



A Year-Round Guide to Yard Care

Tips for healthy lawns and gardens



Contents

Understanding Plant Nutrition 3 - 4

Testing your Soil 5

Erosion Control 6 - 7

Vegetable gardens 9 - 10

Irrigation 11 - 12

A Healthy Lawn 13 - 14

Reducing the Impact of Drought 15

Pest Control 16 - 18

Fertilizing your Lawn 19 - 20

Improving your Soil 21 - 22

Winterize your Yard 23 - 24

Minnesota 2nd Edition, Printed 2016

This booklet was adapted from a publication funded by the Environmental Protection Agency's Chesapeake Bay Program and the Virginia Department of Conservation and Recreation (DCR). The first edition in Minnesota was funded through a grant from the Minnesota Pollution Control Agency.



Photo by Blue Thumb - Planting for Clean Water

The Health of Minnesota's Lakes and Rivers Begins in Your Backyard

Forests, prairies and the land of 10,000 lakes—Minnesotans love the outdoors, even when it's just the backyard. The way you maintain your yard, however, can have surprising impacts on the natural world.

You probably know that pesticides and fertilizers are powerful chemicals that can injure wildlife if overused. But, did you know that yard waste and erosion are major threats to Minnesota waterways and wildlife?

Rain and melting snow wash dirt, leaves, fertilizer and yard waste into streets, which connect to nearby lakes and streams. This debris contains high levels of phosphorus and nitrogen, which enable smelly green algae to grow out of control. In addition to clogging boat propellers and being downright gross, algae blooms can be toxic to swim in and they lower oxygen levels in the water, making it hard for fish to survive.

Sediment from erosion clouds waterways, preventing the growth of aquatic plants—the base of the food chain for many fish and waterfowl.

The good news is that you can help protect Minnesota's waterways and wildlife and still enjoy a vibrant, healthy yard. This guide will help. Arranged in a convenient seasonal format, it will help you decide what to plant and when to fertilize; it will help you restore ailing plants and enrich your soil. Many of the steps outlined in the guide will save you both time and money, making it even easier to enjoy your lawn or garden.

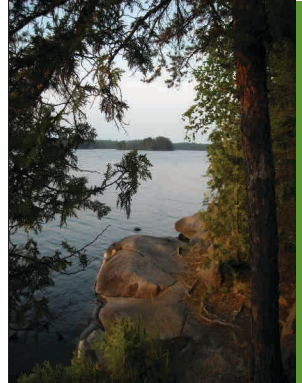


Photo by Gary Hong



Photo by Gary Hong

Fertilizers are not plant food! This is a misnomer. Plants produce their own food using water, carbon dioxide and energy from the sun.

The Six Macronutrients

Plants need 17 nutrients for health but these six are the most important.

Nitrogen (N): Building block for proteins, enzymes, chlorophyll and growth regulators; excess produces excess leaf growth with little fruit

Phosphorus (P): Used in metabolism, respiration and photosynthesis; usually plentiful in Minnesota soils

Potassium (K): Aids in starch formation, water regulation, disease resistance, chlorophyll development and tuber formation; found in potash

Magnesium (Mg): Building block for chlorophyll, an enzyme activator; excess interferes with calcium

Calcium (Ca): Needed for cell wall structure and cell division, an enzyme activator; excess blocks micronutrient absorption

Sulfur (S): Component of proteins and amino acids, important in respiration; generally present in Minnesota soil

Fertilizer Analysis

All fertilizers are labeled with three numbers. These three numbers give the percentage by weight of nitrogen (N), phosphorus (P) and potassium (K). Examples of commonly used fertilizers are 23-3-7 and 28-0-12. Minnesota law prohibits the use of phosphorus fertilizer on lawns, except when establishing a new lawn or if a soil test indicates that phosphorus is deficient.

Compost, cottonseed meal, blood meal, bone meal, hoof and horn meal, fish emulsion and manures are examples of organic fertilizers. Organic fertilizers may contain lower concentrations of nutrients, but they perform important functions that synthetic formulas do not, improving the physical structure of the soil and promoting beneficial bacterial and fungal activity.

Effects of Over-Fertilizing

Not only is over-fertilizing a waste of time and money, it can do serious harm to the plants you intend to help. Fertilizers are salts, much like table salt. If tender plant roots are close to fertilizer granules, water is drawn away from these roots and they dehydrate. Over-fertilizing trees or shrubs, particularly with slow release fertilizer, can also cause them to keep growing into the fall when they should be hardening off for winter.



TIP:

Organic fertilizers are a source of slowly available, water-insoluble nitrogen (WIN). These slow-release fertilizers require fewer applications.



Photo by Jenn Radtke

Fertilizer can harm our water as well. Rain carries nutrients into streams and lakes, feeding algae and aquatic plants. Nitrogen from fertilizer can also leach into groundwater, contaminating wells.

Always sweep up fertilizer spilled on sidewalks, driveways and paved surfaces - it's the law in Minnesota!

Pro tip: If you use native plants, you won't need fertilizers or pesticides at all.



Photo by Washington Conservation District

Nutrient Troubleshooting in the Garden

Here are some common symptoms of nitrogen, phosphorus and potassium deficiencies. Test your soil and consult a professional before beginning fertilizer treatments.

Problem	Missing Nutrient
Yellowing, especially of older leaves	N
Yellowing between veins	K
Leaves turn lighter green	N
Leaves turn brown or purple	P
Brown leaf tips	P
Brown leaf edges	K
Tendency to wilt	K
Reduced flowering	P

It is important to apply the optimum amounts of fertilizer, lime and other soil amendments and to do so at the proper time of year. Perform a soil test every 3 to 4 years. If possible, test around Labor Day so that there is ample time to add nutrients and other soil amendments before the winter.

Types of tests

The University of Minnesota provides soil testing: soiltest.cfans.umn.edu. Fill out the “Lawn and Garden Form” and follow the instructions for collecting and mailing a sample to the Soil Testing Laboratory. Your results will arrive by mail, along with recommendations for fertilizer and soil amendments. The regular test costs \$17 and determines pH, phosphorus, potassium, estimated texture and total organic matter.

Some nurseries also sell soil test kits for at-home use. Private testing companies can provide detailed reports but may be expensive.

The accuracy of any soil test is a reflection of the soil sample. Be sure your sample is representative of your lawn or garden. Using a stainless steel or chrome plated shovel or spade, sample the soil from five (5) scattered spots within the chosen area. Mix soil well to make a composite sample and send about a pint of the sample to the lab. Sample bags are free on request, but any clean container may be used.

How deep should I dig for a soil sample?

Established lawns	4-6 inches
New or compacted lawns	0-3 inches
Vegetable and flower gardens	0-6 inches
Trees and shrubs	0-12 inches

Common Soil Types in Minnesota

- **Sandy soil** is coarse and grainy. Sandy soil drains well but dries out rapidly.
- **Clay soil** is very thick, like putty. It holds water like a sponge, but when it does dry out becomes hard and very solid.
- **Silty soil** is between sandy and clay soil. It holds water but does not dry into a hard, solid mass.
- **Loam** is the ideal mixture of sand, clay and silt. Through the addition of organic amendments, loam can become the perfect soil for your vegetable garden.



TIP:

Do not use brass, bronze or galvanized tools to collect soil samples because they will contaminate samples with copper and/or zinc.



Photo by Washington Conservation District

When you have bare soil or shallow roots, you often end up with erosion.

Erosion robs your lawn and gardens of the nutrients and organic material your plants need. It also pollutes lakes, rivers and streams. Soil is the largest volume pollutant in Minnesota waterways, and most of the phosphorus and pesticides in our waters arrive attached to soil particles.

Signs of Erosion

- Exposed tree roots or stones
- Small rills or gullies
- Silt accumulating in low areas
- Soil splashed on windows and outside walls
- Widening or deepening stream channels

If you have serious erosion problems on your property, contact your county's Soil and Water Conservation District for advice and assistance. They may recommend regrading steep slopes or changing the drainage pathway. Planting deep-rooted native plants along shorelines is the best way to protect against erosion from runoff and waves.

Groundcovers

Turf and other groundcover plants keep bare soil from being washed away by rain. Their roots hold the soil in place and absorb water and nutrients. Around buildings, groundcovers are better than pavement because they also reduce heat, glare, noise and dust. On streambanks, lakeshores, and slopes greater than 12%, use deep-rooted native plants instead of sod to prevent erosion.

Native Plants:

- Anchor the soil, helping to prevent erosion. Their roots also break up compaction.
- Are drought tolerant and don't need to be watered after they are established
- Need no fertilizer or pesticides
- Provide habitat for pollinators, birds and wildlife
- Reduce lawn maintenance and fill narrow, odd-shaped areas where mowing and edging might be difficult.

It may take one to three years to get a new groundcover planting established. Use shredded hardwood mulch to control weeds during this time. When dealing with steep slopes, you may need to use erosion control blankets until the plants are established.

TIP:

Use an erosion control blanket when planting on steep hillsides to hold the soil in place until the roots get established.

Non-turf Groundcovers Native to Minnesota

Barren-strawberry, *Waldsteinia fragarioides*
Wineleaf Cinquefoil, *Potentilla tridentata*
Strawberry, *Fragaria virginiana*
Violets, *Viola* spp.
Bush-honeysuckle, *Diervilla lonicera*.
Chokeberry, *Aronia melanocarpa*
Creepers, Virginia & Thicket, *Parthenocissus quinquefolia* & *P. inserta*
Sumacs, *Rhus glabra* & *R. typhina*
Sweetfern, *Comptonia peregrina*

Raingardens

Raingardens are gardens that are designed to catch rainwater that runs off of your rooftop or driveway. Most raingardens are 4-8 inches deep and they feature plants that tolerate getting partially flooded on occasion. They provide beauty, as well as habitat for birds and pollinators. By soaking up rain where it falls, they slow stormwater runoff, help prevent erosion, and keep pollutants out of area waterways.

Most raingardens have plants native to Minnesota that are well adapted to our seasonal changes. In the summer, these gardens bloom vibrantly, attracting butterflies, birds, and bees. Cultivated varieties of Minnesota natives can also be used, though they don't always provide the same food value for pollinators.

For more information about raingardens visit www.BlueThumb.org.



Year-Round



Learn about native plants, raingardens and shoreline plantings at www.BlueThumb.org.



Photo by Blue Thumb - Planting for Clean Water



Photo by Angie Hong

Starting Seeds Indoors

Start seeds in small, individual containers. It's best to use divided containers with a single seedling per container to prevent the roots from getting tangled. Many gardeners cover their plant trays with clear plastic domes to help retain heat and moisture. Follow the instructions on the seed packets for planting guidelines.

*Note: Don't start seeds in a windowsill because it is usually too cold and has too little light during the early spring. Instead use a grow lamp or fluorescent light.

Timing

Here are some rough guidelines for when to start seeds indoors in Minnesota:

Early February - Leeks and onions

Mid-February - Celery

Early March - Broccoli, cabbage, cauliflower, head lettuce

Mid-March - Peppers and eggplants

Early April - Tomatoes

Transplanting Seedlings to Outdoors

Two weeks before planting your seedlings outdoors, begin to "harden" them by bringing the containers outside for a few hours each day. Start by putting them outside in the shade for a couple of hours during the afternoon and gradually move them into full sun later in the week. Continue bringing them in at night until nighttime temperatures are above freezing. After that, you can transplant them into the garden .

When to Plant

	Seeds	Plants
April 15 - May 1	Asparagus (crowns), beets, broccoli, Brussels sprouts, cabbage (early), carrots, cauliflower, collards, kale, lettuce, onion, parsley, peas, potatoes, spinach	Onion, rhubarb
May 1	Chard, cucumbers	Cabbage (early)
May 10 - June 1	Corn, pumpkin, summer squash, winter squash, watermelon	
May 15	Beans, tomato	Celery, tomato
June 1	Cabbage (late)	Broccoli, Brussels sprouts, cabbage (late), cauliflower, eggplant, pepper, sweet potato
July 1	Chinese cabbage	
Aug. 1 - 15	Lettuce (leaf), spinach	
Oct. 1 - Nov. 1		Garlic (cloves)



Fertilizers are designed to supplement the nutrients already present in your soil. Too much fertilizer can damage roots and also pollute groundwater or local lakes and streams.

Different Plants, Different Needs

Certain crops require more of some nutrients than others. If tomatoes are fertilized heavily with nitrogen into the summer, the plants may be all vine and no fruit. This is also the case with potatoes, which will produce vines instead of tubers. Corn, however, may require nitrogen fertilization every month.

Nitrogen will have its greatest effect three to four weeks after application. Using slow-release fertilizers or heavy amounts of manure will keep plants producing leaves or vines, with fruit or vegetables developing very late in the season.

Application Methods

Broadcasting. Fertilizer is spread over the growing area then left to filter into the soil or incorporated into the soil with a tiller or spade.

Banding. Narrow bands of fertilizer are applied in furrows 2 to 3 inches from the seeds or plants and 1 to 2 inches deeper. If the fertilizer band is placed too close to the seeds, it will burn the roots of the seedlings. For plants widely spaced, such as tomatoes, fertilizers can be placed in a circle 4 inches from the plant base. Banding is a good way to satisfy the needs of plants like tomatoes for phosphorus as the first roots develop.

Side Dressing. Dry fertilizer is applied as a side dressing after plants are up and growing. Scatter fertilizer on both sides of the row, 6 to 8 inches from the plants. Rake it into the soil and water thoroughly.

Foliar Feeding. Nutrients applied to foliage are absorbed and used by the plant quite rapidly. Absorption begins within minutes and is complete within two days. Foliar feeding is best when your soil is too cold for plants to extract dry fertilizer. Foliar nutrition can be a supplement at a critical time, but cannot replace soil fertilization.

Spring



Photo by Dakota County

TIP:

Plant crops with similar fertilizer needs close together to avoid putting too much nitrogen in the soil.

Crops need adequate soil moisture to grow. A healthy plant is 75 to 90 percent water; water is necessary for photosynthesis, provides rigidity to plant tissues, and transports nutrients and sugars to various parts of the plant.

There are several options for watering plants: a watering can, a garden hose with a spray attachment or portable lawn sprinkler, a perforated soaker hose, or an irrigation system.

Careful irrigation helps lakes, rivers, streams and groundwater aquifers by reducing fertilizer and pesticide runoff and conserving water.

When to Water your Lawn

In Minnesota, most lawns can survive without watering, although they may enter a dormant “brown” stage during the summer. If you wish to keep your lawn green during dry, hot weather, add 1 - 1.5 inches of water per week. The best time to water is between 4 and 8am.

Basic Principles for Watering Lawns and Gardens

- Water in the morning instead of the evening to avoid leaf mold. Avoid watering during the heat of the day, as too much water will be lost to evaporation.
- Set your sprinklers to water half an inch per hour. Anything more will run off, wasting water and money. Test the application rate for a sprinkler by placing a tuna can on the lawn and measuring how much water it collects in 15 min.

TIP:

Drip irrigation systems and soaker hoses are the most efficient ways to water your plants; a timer even allows your system to water in the morning, while you're getting ready for work.



Summer



- When using an oscillating lawn sprinkler, place the sprinkler on a platform higher than your garden plants to prevent water from being blocked by their leaves. Water evenly by moving the sprinkler often and overlapping about half of each spray pattern.
- Perforated soaker hoses should be placed with holes down along one side of the row of plants. Semi-permanent soaker hoses can be placed underneath mulch.
- Frequent, light waterings encourage shallow rooting, which causes plants to suffer more during drought. It is better to give a few deep soakings per week.

When to Water Vegetables

Be sure to water the following vegetables at these critical phases of development.

Asparagus	Spear production, fern development
Broccoli, cabbage, cauliflower	Head development
Beans, peas	Pod filling
Carrots	Seed emergence, root development
Corn	Silking, tasseling, ear development
Eggplant, tomatoes cucumber, melons	Flowering, fruiting
Lettuce	Throughout head development

Summer



Photo by Scarsdale Organic Vegetable Garden

Selecting Turf grass

The first step toward a beautiful, healthy lawn is to select the right turf grass variety—one that is adapted to your climate and maintenance preferences. In Minnesota, Kentucky bluegrass, fine fescue, and some of the perennial ryegrass cultivars are recommended.

In order to flourish, turf grass requires a soil depth of six to eight inches for good root growth, a soil pH between 6 and 8, about an inch of water weekly during the summer, and adequate sunshine. If your yard doesn't meet these criteria, consider an alternative groundcover (see page 7).

“Lo-mow” Lawns

For people who would prefer to have more free time and spend less time mowing, fertilizing and watering their lawns, a lo-mow lawn mix may be the perfect solution. These mixes are composed primarily of fescue grasses, sometimes with clover or other flowers, that grow slowly and require less moisture and nutrients and only occasional mowing.

These mixes grow best in full sunlight or very light shade and are not well suited for clay or poorly drained soils. To replace your existing lawn, use an herbicide or sod cutter to remove all grass and weeds and then plant the new fescue mix between mid-August and mid-September along with one pound of 10-10-10 fertilizer per thousand square feet you'll be seeding.

Mow Regularly and Leave Clippings on the Lawn

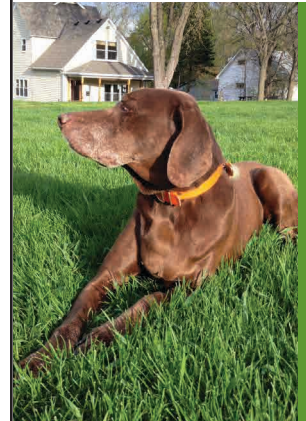
Mow regularly with a sharp mower blade to help your grass grow thick and dense. Mow often enough so that no more than 1/3 of the leaf surface of the grass plants is removed at one time. For most lawn areas, mowing at a height of two to three inches will provide a good quality turf. Set the mower blade higher during the summer or skip mowing all-together to reduce stress on the turf.

Leave your clippings on the lawn to provide a natural fertilizer throughout the summer. If the grass clippings are too thick in the spring and fall, collect and add them to your compost pile. Always sweep clippings off of driveways, streets and sidewalks to keep the nutrients out of storm drains and local waterways.

TIP:

To determine the pH of your soil, send a sample to the University of Minnesota for testing. The soil report will also tell you what kind of fertilizer to use and how much. Go to:

soiltest.cfans.umn.edu



Summer

Seeding or Sodding New Lawns

Seeding is generally less expensive than sodding and allows you a wider variety of grasses to choose from. However, a seeded lawn may take longer to establish and should be planted between mid-August and mid-September to succeed.

Sod establishes rapidly and is generally weed-free in the beginning. It can also be laid any time during the growing season, but is more expensive than seed.

Whether seeding or sodding your new lawn, it is important to prepare the soil beforehand. Conduct a soil test to determine what nutrients are present in the soil and amend clay soil with sand and organic matter to reduce compaction and allow water to soak in better. After amendments are added, apply a phosphorus and potassium fertilizer as prescribed by your soil test before seeding or sodding.

Fertilize in the Fall

Late summer and fall are the best times to apply fertilizer to your lawn in Minnesota. Fertilizing in the spring may make the lawn look nice, but it can deplete the plants' energy reserves. Choose a cool day to fertilize and water immediately afterwards if rain is not forecasted. By leaving grass clippings on the lawn all summer, you can reduce the need for artificial nitrogen 20 - 30 percent after the first year and 35 - 45 percent after the second year.

Save Time and Money

By leaving their grass clippings on the lawn rather than bagging them as trash, homeowners in Minnesota save more than time. Annual homeowner savings for a typical quarter-acre lot amount to \$25 to \$50 in fertilizer costs and \$25 to \$45 for plastic bags. In addition, you will help your local government keep a lid on refuse disposal costs. A typical quarter-acre lot generates 3,500 to 4,000 pounds of grass clippings a year. Disposing of them costs the homeowner \$50 to \$90 a year in public service charges, private collector fees or taxes.

Water if Needed

Except during the most severe drought, grasses common to Minnesota will survive without watering. If you wish to maintain a green yard in dry weather, add about 1 inch of water a week, preferably in the early morning and only as much as will soak into the ground.



Photo by Capitol Region Watershed District

Saving your Soil

What happens to soil nutrients during a drought? Nothing. The good news about drought is that it does not rob your soil of nutrients.

But, heavy rainfall after a dry period can wash away clay, and with it valuable nutrients and topsoil. To hold on to your soil:

- Incorporate organic matter into clays and other soil types to improve soil structure.
- Mulch your plants to conserve moisture and control erosion.
- Use trickle irrigation near the base of plants to reduce runoff.

Watering during a Drought

There is no substitute for water during a dry spell. However, you should adhere to local water restrictions. Some communities use four times as much water in the summer as in the winter and this places a strain on infrastructure and can make it hard to maintain pressure for fire hydrants. Remember that the water you use on your lawn is the same water we all rely on for drinking.

The best time to water is early morning, when humidity is high and moisture loss is minimal. If you water in the afternoon, you'll lose 20 - 25% of the water to heat and evaporation. Watering in the evening wastes less water but increases the risk of fungal disease and insect damage.

Dormancy or Death?

Mother Nature provides your lawn with a built-in protection plan: dormancy. Grass turns tan as moisture reserves dry up, but it usually doesn't die unless it goes several weeks without any water. By going into a dormant state, grass halts the process of photosynthesis. This is why grass grows at a slower pace in hot, dry periods. When rains do come, your grass will green up.

Never apply fertilizer or herbicide to a dormant lawn because it could kill your grass.

Replacing Lawn with Native Plants

Natives are hardy and easily survive harsh winters, summer heat, and even drought. Once established, native gardens and prairie plantings need very little weeding, watering, mulching or mowing.

Native plants also help to clean water. They generally have deep root systems, which help to hold the soil in place in addition to increasing the soil's ability to absorb water. Microbes surrounding the roots break down pollutants such as hydrocarbons and bacteria. Use the plant selector at www.BlueThumb.org to find native plants for your yard.

TIP:

Don't use herbicides during periods of drought. Grass uses water to detoxify these chemicals and can easily become over-stressed.



Summer

Photo by Virginia Cooperative Extension

TIP:

Enlist the aid of wild birds in your garden. They feed on pest insects. Consider planting shrubs and trees with fruits that attract them—and distract them from your fruits and vegetables. You can protect ripening fruits and vegetables with bird netting.

Summer



Photo by Russell Reynolds

The best way to control insects and disease is to prevent them from getting a foothold in your yard. A few important things to remember:

- **Use native plants** when possible, as these are most resistant to indigenous pests.
- **Buy plants from a reputable grower** who can assure you that they are pest free. Use disease-free, certified seed. Beware of plants treated with neonicotinoids, however, as these can kill beneficial insects like bees.
- **Water in the morning.** This allows plants to dry before the cool evening, making them less susceptible to disease. It also discourages the presence of many insects that feed at night.
- **Avoid overcrowding** in your garden beds. This will slow the spread of diseases and insects, giving you more time to deal with them.
- **Weed your garden beds.** Weeds and grasses often harbor pests. Organic mulches and fabric covers are extremely effective for weed control and also reduce soil splash, which can bring soil-borne diseases into contact with lower leaves.
- **Avoid injuring plants.** Broken limbs, cuts, bruises, cracks and insect damage are often sites of infection. Remove and dispose of diseased or infested leaves as soon as you observe them. Remove severely damaged plants before they contaminate others.
- **Inspect plants** for egg clusters, beetles, caterpillars and other insects as often as possible. Hand-pick as many pests as you can. Avoid sprays until the population has reached a critical level.
- If slugs are a problem, try to create drier conditions. Placing diatomaceous earth, crushed eggshells and hydrated lime near plants may deter slug activity.

Using Pesticide and Herbicide










Before applying a pesticide, be certain to identify the target pest accurately. Also, make sure it is actually causing harm to your plants. Poor growing conditions (moisture or nutrient levels, severe weather) cause most plant problems, not pests.

Always read the label before applying chemicals in your yard. Select products targeted to the pest or weeds in your yard to avoid damaging beneficial insects or even your own flowers and vegetables.

Never spray chemicals near water - polluted runoff can harm wildlife. Also avoid spraying on windy days and near paved surfaces.

Beneficial Bugs

Many insects prey on pest insects. Here are a few bugs you want to see in the yard and the pests they feed on:

	Assassin bug, <i>Reduviidae</i>	Aphids, caterpillars, leafhoppers
	Ground beetles, <i>Carabidae</i>	Insects, earthworms, gypsy moths
	Big-eyed bug, <i>Lygaeidae</i>	Aphids, caterpillar eggs and larvae, immature bugs, leafhoppers, spider mites
	Predacious stink bug, <i>Pentatomidae</i>	Potato beetles, caterpillar larvae, Mexican bean beetles
	Syrphid fly larvae, <i>Syrphidae</i>	Aphids, mealybugs
	Lady beetle, <i>Hippodamia convergens</i>	Aphids, mealybugs, spider mites
	Green lacewing larvae, <i>Chrysopa carnea</i>	Insect eggs, aphids, spider mites, thrips, leafhopper nymphs, caterpillar larvae
	Trichogramma wasp, <i>Trichogrammatidae</i>	200 pest insect eggs including cutworms, corn borers, corn earworms, armyworms, codling moths, cabbage moths
	Encarsia wasp, <i>Encyrtidae</i>	Greenhouse whiteflies

TIP:

Purchase only the pesticide and fertilizer you need for one season. Dispose of old or unused chemicals at your county's household hazardous waste drop-off site. Never pour pesticides down a sink, toilet or storm drain.



Summer

Photo by Dave Gunn

Photo by Washington Conservation District



Pest-Control Plants

Many plants produce natural chemicals that repel insects. When planted among flowers and vegetables, these plants help keep pests away.

Pest

Ant
 Aphids
 Bean leaf beetle
 Codling moth
 Colorado potato bug
 Cucumber beetle
 Flea beetle
 Cabbage worm
 Japanese beetle
 Leaf hopper
 Mexican bean beetle
 Slugs
 Spider mites
 Squash bug
 Stink bug
 Thrips
 Tomato hornworm
 Whitefly

Plant Repellent

Mint, tansy, pennyroyal
 Mint, garlic, chives, coriander, anise
 Potato, onion, turnip
 Common oleander
 Green beans, coriander, nasturtium
 Radish, tansy
 Garlic, onion, mint
 Mint, sage, rosemary, hyssop
 Garlic, larkspur, tansy, rue, geranium
 Geranium, petunia
 Potato, onion, garlic, radish, petunia, marigolds
 Prostrate rosemary, wormwood
 Onion, garlic, cloves, chives
 Radish, marigolds, tansy, nasturtium
 Radish
 Marigolds
 Marigolds, sage, borage
 Marigolds, nasturtium



Did you know that early fall is actually the best time to fertilize your lawn?

Selecting a Fertilizer

Before fertilizing, do a soil test. The results will indicate the acidity (pH) of your soil and if you have any nutrient deficiencies. In Minnesota it is illegal to use a phosphorus fertilizer on your lawn unless soil tests indicate that your soil needs phosphorus.

Choose a fertilizer with 35- 50% of the nitrogen in a slow-release form. This provides some nitrogen for immediate use while releasing some more slowly to provide for a longer sustained nutrient supply and more uniform growth. Acidic soils may need lime in addition to fertilizer (apply it in the fall so it can break down during the winter). Mature lawns generally require more nitrogen than potassium.

High and Low Maintenance Lawns

High-maintenance lawns are characterized by vigorously growing plants such as improved Kentucky bluegrass and improved turf-type perennial ryegrass varieties. These lawns require 3 to 4 pounds of nitrogen per 1,000 square feet of lawn area each year.

Low-maintenance lawns typically contain plants such as creeping red fescue, chewings fescue, hard fescue, or some of the common types of Kentucky bluegrass which grow and spread more slowly. A low-maintenance lawn will typically require only 1 to 2 pounds of nitrogen per 1000 square feet of lawn area per year.

Maintenance practices	Nitrogen (N) to apply lb. N/1000 ft ²	Timing of applications
	High-maintenance lawn	
(Irrigation, clippings removed)	4	Aug, Sept, mid-Oct, May-June
(Irrigation, clippings not removed)	3	Aug, mid-Oct, May-June
	Low-maintenance lawn	
(No irrigation, clippings removed)	2	Aug, mid-Oct.
(No irrigation, clippings not removed)	1	Sept

TIP:

Choose a fertilizer with 35 to 50% of the nitrogen in a slow-release form; look for the percentage of water insoluble nitrogen (WIN) on the label. Too much quick release nitrogen creates growth too quickly and can weaken the plant going into the summer.



Photo by Dakota County

Fall

TIP:

Applying fertilizer in the spring causes grass to grow tall instead of allowing the grass to develop its roots and food reserves. This makes your lawn more susceptible to disease and drought.

Choosing Application Equipment

It is important to apply lawn fertilizers uniformly for even growth. Proper application by hand is very difficult. Drop-type or rotary fertilizer spreaders are most effective.

Rotary spreaders tend to cover a broader swath, but take care to avoid application of any fertilizer to driveways, roads or bare soil. It is illegal and fertilizer could be washed into the water supply.

Use the following chart to determine the correct amount of fertilizer to apply for a desired amount of nitrogen

Fertilizer analysis	Lbs of fertilizer per 1000 square ft. to achieve 0.5 and 1 lbs of N per square ft.	
	(0.5 lbs N)	(1 lbs N)
*6-2-0	8.3	16.6
*10-10-10	5.0	10.0
*12-4-8	4.1	8.3
*16-8-8	3.1	6.2
20-0-16	2.5	5.0
*23-3-7	2.1	4.3
28-0-12	1.8	3.6
31-0-0	1.6	3.2
33.5-0-0	1.5	3.0
38-0-0	1.3	2.6
46-0-0	1.1	2.2

*Phosphorus fertilizer can **only** be used for gardens, trees and agricultural crops or for newly established lawns.

Fall



Photo by Minnesota Pollution Control Agency

Applied correctly, soil amendments conserve moisture, improve infiltration of rainfall water and unlock existing nutrients in the soil. Common soil amendments include lime, sulfur, ash, compost and manure.

Changing the pH of your Soil

Sulfur and lime are common amendments used to balance soil pH. Elemental sulfur makes soil more acidic. Dolomitic limestone adds calcium and magnesium as it increases pH to make soil more alkaline. Wood ashes also raise soil pH, but you must apply twice as much ash as limestone. Never use coal ashes or more than 20 pounds of wood ash per 1000 square feet, as toxicity may result.

Adding Nutrients to your Soil

Commercial fertilizers are the most common amendments for adding nutrients to soil. Other nutrient sources include cottonseed meal, kelp meal, leather meal and worm castings, each of which contains nitrogen, phosphorus and potassium in some amount. Common potassium sources also include granite meal, which releases potassium slowly, and greensand, which is more readily dissolved.

If you apply manure, compost and other organic matter regularly, it will improve your soil structure and nutrient content and you will need little or no synthetic fertilizers. Organic amendments must be applied more than once to work.

Fresh manure is quite high in nitrogen and may burn plants in a growing garden. It is best applied in the fall and tilled under. Manure is not recommended for lawns due to its high phosphorus content. Compost, typically made from yard clippings, kitchen scraps and fallen leaves, can be added to gardens when tilled in the spring or placed beneath mulch in plant beds. Composting produces a valuable source of nutrients, and the resulting dark earth, called humus, helps soil retain moisture.

Making Use Of Fallen Leaves

Deciduous trees provide cooling shade through the summer and let sunlight warm your home in the winter. But if you have large trees adorning your property, you may consider yourself cursed in the fall, when all those leaves need to be raked and carted away.

Save time by mowing over your leaf-covered lawn with a mulching mower instead of raking. Once broken into smaller pieces, the leaves will breakdown further and provide nutrients during the winter. If there are too many leaves, however, you may need to rake and compost some of them so that they don't smother the grass.

TIP:

Organic fertilizers typically contain more calcium, magnesium and micronutrients than commercial fertilizers.



Fall



Build a compost pile

- Select a location for composting. Many people build wooden or wire enclosures for composting, and some purchase mounted rotating bins. However, the microbes that produce good compost are content with a simple pile of leaves and grass clippings.
- Rake clippings from tall grass to use in your compost pile. They provide an excellent nitrogen source, especially if you are without access to manure. If the grass is green, however, do not add too much at once.
- Add other lawn wastes such as leaves (dry and fresh), straw, sawdust and wood chips. These provide carbon and nitrogen to the compost. Consider using your lawn mower to shred leaves before composting them.
- You can compost kitchen waste such as orange peels and apple cores, but avoid adding scraps that will attract pets or wild animals.
- Add diseased or insect-infested plant parts and weeds only if you are certain your compost pile will heat up enough to kill the pest organisms and weed seeds.
- Add an occasional layer of soil and some ground limestone to aid the decomposition process. Turn the compost occasionally.



Photo by Metro
Watershed Partners

It is often necessary to give your plants a little extra attention in the fall to help them make it through winter and start spring in peak condition.

Landscape with Winter in Mind

Begin by selecting hardy plants that can survive snow and freezing temperatures. Native plants are your best bet because they are uniquely adapted to Minnesota's climate. Also be sure to plant trees and shrubs in an appropriate site. Avoid poorly drained soil, low spots that create frost pockets and sites that experience rapid fluctuations in temperature. Consider the wintertime patterns of sun and shade in your yard.

Garden Cover Crops

Cover crops maintain and even improve the nutrients in your garden soil during the winter. The cover crop's roots hold the soil, decreasing erosion. When tilled under in the spring, the crop adds valuable organic material to the soil.

Plant winter cover crops in September or October. Till under plant wastes from the summer, then broadcast the seed and rake it evenly into the soil. If you have fall crops growing, you can sow cover crop seed between rows within a month of harvest without hampering your vegetables.

Some cover crops are legumes such as crimson clover, fava beans or hairy vetch. Others include barley, winter rye and winter wheat. Mixtures of two cover crops are often very effective.

Prune at the Right Time

Proper pruning throughout the year reduces damage by ice and snow. Trim branches so that limbs are not weighted down by ice and snow. Avoid late summer pruning, however, as it stimulates new growth, exhausting the nutrients a plant needs to survive winter.

TIP:

Many varieties of rhododendron, azalea, camellia, daphne and holly should be planted on the northern or eastern side of a building or wall to protect them from prevailing winds and intense winter sun.



TIP:

Remove snow from branches with a broom. Always sweep upward with the broom to lift snow off. When branches are frozen and brittle, avoid disturbing them. Wait until a warmer day.

Photo by Washington Conservation District



Water Properly

Be sure your plants have enough water. If autumn rains have been insufficient, give plants a deep soaking that will supply water to the entire root system before the ground freezes. This practice is especially important for evergreens.

Apply Mulch

Mulch helps to control erosion, retain moisture and stabilize soil temperature, as well as controlling weed growth. A two-inch layer of mulch material will reduce water loss and maintain uniform soil moisture around roots. Mulch also reduces repeat freezing and thawing of the soil, which causes significant damage to some shallow-rooted plants. Mulch can even be applied to garden beds in lieu of cover crops to prevent winter erosion. Use shredded hardwood mulch in rain gardens to prevent your mulch from floating away.

Protect Newly Planted Trees

Prevent bark splitting by wrapping trunks with burlap strips or a commercial tree wrap. Bark splits during extreme fluctuations in temperature. Afternoon sun warms exposed trunks and the sudden temperature drop at nightfall causes splits and cracks.



More Information

University of Minnesota Extension

Local Extension agents
www.extension.umn.edu/offices
Gardening, commercial horticulture, pest management
www.extension.umn.edu/garden
Yard and Garden Info
www.extension.umn.edu/garden/yard-garden
Forestry and woodland stewardship
www.myminnestawoods.umn.edu

Minnesota Department of Natural Resources

Bird feeding, gardens and native plants, living with wildlife, shoreland management, tree care
www.dnr.state.mn.us/backyard

Minnesota Pollution Control Agency

Water monitoring, water quality data
www.pca.state.mn.us/water

Minnesota Department of Agriculture

Animals and livestock, agricultural chemicals and fertilizers, plants, pests and pest control
www.mda.state.mn.us

U.S. Department of Agriculture

Natural Resources Conservation Service
Agriculture conservation and assistance programs
www.nrcs.usda.gov
(804) 287-1691

U.S. Environmental Protection Agency

Science and technology, laws and regulations
www.epa.gov
(202) 272-0167

U.S. Fish and Wildlife Service

Wildlife habitat
www.fws.gov
(800) 344-WILD

American Horticultural Society

Gardening resources and tips
www.ahs.org
(800) 777-7931

Blue Thumb - Planting for Clean Water

Native gardens, raingardens and shoreline plantings
www.bluethumb.org

Minnesota State Horticultural Society

Resources, classes, garden clubs
www.northerngardener.org

Minnesota Landscape Arboretum

Plant information, collections, classes
www.arboretum.umn.edu

Wild Ones

Native plants and natural communities
www.for-wild.org

Minnesota Water - Let's Keep it Clean

Seasonal tips for keeping water clean
www.cleanwatermn.org

Photo Credits

Large front and back cover photo:
Native plant garden - Rice Creek Watershed District

Front cover (top to bottom):
Shoreline planting - Rice Creek Watershed District
Learning about native plants - Angie Hong
Leaf raking - Metro Watershed Partners
Winter garden - Angie Hong

Back cover:
Woman in raingarden - Bonnie Juran



www.BlueThumb.org

