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Gardening Basics

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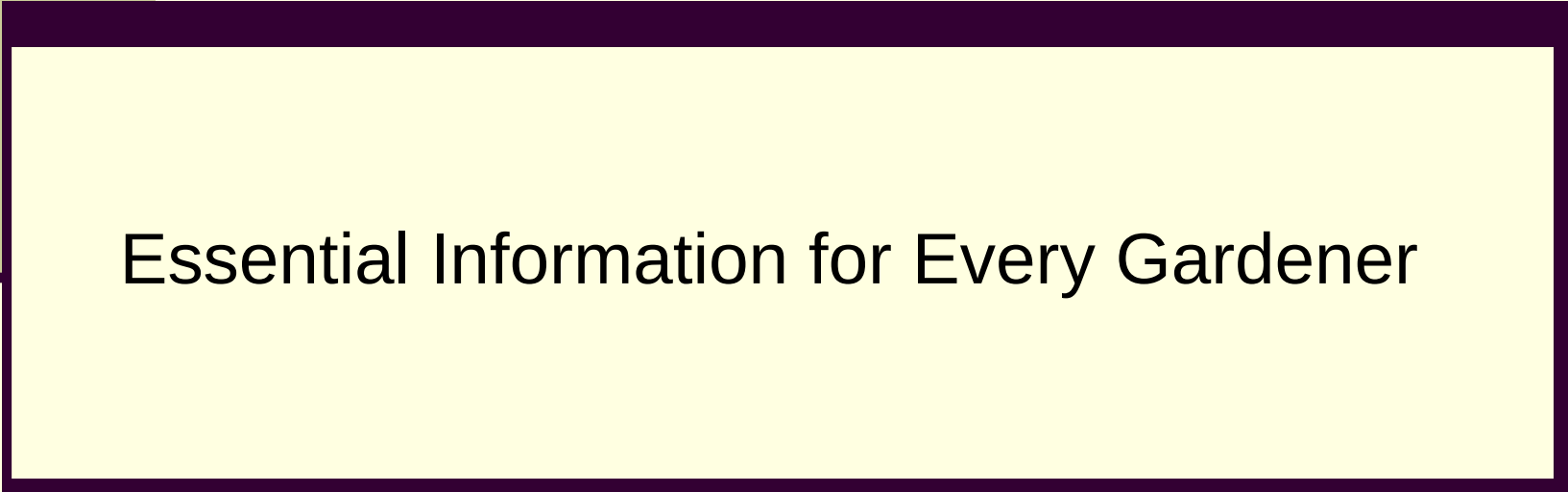
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Gardening Basics

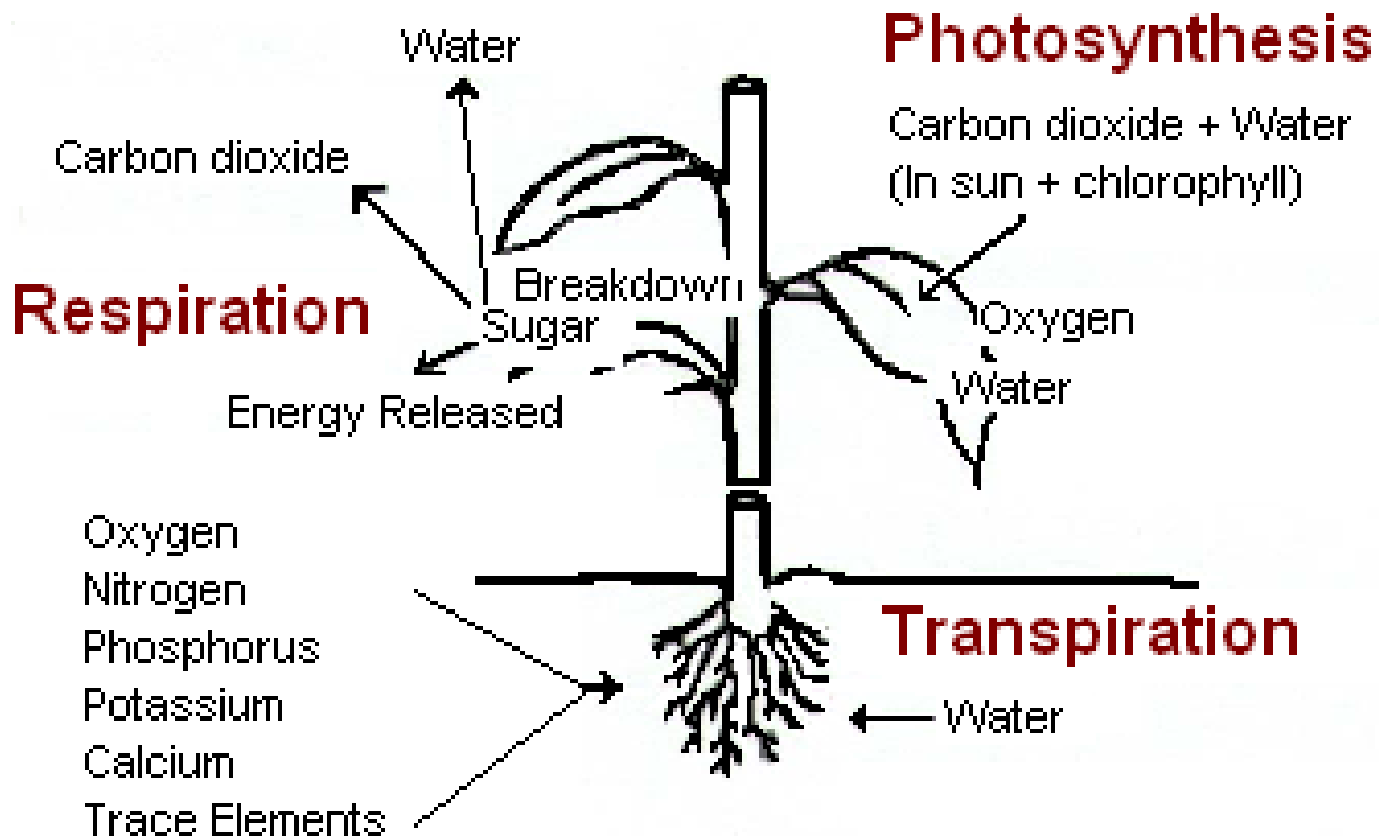


Essential Information for Every Gardener

Topics

- Plant Processes
- Soil
- Water
- Fertilizer
- Weed, Pest, and Disease Control
- Climate Zones
- Plant Material and Selection
- Plant Names
- A Quick Guide to Lawn Care

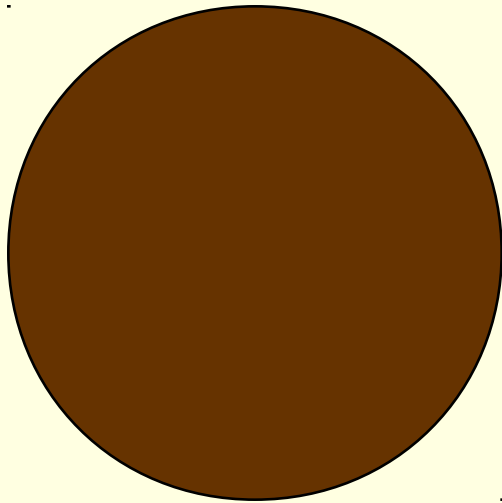
Plant Processes



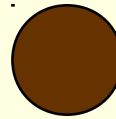
Soil

- Type
- pH
- Nutrients
- Soil Tests
- Soil Improvement Methods
- Organic Material
- Macro and Micro Organisms

Soil Particles



Sand



Silt



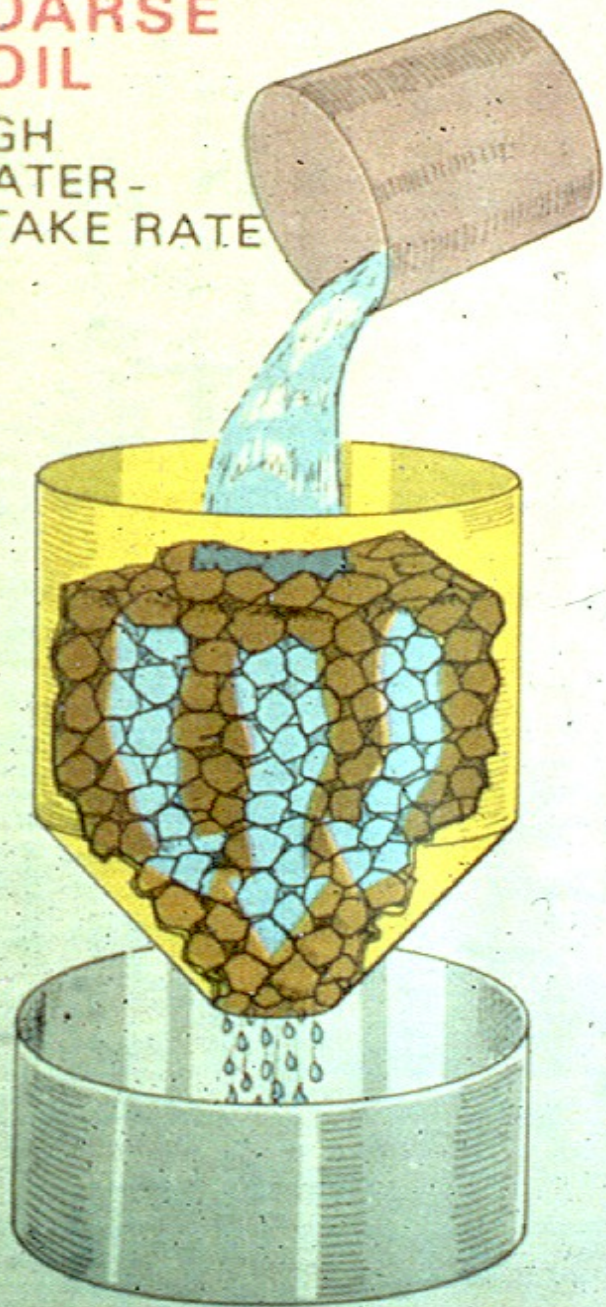
Clay

Soil Type

- Mostly sand
 - Does not retain water or nutrients.
- Mostly clay
 - Dries rock hard.
 - Compacts.
 - Does not absorb water.
 - Increases problems such as root rot.
- Loam (20% clay, 40% silt, 40% sand)

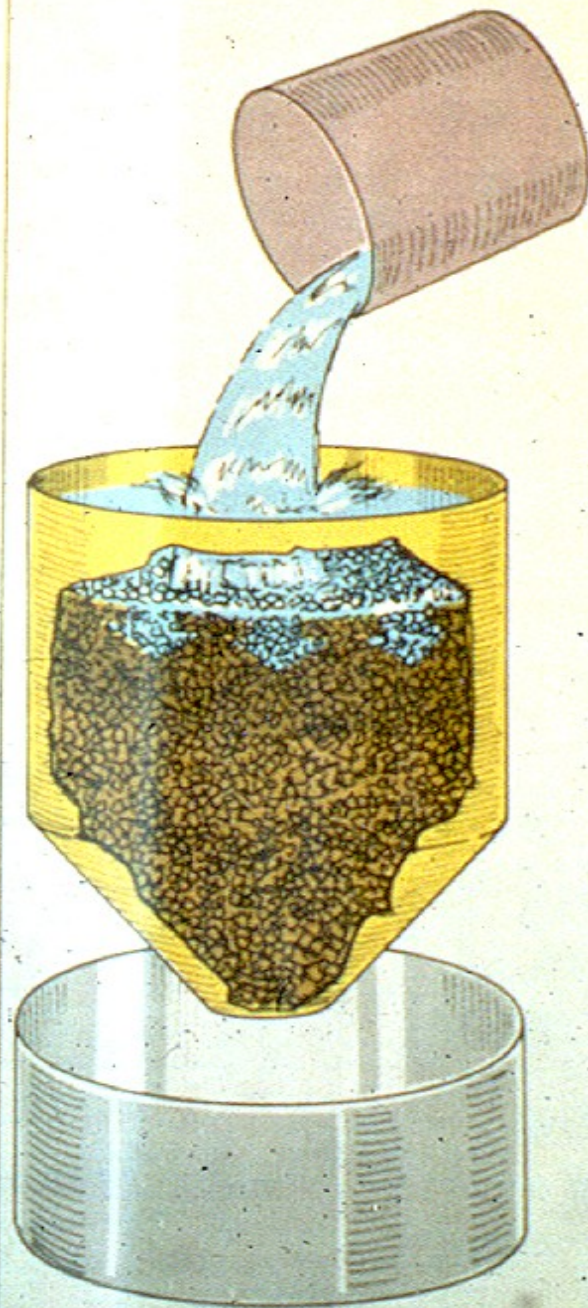
**COARSE
SOIL**

HIGH
WATER-
INTAKE RATE



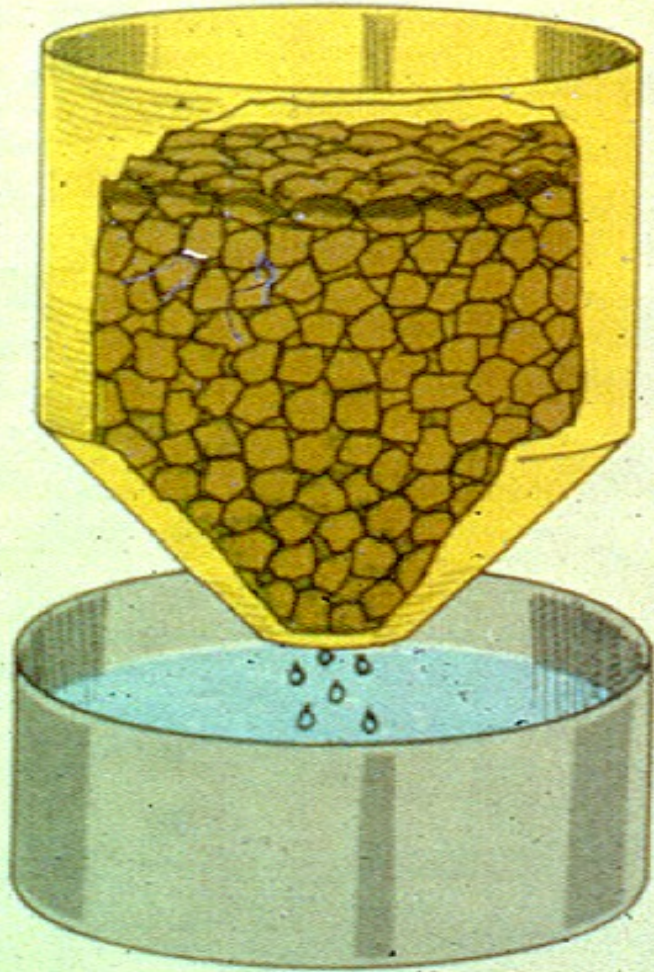
**FINE
SOIL**

LOW
WATER-
INTAKE
RATE



COARSE - TEXTURED SOIL

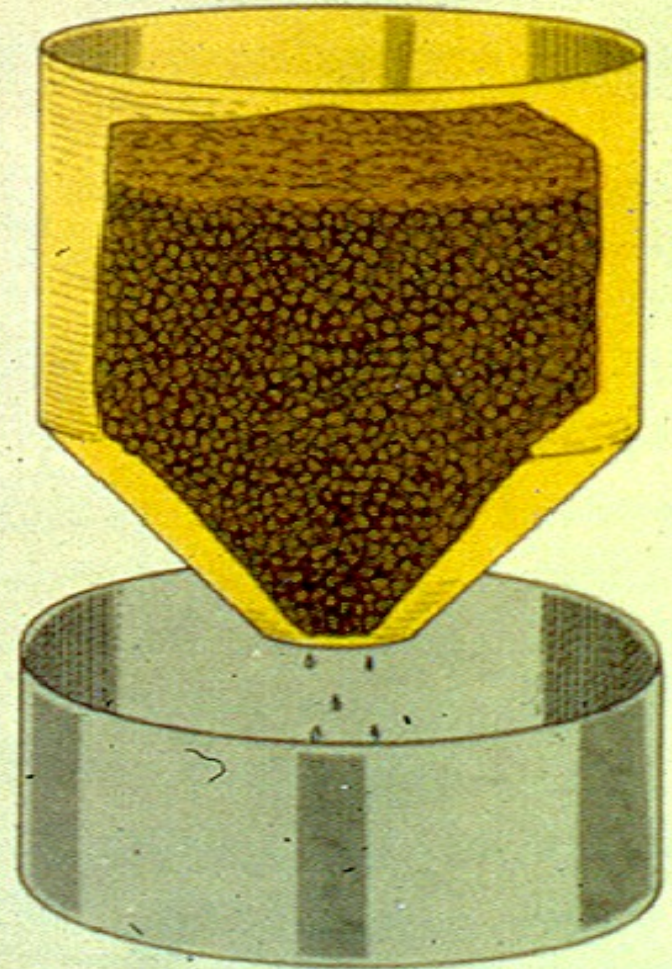
LOW WATER -
HOLDING CAPACITY



(a)

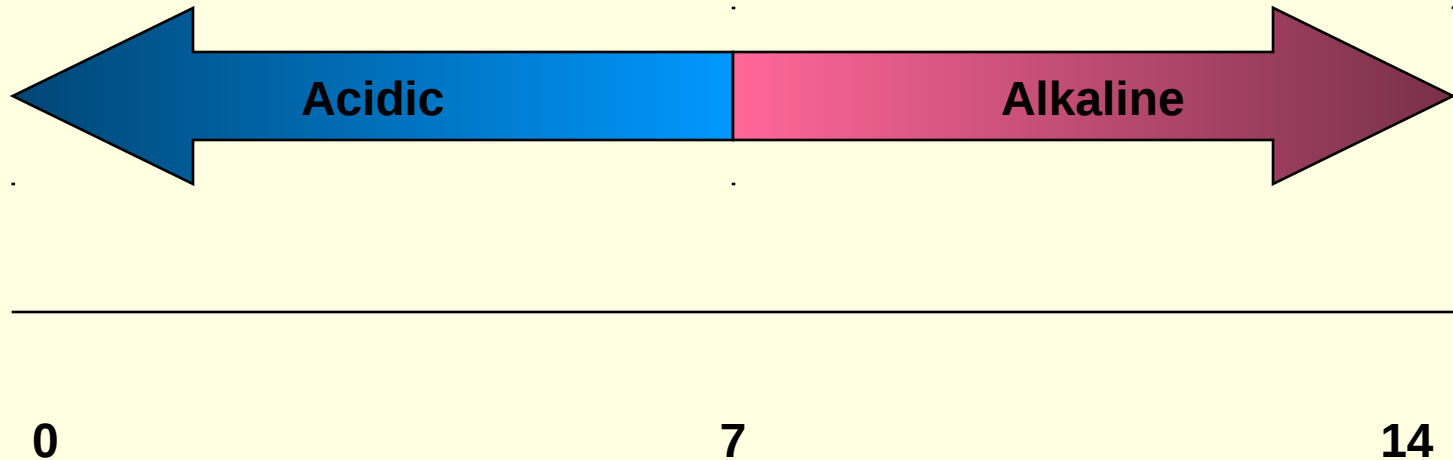
FINE - TEXTURED SOIL

HIGH WATER -
HOLDING CAPACITY



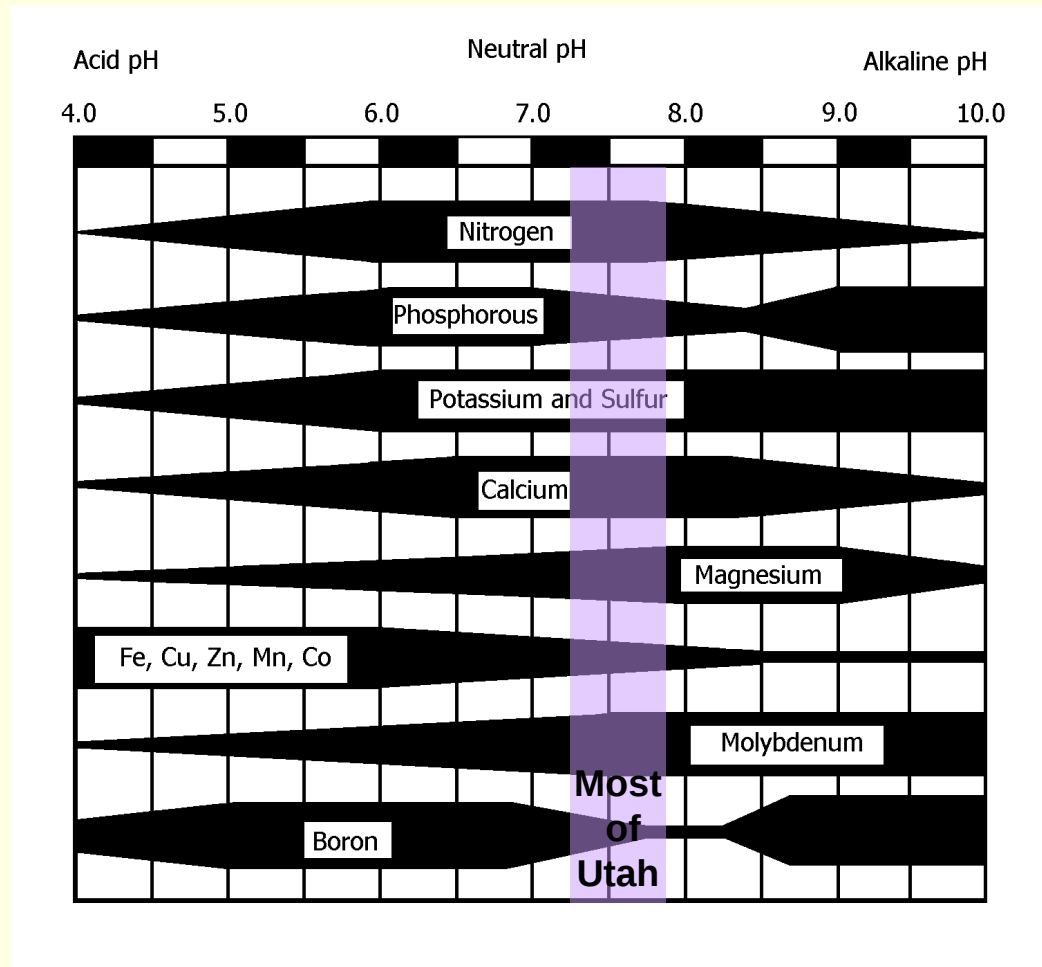
(b)

Soil pH



**Alkalinity may make soil nutrients unavailable to plants.
Changing pH is very difficult in Utah.**

Effect of Soil pH



Nutrients

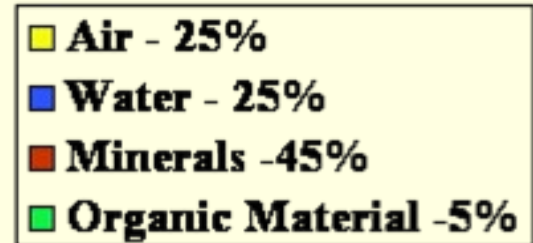
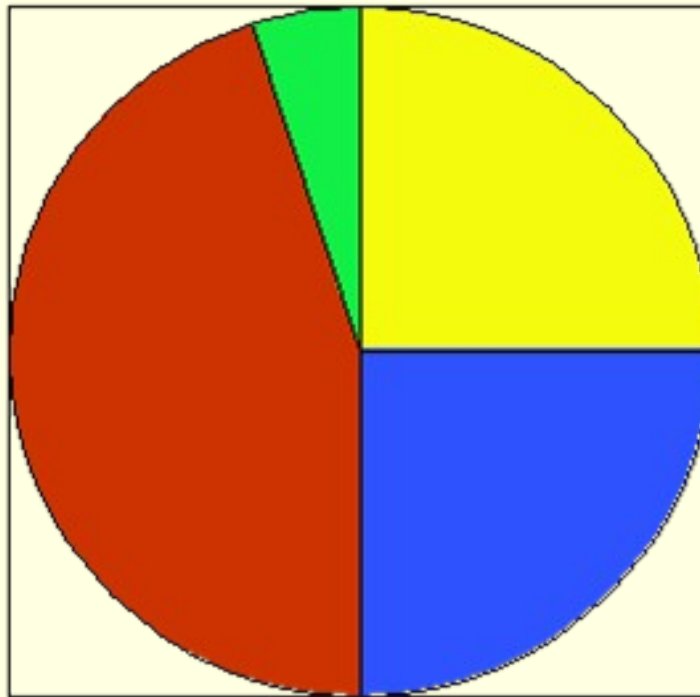
■ Macronutrients

- Nitrogen
- Phosphorus
- Potassium
- Sulfur
- Calcium
- Magnesium
- Hydrogen, Oxygen and Carbon

■ Micronutrients

- Iron
- Boron
- Copper
- Manganese
- Molybdenum
- Zinc

Four Components of Soil



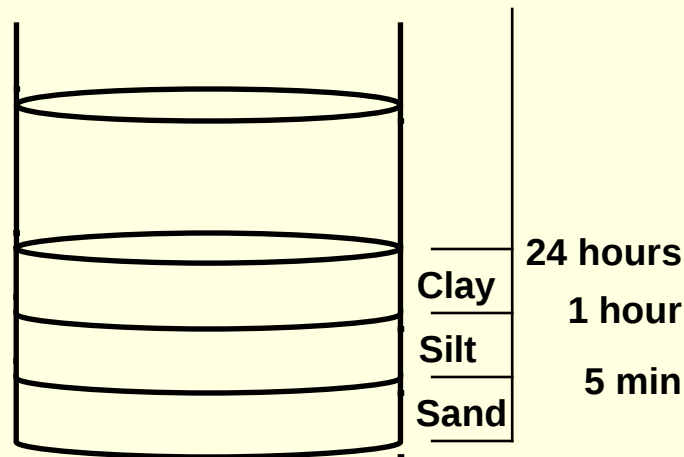
Utah topsoil contains less than 1% organic material.

Soil Tests

- Canning Jar Test
- Ribbon Test
- Over-the-counter Tests
- Utah State University (USU) Soil Testing

Canning Jar Test

1. Put one cup of soil in a quart jar.
2. Add water until the jar is 2/3 full.
3. Mix thoroughly and record settling levels.



Percentages

- Percentage of clay = $24 \text{ hr} - 1 \text{ hr} / 24 \text{ hr}$
- Percentage of silt = $1 \text{ hr} - 5 \text{ min} / 24 \text{ hr}$
- Percentage of sand = $5 \text{ min} / 24 \text{ hr}$
- Loam = 40% sand, 40% silt, 20% clay

Ribbon Test

1. Take a handful of soil; moisten if dry.
2. Attempt to squeeze the soil into a ribbon using your thumb.
3. Determine the length of the ribbon.
4. Add water to make a soupy mud.
5. With a dry hand, determine if the soup feels mostly gritty or mostly smooth, or both.
6. Check the table below to determine the type of soil.

Over-the-Counter Tests

- Garden centers carry home soil test kits.
- Tests kits for a single test start about \$1.
- Kits test multiple factors:
 - pH
 - Nitrogen, Phosphorous, Potassium (N-P-K)
 - Moisture
- Results are only approximate.
- Using distilled water increases accuracy.
- Soil test meters are also available.

USU Soil Testing

- Obtain the kit from the USU Davis County Extension Office.
- Follow the instructions in the kit to take a soil sample from your yard.
- Select tests you want USU to make.
- Send the sample with a check for the appropriate amount to the address provided in the kit.

Soil Compaction

- Soil may become compacted from:
 - Heavy equipment in new construction areas.
 - Excessive tilling.
 - Traffic (play, animals).
 - Soil chemistry.
- Aeration, liquid conditioners, and digging can loosen compacted soil.

Soil Improvement Methods

- Organic Material
- Green Manures
- Double Digging

Organic Material

- Retains water in sand.
- Increases drainage and aeration.
- Breaks up compacted soils.
- Adds nutrients to the soil.
- Moves the pH towards neutral.

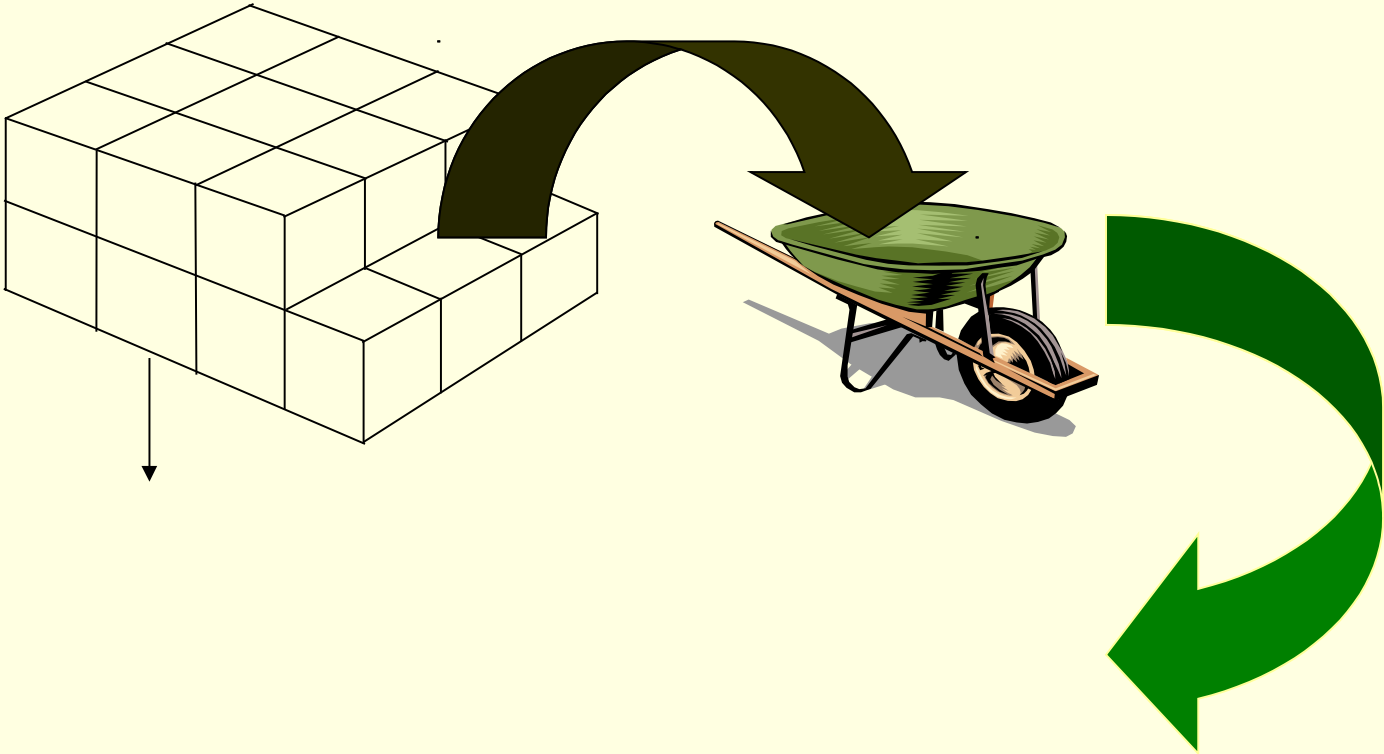
Sources of Organic Matter

- Compost
- Tree leaves
- Pine needles (acidic)
- Grass clippings
- Manure – horse, cow, chicken, rabbit ...
 - Fresh manure can burn plants.
- Recycled paper and cardboard

Green Manures

- Green manures are cover crops that are tilled into a planting bed just before they go to seed:
 - Alfalfa
 - Clover
 - Vetch
 - Barley
 - Buckwheat
 - Winter rye

Double Digging



Macro and Micro Organisms

- Soil is teeming with life essential to healthy soil.
- Fungi, bacteria and other microscopic organisms convert organic material to nutrients.
- Earthworms and small animals aerate and mix soils and leave droppings.
- Other organisms act as predators.

Water

- Drainage
- Guidelines
- Hydrozoning

Drainage

- Soil drainage test:
 - Dig a hole 18 inches deep.
 - Fill with water.
 - Measure the time required to drain completely.
(Longer than 5 hours indicates poor drainage.)
- Most plants will drown if water collects around roots (no oxygen uptake).
- Sandy soils do not retain water easily and must be watered more frequently.
- Heavy soils prevent water draining away from roots.
- Raised beds improve drainage in clay soils.

Watering Guidelines

- Water early in the day.
- Avoid frequent, light watering.
- Base the frequency of watering on soil type.
- Know how much water you are applying.
 - See USU online publications for sprinkler system water-check instructions:
<http://extension.usu.edu/files/publications/publication/HG-2003-02.pdf>
- Avoid runoff.

Hydrozoning vs. Xeriscaping

- Xeriscaping is an industry buzz word and has many different interpretations.
- Hydrozoning is a method of grouping plants by their water needs.
- Design your garden to create distinct garden areas with separate water sources.
- Plant species with common water needs in each area.

Fertilizer

- N-K-P
- Pounds of Nitrogen
- Application

N-P-K

- % Nitrogen (N) – vegetative growth
- % Phosphorus (P) – roots, flowers, fruit
- % Potassium (K) – plant health
- 4-10-8 = 4% N, 10% P, 8% K
- Quick release vs. slow release

Pounds of Nitrogen

Lbs in bag	% N	Lbs N required	Lbs to apply
20 (21-0-0)	21	4	19
10 (34-0-0)	34	4	11
20 (6-2-0)	5	4	67

Fertilizer Application

- Application method varies:
 - Lawns – apply evenly over entire surface.
 - Perennial beds – broadcast.
 - Vegetable and rose beds – work into soil around plants, six inches away.
- Excess fertilizer causes plant problems.
- Water moves fertilizer to the roots.

Weed Control

- Do not allow weeds to go to seed.
 - Remove
 - Mulch
 - Prepared organic and cover crops
 - Plastic
 - Weed block
 - Solarize
 - Apply chemicals

Chemical Weed Control

- Pre-emergent – prevents germination of annual and perennial weeds.
- Broadleaf – selectively kills non-grass weeds; particularly useful in lawns.
- Roundup™ – kills all plants on contact; use to kill grass weeds; reseed lawns after use.
- Grass-Be-Gone™ – selectively kills grass weeds; useful in perennial beds.

Disease Control

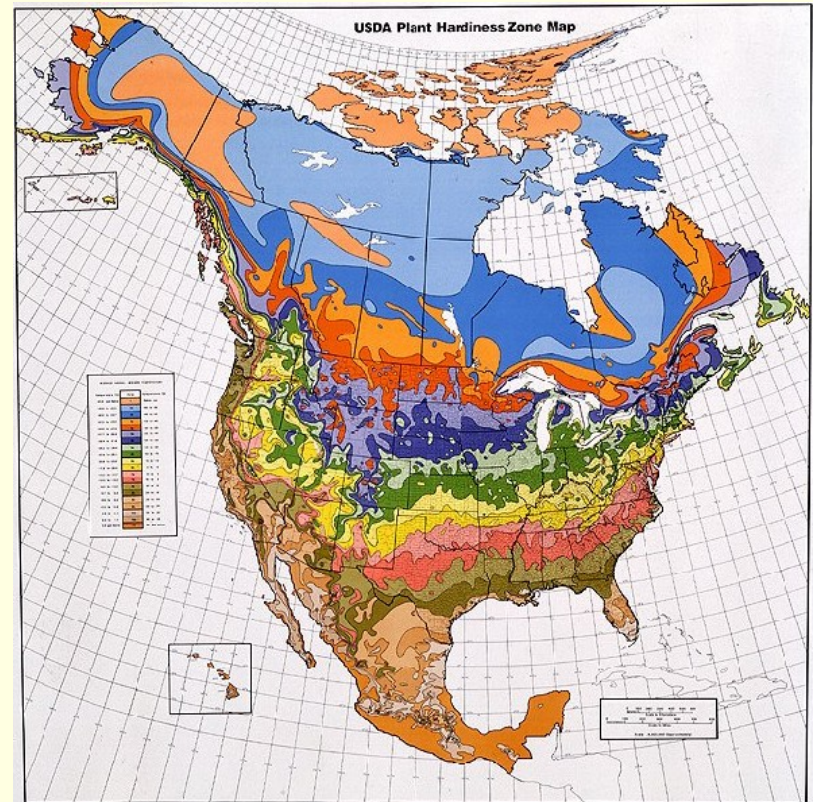
- Do not crowd plants.
- Rotate annually (does not apply to perennials).
- Clean the plants.
- Remove debris.
- Water the soil, not the plants.
- Select disease-resistant varieties.
- Make sure that air can circulate to dry off the leaves.

Insect Control

- Keep plants healthy.
- Keep the garden clean.
- Monitor plants for insect damage.
- Manually remove insects when practical.
- Introduce predatory insects.
- Use pesticides sparingly; follow the instructions on the label.
 - Pesticides will kill beneficial insects as effectively as they kill pests.

Climate Zones

- Hardiness Zones
 - USDA →
 - Sunset
 - Arnold Arboretum
- Micro Climates
- Wind Patterns
- Sun Exposure



Plant Material and Selection

- Choose the right plant for the right location.
- Consider
 - Aesthetics
 - Use
 - Environment – wind, soil type
 - Climate – macro and micro
 - Spacing
 - Size at maturity
 - Power lines

Plant Common Names

- A plant may have many different common names such as ***Nymphaea alba*** (a white water lily) which has 15 English, 44 French, 105 German and 81 Dutch common names.
- Several plants may have the same common name such as Dusty Miller among which are ***Artemesia stellerna*, *Centaurea cineraria*, *Chrysanthemum ptramiciflorum*, *Lychnis coronaria*, and *Senecio cineraria*.**
- The scientific name uniquely identifies a plant.

Plant Scientific Names

- Scientific names are binomial (two piece) names that uniquely identify a species.
- The two pieces are **Genus** and ***specific-epithet*** and constitute the species name.
- Genus name are capitalized; the binomial name is italicized.
- A name in single quotes appended to the species name identify a cultivar of the species.
- For example, a variety of the Sugar Maple is:
 - ***Acer saccharum*** 'Legacy'
- Genetic crosses between two species are identified by an x. (*Caryopteris x clandonensis*)

Inferences from Names

- The specific epithet may describe:
 - Characteristics
 - Origin
 - Developer
- Plants in a given family have similar problems
 - Rosaceae – fire blight
 - Solanaceae – verticillium wilt

Quick Guide to Lawn Care

- Mow – high; 2½ to 3 inches
- Water – deeply and infrequently
- Fertilize – 4 to 6 lbs of nitrogen per 1000 square feet per year spread over the growing season; late fall most advantageous
- Aerate
- Control bugs and weeds

Resources

- Utah State University Extension Office
Davis County Courthouse, Room 200
28 East State Street, Farmington
 - Gardening Hotline: 451-3204
 - Diagnostic Clinics: May – September,
Tuesdays, 1– 4pm
 - Speakers Bureau
- “Backyard Basics” – public gardening classes
Utah House, Thursday evenings, 7–8pm
- Books – use the library or buy your own favorites.

USU Publications

- Online publications:
<http://extension.usu.edu/htm/publications/>
- Preparing garden soil:
<http://extension.usu.edu/files/gardpubs/hfs01.pdf>
- Water check:
<http://extension.usu.edu/files/publications/publication/HG-2003-02.pdf>
- Water-wise landscaping:
<http://extension.usu.edu/files/publications/publication/HG-518.pdf>
- Water-wise plants:
<http://extension.usu.edu/files/publications/cernyrev.pdf>
- Inorganic fertilizer
<http://extension.usu.edu/files/gardpubs/hg509.pdf>
- Organic fertilizer
<http://extension.usu.edu/files/gardpubs/organic.htm>

Summary

- Know and improve your soil.
- Select plants to match your site and needs.
- Water deeply and infrequently.
- Fertilize according to the needs of the plants.
- Control weeds before they go to seed.
- Get dirty and enjoy it.