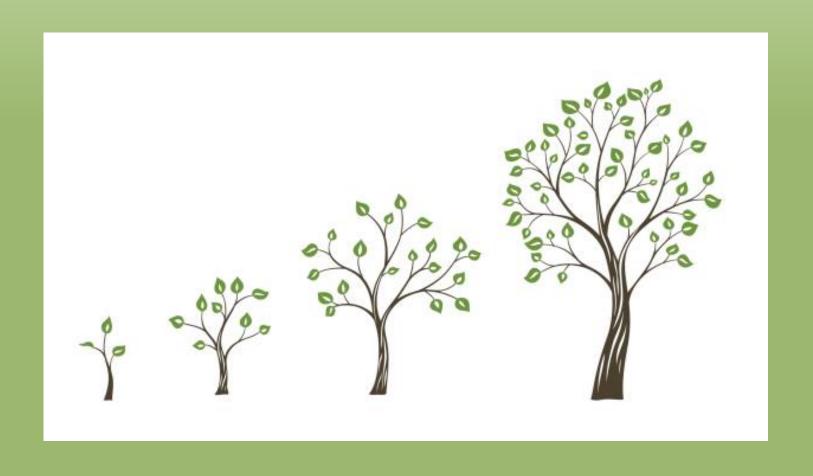


Today's Session Outline

- Basic knowledge of plant growth
- General care and maintenance of trees
- Special plant care (Part 1) Shrubs

Tree Growth Parts and Processes



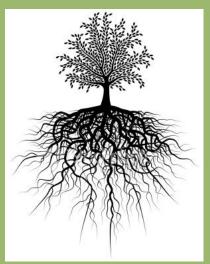
Trees

- Woody plant with a single stem, growing to at least 12 to 15 feet tall. Has branches and a distinct head some distance from the ground
- Trees made up of
 - Roots
 - Stems and Branches
 - Leaves

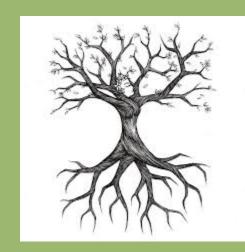


Typical Impression of Tree Roots











Actual Tree Root Growth



Actual Tree Root Growth

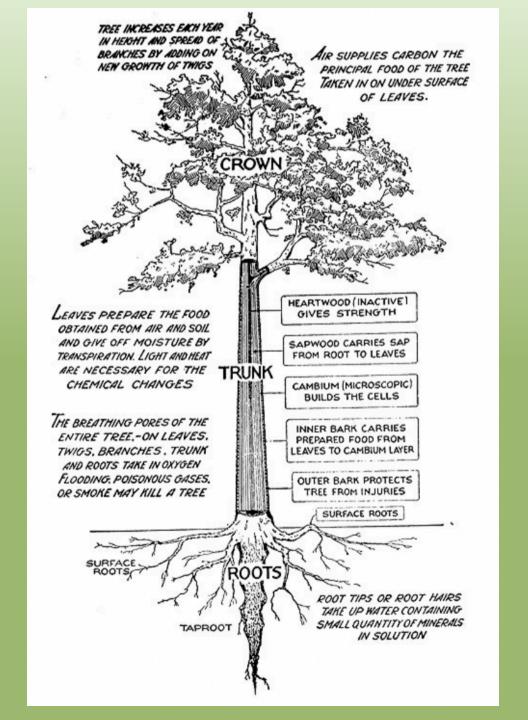


Actual Tree Root Growth

- Anchorage, support, storage, movement of water and nutrients
- Found in upper 2-6' of soil
- Root Apical Meristem

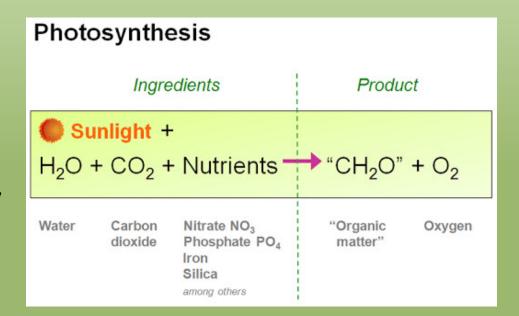


Tree Growth



Photosynthesis

- Green plants use sunlight to make food from carbon dioxide and water
- Occurs during the day
- Releases oxygen
- Environmental effect internal processes



Photosynthesis

Water

Product Ingredients Sunlight + $H_2O + CO_2 + Nutrients$ "CH₂O" + O₂ Nitrate NO₃ "Organic Carbon Oxygen Phosphate PO₄ matter" dioxide Iron

Silica

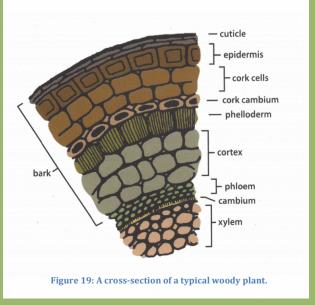
among others

Glucose

Stems and Branches

- Movement, Support, Maximizing
 Photosynthesis
- Vascular System
 - Xylem
 - Phloem
 - Cambium





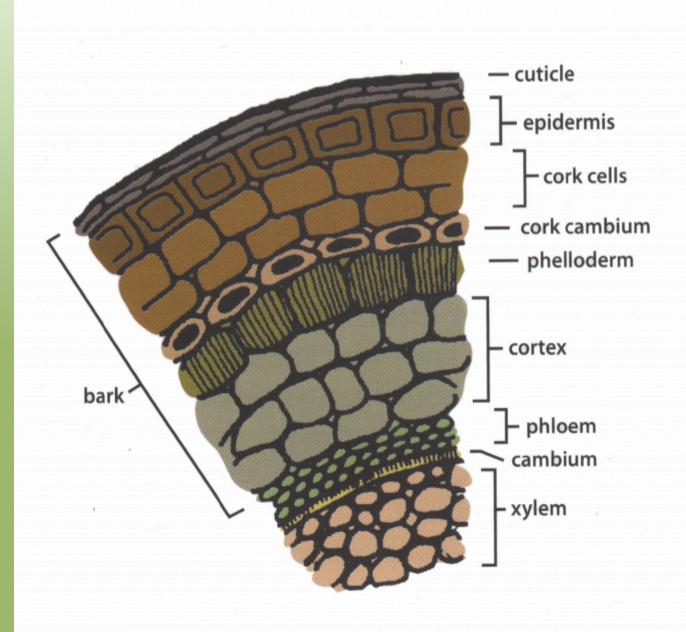
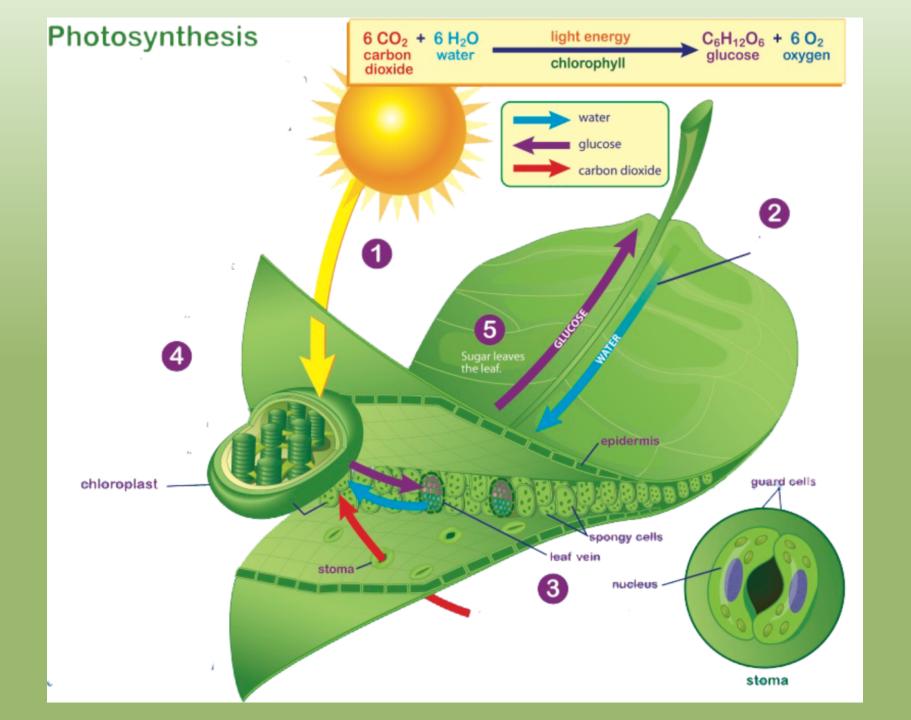


Figure 19: A cross-section of a typical woody plant.

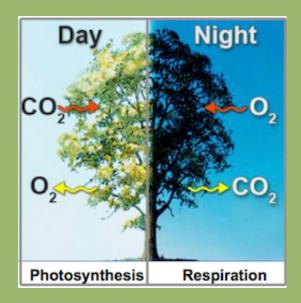
Photosynthesis

https://www.youtube.com/watch?v=VDSFck-h8D4



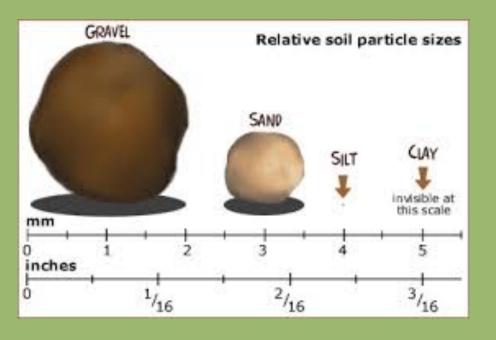
Respiration

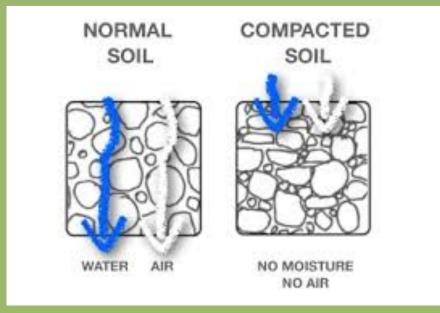
- Creating and releasing usable energy for tree
- By-products are CO2 and water vapor
- Happens all the time
- Water and oxygen break down sugar



Soils

- Sand, silt, clay
- Water availability
 - Important for photosynthesis and respiration
- Compaction

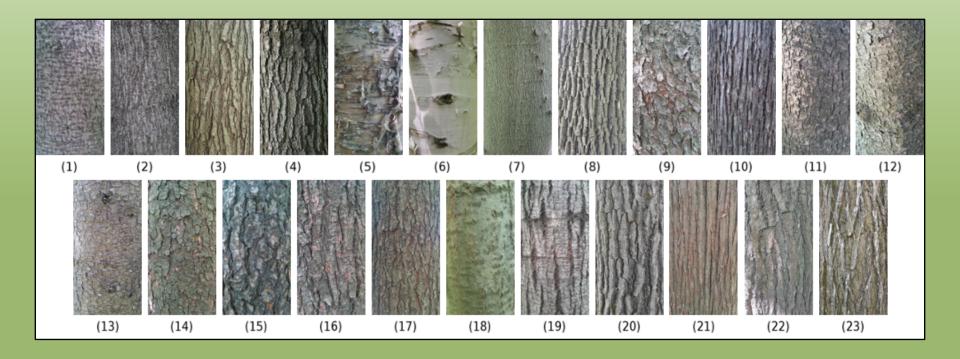




Soils

https://extension.psu.edu/soil-health-soil-physical-properties





- •COLOR
- •DEEP

- ·CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- •SCALES
- •PLATES



BLACK GUM - DEEP FISSURES

- •COLOR
- •DEEP

- ·CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- •SCALES
- •PLATES



PAPER BIRCH - PEELING BARK

- •COLOR
- •DEEP

- ·CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- •SCALES
- •PLATES



RED PINE - PLATES

- •COLOR
- **•DEEP**

- ·CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- ·SCALES
- •PLATES



AMERICAN BEECH - SMOOTH

- •COLOR
- •DEEP

FISSURES

- ·CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- •SCALES
- •PLATES



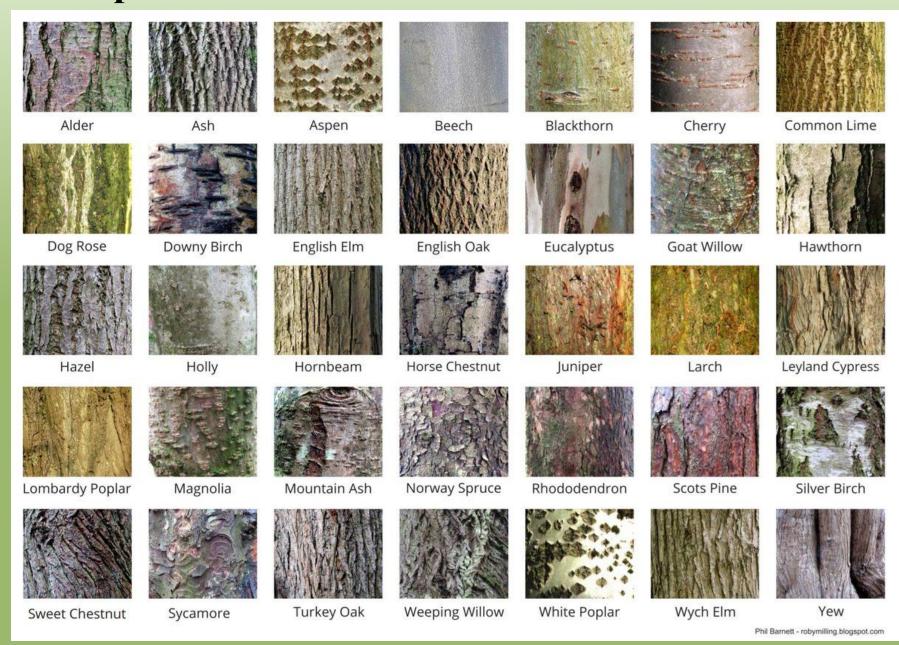
AMERICAN BEECH - SMOOTH

- •COLOR
- •DEEP

- •CRACKS
- •PEELING
- •SHAGGY
- **·SMOOTH**
- •SCALES
- •PLATES

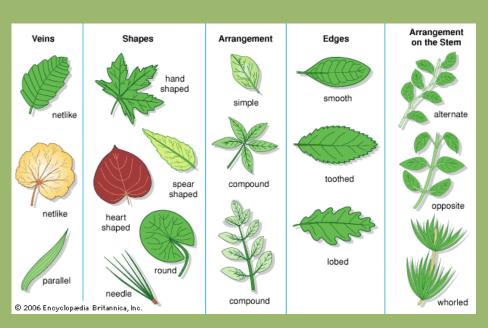


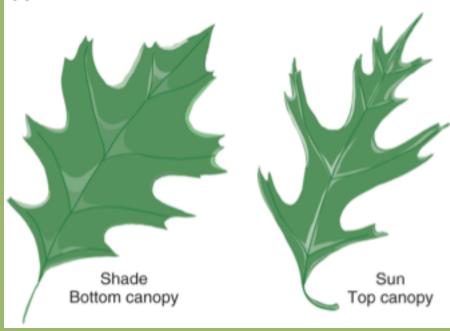
Tree Species Bark



Leaves

- Shape, size, color, orientation
- Photosynthesis
 - Sun Leaves vs. Shade Leaves





SHAPE & ARRANGEMENT





Orbicular

circular

Rhomboid



needle shaped





diamond-shaped



Flabellate fan shaped

Ovate egg-shaped, wide at base

leaflets in tight circular rings

Denticulate with fine dentition

Ciliate

with fine hairs



Lobate

indented, but not to midline

Sinuate

with wave-like indentations

Serrate



Doubly Serrate

serrate with sub-teeth

MARGIN

Crenate

with rounded teeth

teeth forward-pointing



Spiny with sharp stiff points



Dentate with symmetrical teeth



Entire even, smooth throughout



Serrulate with fine serration



Undulate widely wavy

Acuminate

tapering to a long point

Alternate

leaflets arranged alternately

Hastate Palmate triangular with basal lobes



Pedate palmate, divided lateral lobes



Spatulate

Spear-shaped pointed, barbed base



Bipinnate

leaflets also pinnate





stem attached centrally

Subulate tapering point, awl-shaped





Cordate heart-shaped, stem in cleft



Lobed deeply indented margins

Obcordate

Linear

parallel margins, elongate



Perfoliate



Trifoliate/Ternate



Odd Pinnate heart-shaped, stem at point leaflets in rows, one at tip



Tripinnate leaflets also bipinnate

Truncate

squared-off apex



Arcuate secondary veins bending toward apex



VENATION

Cross-Venulate small veins connecting secondary veins



Dichotomous veins branching symmetrically in pairs



Longitudinal veins aligned mostly along long axis of leaf



Pinnate secondary veins paired oppositely



Palmate several primary veins diverging from a point



Reticulate smaller veins forming a network



Parallel veins arranged axially, not intersecting



Rotate in peltate leaves, veins radiating





Obovate egg-shaped, narrow at base





Pinnatisect

deep, opposite lobing

Unifoliate



Whorled



Digitate with finger-like lobes



Elliptic oval-shaped, small or no point leaflets in adjacent pairs



Obtuse

bluntly tipped

Opposite



rings of three or more leaflets







www.regreenspringfield.org

United States
Department of Agriculture

Forest Service

Northeastern Area State and Private Forestry

NA-FR-04-07 November 2008

Tree Owner's Manual

for the

Northeastern

and

Midwestern

United States

www.treeownersmanual.info











Tree Owner's Manual

for the Northeastern and Midwestern United States

Authors:

Jill R. Johnson, Forest Service

Gary R. Johnson, University of Minnesota Maureen H. McDonough, Michigan State University

Lisa L. Burban, Forest Service Janette K. Monear, Tree Trust

Illustrator:

Jennifer Salveson

Technical Reviewers:

Katie Armstrong, Forest Service

Bert Cregg, Michigan State University

Paul Dykema, City of Lansing, MI

Dennis Fallon, Xcel Energy

Danielle Fitzko, Vermont Dept. of Forests, Parks, and Recreation

Justine Gartner, Missouri Dept. of Conservation

Sharon Lilly, International Society of Arboriculture

Pam Louks, Indiana Dept. of Natural Resources

Rita McKenzie, Purdue University

Jill Pokorny, Forest Service

Bob Ricard, University of Connecticut

Tom Wawra, Bachman's Landscaping

Les Werner, University of Wisconsin-Stevens Point

Paul Wierzbicki, Tree Trust

Ron Zillmer, Mid-State Technical College



Northeastern Area State and Private Forestry

Forest Service U.S. Department of Agriculture

11 Campus Blvd., Suite 200 Newtown Square, PA 19073 NA-FR-04-07 November 2008

www.na.fs.fed.us

Table of Contents

Important Precautions	
Model Information and Parts Diagram	
Deciduous Model	
Evergreen Model	
Packaging	
Roots	
Trunk and Branches	3
Pre-Installation (Preparing to Plant)	
Materials	
Instructions	
Installation (Planting)	
Materials	
Instructions	
Maintenance Schedule	
Maintenance Instructions	
Watering	13
Installing a Trunk Guard	14
Preventing and Correcting	
Encircling Roots	15
Mulching	
Fertilizing	
Checking Tree Health	
Checking Tree Safety	
Pruning	18
Protecting Trees from Construction	
Damage	24
Record of Tree Types and Locations	
Service and Repair	28
How to Hire an Arborist	
Record of Service	
Troubleshooting	
Other Sources of Help	
In the Event of an Emergency	32
Removal and Disposal	33
Whole Tree	33
Trimmings	
Leaves	33
Buying a New Tree	
Decide on the type of tree	34
Select a high quality tree at the	
nursery	35
Additional Sources of Information	
Transporting Your TreeBack co	
Storing Your Tree Until PlantingBack co	ovei

The use of trade or firm names in this publication is for reader information and does not imply endorsement of the U.S. Department of Agriculture of any product or service.