EXTENDING KNOWLEDGE ❯❯ CHANGING LIVES

Soil Testing Made Simple

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EXTENDING KNOWLEDGE ❯❯ CHANGING LIVES

- Why Test Your Soil
- Timing
- Equipment
- Sampling Areas and Patterns
- Local Labs
- Fertilizer Calculations

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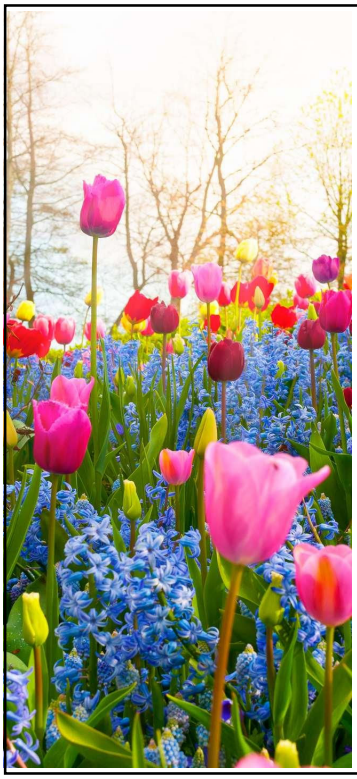

Timing

- Every 3-5 years
- Spring
- Fall
- After establishing a new garden
- Growth Issues
- High compost use

Equipment

- Clean bucket
- Clean shovel or trowel
- Sealable paper or plastic bag
- Lab submission form

Sample Area

- Soil can be highly variable
  - Collect from a uniform section
  - Multiple samples
- "W" or "Z" pattern
  - 6-8 sub samples
  - 4-6 inch depth
  - Remove any plant debris
- Mix sub samples
- 2 cups of soil for testing

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Soil Testing Labs

- Agvise
  - Northwood, ND
  - Benson, MN
  - https://www.agvise.com/
- University of Minnesota
  - St. Paul, MN
  - https://soiltest.cfans.umn.edu/

AGVISE LABORATORIES

804 Highway 15 West
PO Box 510
Northwood, ND 58267
northwoodlab@agvise.com
701-587-6010

902 13th Street North
PO Box 187
Benson, MN 56215
bensonlab@agvise.com
320-843-4109

Soil Submission Form – Lawn, Garden, Landscaping

One soil sample per sheet. All prices in U.S. dollars, effective April 1, 2025. Subject to change.

Homeowner Information		Submitter Information (if different)	
Name		Name	
Address		Address	
City, State, Zip		City, State, Zip	
Email		Email	
Phone		Phone	
		Account #	

See reverse side for instructions on soil sample collection and shipping

Reference number – For office use only.

Soil Sample Information
Create a sample ID. Write it below and on the soil bag.

Sample ID
Sample Depth (inches)
Sample Date

Crop Choice *Mark up to 3 choices.*

- ▫ Lawn
- ▫ Corn (sweet)
- ▫ Vegetable Garden
- ▫ Potato
- ▫ Strawberry
- ▫ Tomato

Additional horticultural assistance and help can be obtained from your local county extension office or Master Gardener program.

Soil Analysis Option
Mark one soil analysis option.

▫ B + OM - $27.30	nitrate-N, phosphorus, potassium, pH, salinity, organic matter
▫ C5 - $38.35	nitrate-N, phosphorus, potassium, calcium, magnesium, sodium, sulfate-S, zinc, pH, salinity, organic matter, CEC, base saturation
▫ F1 - $50.40	nitrate-N, phosphorus, potassium, calcium, magnesium, sodium, sulfate-S, chloride, boron, copper, iron, manganese, zinc, pH, salinity, organic matter, carbonate, CEC, base saturation

Additional Analysis

▫ Soil Texture - $26.50	sand, silt, clay, USDA class

Suggested Soil Analysis Options
Option B + OM for NPK fertilizer guidelines. Option C5 if irrigated (salinity or sodicity risk). Option F1 for comprehensive analysis or if troubleshooting problems.

Payment	Amount $
▫ Check enclosed	▫ Call for credit card
▫ Bill account	

SD Residents: Do not include payment. You will be invoiced separately to include appropriate SD Sales and Use Tax.

SOIL TEST RESULTS

Match fertilizer to your soil test!

N-P-K

Nutrient In The Soil			Interpretation			
			VLow	Low	Med	High
Nitrate	0-6"	41 lb/acre	******	******	******	******
Phosphorus	Olsen	41 ppm	******	******	******	******
Potassium		295 ppm	******	******	******	******
Chloride						
Sulfur						
Boron						
Zinc						
Iron						
Manganese						
Copper						
Magnesium						
Calcium						
Sodium						
Org. Matter		3.8 %	******	******	***	
Carbonate (CCE)						
Sol. Salts	0-6"	0.36 mmho/cm	******	**		

1st Crop Choice			2nd Crop Choice			3rd Crop Choice		
Veg. Garden			Potatoes			Cabbage		
YIELD GOAL			YIELD GOAL			YIELD GOAL		
1 Season			250 Cwt			1 Season		
SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
Broadcast			Broadcast			Broadcast		
LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION	
N	124		N	54		N	129	
P_2O_5	27	Broadcast	P_2O_5	30	Band (2x2) *	P_2O_5	25	Band (Starter)*
K_2O	0		K_2O	30	Band (2x2) *	K_2O	0	
Cl			Cl			Cl		
S			S			S		
B			B			B		
Zn			Zn			Zn		
Fe			Fe			Fe		
Mn			Mn			Mn		
Cu			Cu			Cu		
Mg			Mg			Mg		
Lime	0		Lime	0		Lime	0	

Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)				
			% Ca	% Mg	% K	% Na	% H
0-6" 7.8							

Crop 1: Soil nitrate for 0-24 inch depth is estimated 71 lb/acre nitrate-N. To convert lb/acre to lb/1000 sq. ft, divide the lb/acre guideline by 50 (e.g. 100 lb/acre equals 2 lb/1000 sq. ft). May respond to starter P & K, even on high soil tests. AGVISE Broadcast guideline will build P & K test levels to the high range over several years.

Crop 2: Soil nitrate for 0-24 inch depth is estimated 71 lb/acre nitrate-N. *CAUTION: Seed-placed fertilizer can cause injury.* May respond to starter P & K, even on high soil tests. Crop nutrient removal: P_2O_5 = 45 K_2O = 125 AGVISE Broadcast guideline will build P & K test levels to the high range over several years.

Crop 3: Soil nitrate for 0-24 inch depth is estimated 71 lb/acre nitrate-N. *CAUTION: Seed-placed fertilizer can cause injury.* May respond to starter P & K, even on high soil tests. AGVISE Broadcast guideline will build P & K test levels to the high range over several years.

SOIL TEST RESULTS

Match Fertilizer to your soil test!

N-P-K

Nutrient In The Soil			Interpretation			
			VLow	Low	Med	High
Nitrate	0-6"	370 lb/acre	******	******	******	******
Phosphorus	Olsen	171 ppm	******	******	******	******
Potassium		563 ppm	******	******	******	******
Chloride						
Sulfur						
Boron						
Zinc						
Iron						
Manganese						
Copper						
Magnesium						
Calcium						
Sodium						
Org. Matter		15.5 %	******	******	******	******
Carbonate (CCE)						
Sol. Salts	0-6"	1.85 mmho/cm	******	******	******	******

1st Crop Choice		
Veg. Garden		
YIELD GOAL		
1		Season
SUGGESTED GUIDELINES		
Broadcast		
LB/ACRE		APPLICATION
N	0	
P_2O_5	0	
K_2O	0	
Cl		
S		
B		
Zn		
Fe		
Mn		
Cu		
Mg		
Lime	0	

2nd Crop Choice		
Lawns		
YIELD GOAL		
1		Season
SUGGESTED GUIDELINES		
Broadcast		
LB/ACRE		APPLICATION
N	0	
P_2O_5	0	
K_2O	0	
Cl		
S		
B		
Zn		
Fe		
Mn		
Cu		
Mg		
Lime	0	

3rd Crop Choice
No Selection
YIELD GOAL
SUGGESTED GUIDELINES
No Selection

SOIL TEST RESULTS

Match Fertilizer to your soil test!

N-P-K

Nutrient In The Soil		Interpretation			
		VLow	Low	Med	High
0-6" Nitrate	2 lb/acre	•			
Olsen Phosphorus	4 ppm	••••••			
Potassium	280 ppm	••••••••••••••••••••••••••••			
Chloride					
Sulfur					
Boron					
Zinc					
Iron					
Manganese					
Copper					
Magnesium					
Calcium					
Sodium					
Org.Matter	5.4 %	•••••••••••••••••••••••••••			
Carbonate(CCE)					
0-6" Sol. Salts	0.35 mmho/cm	••••••••			

1st Crop Choice			2nd Crop Choice			3rd Crop Choice		
Veg. Garden			Lawns					
YIELD GOAL			YIELD GOAL			YIELD GOAL		
1 Season			1 Season					
SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
Broadcast			Broadcast					
LB/ACRE		APPLICATION	LB/ACRE		APPLICATION	LB/ACRE		APPLICATION
N	175		N	200		N		
P_2O_5	152	Broadcast	P_2O_5	86	Broadcast	P_2O_5		
K_2O	0		K_2O	0		K_2O		
Cl			Cl			Cl		
S			S			S		
B			B			B		
Zn			Zn			Zn		
Fe			Fe			Fe		
Mn			Mn			Mn		
Cu			Cu			Cu		
Mg			Mg			Mg		
Lime			Lime			Lime		

Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)				
			% Ca	% Mg	% K	% Na	% H
0-6" 8.0							

Crop 1: Soil nitrate for 0-24 inch depth is estimated 20 lb/acre nitrate-N. To convert lb/acre to lb/1000 sq. ft, divide the lb/acre guideline by 50 (e.g. 100 lb/acre equals 2 lb/1000 sq. ft). May respond to starter P & K, even on high soil tests. AGVISE Broadcast guideline will build P & K test levels to the high range over several years.

Crop 2: Soil nitrate for 0-24 inch depth is estimated 20 lb/acre nitrate-N. To convert lb/acre to lb/1000 sq. ft, divide the lb/acre guideline by 50 (e.g. 100 lb/acre equals 2 lb/1000 sq. ft). Total nitrogen for lawn should be split across 3 or 4 applications during the season. May respond to starter P & K, even on high soil tests. AGVISE Broadcast guideline will build P & K test levels to the high range over several years.

SOIL TEST RESULTS

Recommendations based on *lb/1000 sq feet*. Use these calculations for fertilizing lawns, home gardens, or raised beds.

Use Table A for conventional fertilizers or Table B for organic fertilizers

Enter fertilizer and garden data in blue boxes. Press "Enter" to complete calculation.

Calculation for fertilizer needed is in yellow box.

Calculations showing other information are in green boxes.

A. Conventional Fertilizers: Includes manufactured fertilizers such as urea, diammonium phosphate, ammonium sulfate, potassium chloride, and blends of these materials

	Garden Example	Lawn Example	Your Calculation 1	Your Calculation 2	
Step 1. Enter N-P-K on Fertilizer label					
Fertilizer N	8	21	10		The N-P-K percentages are shown on the fertilizer bag or box
Fertilizer P (P_2O_5)	4	3	10		
Fertilizer K (K_2O)	8	6	10		
Step 2. Enter N recommendation					*N recommendation is from A Home Gardener's Guide to*
lb/1000 sq feet	2	1	3.5		*Soils and Fertilizers, soil test recommendations, or other*
Step 3. Enter Lawn or Garden area					*publications*
square feet	250	2000	100		Measure your lawn, garden, or raised bed to calculate area
Calculations					
Total fertilizer needed (lb)	6.3	9.5	3.5	#DIV/0!	*Recommended amount of fertilizer to apply*
P_2O_5 supplied lb/1000 ft2	1	0.1	3.5	#DIV/0!	These show how much P_2O_5 and K_2O will be applied when you
K_2O supplied lb/1000 ft2	2	0.3	3.5	#DIV/0!	apply fertilizer at the recommended rate.

WSU:https://puyallup.wsu.edu/soils/archive-wsu-puyallups-legacy-of-urban-and-organic-systems-research/gardening/

University of Georgia: https:/aesl.ces.uga.edu/soil/fertcalc/

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Fertilizer Types

- Organic
- Synthetic
- Water-soluble, liquid
- Slow-release
- Compost
  - Plant or animal
  - Acts as a slow-release

Questions ?

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References

- UMN Extension. Soil Testing for Lawns and Gardens. https://extension.umn.edu/managing-soil-and-nutrients/soil-testing-lawns-and-gardens. Accessed 1.20.26.
- NDSU Extension. Evaluating, Preparing and Amending Lawn and Garden Soil. H1325. June 2021.
- NDSU Extension. Interpreting the NDSU Soil Test Analysis for Managing Turfgrass. H1824. April 2023.
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