ryegrass and Kentucky bluegrass 	<ul style="list-style-type: none"> Lawns should be primarily mixtures of fine fescue or tall fescue with limited Kentucky bluegrass or perennial ryegrass Higher traffic areas should be seeded with mixes that contain a low percentage of fine fescues Repair as needed to maintain turf density and prevent erosion Without irrigation, seed only September to mid-October when adequate moisture is anticipated 	<ul style="list-style-type: none"> Lawns should be primarily mixtures of fine fescue or tall fescue with limited Kentucky bluegrass or perennial ryegrass Higher traffic areas should be seeded with mixes that contain a low percentage of fine fescues Utility areas can be seeded with native conservation grasses, forbs or perennial flowering plants Repair as needed to maintain turf density and prevent erosion In September when adequate moisture is anticipated
Seeding continued		<ul style="list-style-type: none"> Irrigation is essential during germination and establishment of new seed Choose seed mixtures based on soil type and intensity of use Rescue seeding can be done with high quality perennial ryegrass blends For seed selection use the National Turf Evaluation Program spreadsheet^{**} 		
Re-sodding	<ul style="list-style-type: none"> Intense use areas, such as soccer goals and between the hash marks on football fields, every 1 to 3 years as needed Irrigation is essential at installation and during grow-in period 	<ul style="list-style-type: none"> Intense use areas, such as around pitcher's mound or baseball infields Irrigation is essential at installation and during grow-in period 	Never	Never

^{**}<http://apps.hort.iastate.edu/turfgrass/extension/InteractiveNTEPSpreadsheet.xlsm>

	Level 1 – Highest Care	Level 2 – High Care	Level 3 – Moderate Care	Level 4 – Lowest Care
Topdressing	<ul style="list-style-type: none"> • Apply in combination with aeration to prepare seed bed, modify soil and smooth field • Use finished composts with low nitrogen and phosphorus content, or • Use a soil mix that is similar to the existing soil in the root zone • In all cases avoid forming soil layers which may cause shallow rooting depth and interfere with water movement in the soil 		Never	Never
Weeds	<ul style="list-style-type: none"> • Following the previous BMPs will establish a healthy, thick turf which will outcompete broadleaf weeds • Depending on weed species present, accept up to 15 - 20% weeds 	<ul style="list-style-type: none"> • Following the previous BMPs will establish a healthy, thick turf which will outcompete broadleaf weeds • Depending on weed species present, accept up to 20 - 30% weeds 	<ul style="list-style-type: none"> • Hand-pull weeds, use a weed whacker or use heat or steam to kill weeds • Use mulch in flower beds and around landscape plantings to reduce weeds • Use landscape fabric under playground shock absorption materials • Depending on weed species present, 50% weeds or more is acceptable in most lawns • Use broadleaf herbicides only when needed, based on monitoring, to reduce weed populations to acceptable levels • Use targeted spot treatments whenever possible and avoid broadcast applications 	<ul style="list-style-type: none"> • Hand-pull weeds • Use a weed whacker, heat or steam around fences and other structures • Spray fence lines only when necessary and schedule when students will not be in the area for several days • Use herbicides to control invasive and noxious plants when necessary • Use targeted spot treatments whenever possible and avoid broadcast applications
	<ul style="list-style-type: none"> • Use broadleaf herbicides only when needed, based on monitoring, to reduce weed populations to acceptable levels • Use targeted spot treatments whenever possible and avoid broadcast applications • Coordinate any herbicide use with annual over-seeding program so desirable turf seed is not damaged • Apply pre-emergent herbicide in spring primarily for crabgrass if needed, based on weed monitoring during the previous year • Broadleaf weed control every 2-3 years, only as needed • Broadleaf weed control in spring or fall is more effective, but to reduce student exposure applications may be more acceptable during the summer when school is not in session • Summer herbicide applications should only be done when the weeds are actively growing • When weeds are drought stressed, water the area to be treated for a few days prior to herbicide application • Herbicides should not be applied in temperatures above 85° F to avoid turf damage and reduced efficacy • Effective post-emergent crabgrass control is available and may be used as an alternative to routine pre-emergent crabgrass applications when areas of crabgrass are limited 			

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Insect Pests <ul style="list-style-type: none"> • White Grubs are the larvae of Japanese beetles, May/June beetles, European Chafers, Asiatic garden beetles, Oriental beetles and other scarabs. Turf injury occurs from late July through November and from April - June and is often localized. A site-specific strategy should be practiced • Action Thresholds for non-irrigated turf (grubs/sq.ft.) Action thresholds may be increased 30% with irrigation • European chafer: 4 to 6/sq.ft. • Japanese beetle: 6 to 12/sq.ft. • Oriental beetle: 6 to 12/sq.ft. • Asiatic garden beetle: 10 to 20/sq.ft. 	<ul style="list-style-type: none"> • Monitor July-September • Beginning of spring and fall sports seasons coincides with peak turf injury from white grubs • Action threshold levels are species dependent (see cell to left) • Irrigate as needed to promote grass root growth throughout the growing season • Insect parasitic nematodes can be very effective when applied properly^{%%} • Consider preventative grub control applications on fields that are infested more than 2 – 3 years in a row 	<ul style="list-style-type: none"> • Monitor July-September • Action threshold levels are species dependent (see cell to far left) • Irrigate as needed to promote grass root growth throughout the growing season • Action thresholds may be doubled with irrigation • Insect parasitic nematodes can be very effective when applied properly^{%%} 	<ul style="list-style-type: none"> • Monitor July-September • Scarab beetles (adult white grubs) often avoid laying eggs in low maintenance non-irrigated turf • Action threshold levels are species dependent (see cell to far left) • Action thresholds may be doubled with irrigation • Insect parasitic nematodes can be very effective when applied properly^{%%} 	Pesticide treatment never required
Insect Pests <ul style="list-style-type: none"> • Chinch Bugs 	<ul style="list-style-type: none"> • Supplement rainfall when needed to provide a total of 1" of water per week during summer • Avoid over-fertilizing to prevent thatch build-up. Dethatch and/or core aerate if thatch exceeds ¾ inch • Pesticide applications only as needed when damage is evident and more than 5-10 chinch bugs per sample using coffee can-float monitoring method^{&&} • If seeding, select resistant, endophytic varieties of tall fescue, perennial ryegrass or fine fescue suitable for athletic fields 		<ul style="list-style-type: none"> • If seeding, select resistant, endophytic varieties of tall fescue, perennial ryegrass or fine fescue suitable for athletic fields 	<ul style="list-style-type: none"> • If seeding, select resistant, endophytic varieties of tall fescue, perennial ryegrass or fine fescue suitable for athletic fields
Turf Diseases^{@@} <ul style="list-style-type: none"> • Brown Patch • Dollar Spot • Leaf Spot 	<ul style="list-style-type: none"> • Apply no more than 0.5 pound of quick release nitrogen per 1,000 square feet per application • Time fertilization and liming to avoid disease critical periods (e.g. avoid fertilization in early spring and just before hot, humid weather) • Remove dew from fields early in the morning, by dragging with a bar • Improve air circulation over turf areas • Irrigate early in the morning only 			
Turf Diseases^{@@} <ul style="list-style-type: none"> • Snow Mold 	<ul style="list-style-type: none"> • Avoid fertilizing turf after mid-October • Continue mowing until growth ceases and gradually increase or reduce mowing height to achieve 2 inches at last mowing • Overseed with tolerant grasses and resistant cultivars, especially if damage has been severe 			

^{%%}http://www.yardscaping.org/lawn/documents/Beneficial_Nematodes.pdf

^{&&}<http://www.gardening.cornell.edu/lawn/lawncare/pestpro.html>

^{@@}<http://extension.umass.edu/turf/publications-resources/best-management-practices>

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Other Pests • Mice, Rats or Other Rodents	<ul style="list-style-type: none"> • Seal or fill in all potential nesting sites • Reduce potential food sources by maintaining covered and sealed dumpsters and trash cans • Clean up all food scraps and waste left out by students, staff or visitors • Avoid installation of bird feeders • Compost piles or bins should be inaccessible to rodents 			
• Stinging Insects <ul style="list-style-type: none"> • Yellowjackets • Wasps • Hornets • Bees 	<ul style="list-style-type: none"> • Beginning in early spring, monitor for stinging insect hives or nests and remove before they become established • Fill in abandoned animal dens (including rodent burrows) in areas students use • Seal cracks and crevices within walls of buildings and on play structures • Restrict outdoor eating and drinking in the late summer/fall when yellowjackets are foraging • Keep garbage cans covered • Install stinging insect traps outside of areas that people frequent • Use RTU aerosol sprays in emergency situations 			
• European Red Ants are stinging insects found primarily along the coast. Nests in a variety of habitats including bark mulch, lawns, forested areas, leaf litter, and under rocks and human debris	<p>Contact the University of Maine Cooperative Extension (1-800-287-0279) to confirm suspected infestations and obtain current management recommendations</p>			
• Mosquitoes	<ul style="list-style-type: none"> • Eliminate sources of standing water and keep all roof gutters free flowing • When monitoring indicates the potential for mosquito vectored disease, restrict outdoor activities to mid-day • Encourage students, staff and visitors to use insect repellents during activities that expose them to biting mosquitoes • When the Maine CDC determines there is a credible threat for mosquito-borne disease near a school, consider hiring a licensed commercial pest management company to apply mosquito controls 			
• Ticks	<ul style="list-style-type: none"> • Move all play structures or class areas at least 3 yards away from forest or brushy edges of school yards • Install a 3 foot wide strip of mulch or crushed rock next to any forest or brushy edges of school yards • Do not allow students to walk into forest or brushy areas next to schools • Keep trails cleared to at least a 6 – 8 foot width to prevent students from brushing up against brushy areas • Remove stone walls or other structures that provide harborage for squirrels, mice and other small mammals • Do not feed birds or other animals on school grounds • Encourage students, staff and visitors to use insect repellents during activities that might expose them to tick habitats • Encourage proper attire to prevent ticks from accessing skin areas • Encourage tick checks each time students and staff enter tick habitats • Keep play areas mowed • Avoid any pesticide application to control ticks unless students or staff must frequently use forest or brushy areas that provide suitable deer tick habitat and deer tick numbers are high 			

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Artificial/Synthetic Turf	<ul style="list-style-type: none"> • Do not apply disinfectants or sanitizers to the field on a routine basis • Use disinfectants only when necessary to clean up blood/body fluids; follow specific label directions to clean and decontaminate against HIV on surfaces soiled with blood/body fluids • To remove mold, dirt or dust, clean field with detergent and surfactant • To remove small leaves, seeds or other small debris, use leaf blowers, rakes or sweepers, being careful not to displace large amounts of infill material • To remove gum, freeze it with ice cubes or aerosol freezing agents • Inspect all equipment for leaks before operating on the field • Monitor and maintain proper infill depth by topdressing just prior to sweeping and grooming • Follow manufacturer guidelines for sweeping and grooming • Go over the field with a magnet periodically to pick up stray metals • For static, apply wetting agents to the infill • Use extreme care when removing snow or ice from the field so not to move the infill or tear seams • Keep all sources of fire or ignition away from the field surface • Never fill gasoline tanks on the field • Aerate infill materials to maintain G-Max value for every test point at less than 200g's (as measured in accordance with ASTM Standard F355-A and ASTM Specification F1936 			