

MODULE I • Introductory Horticulture Training

Introduction to Botany

Presented by
Landscape Ontario's
Garden Centre Sector Group

HORTICULTURAL TRADES ASSOCIATION
landscape ontario.com



Horticulture is...

...the art and science of producing, using, and maintaining ornamental plants, fruits and vegetables.

From the Latin words:

Hortus = Garden

Cultura = Culture or Cultivation



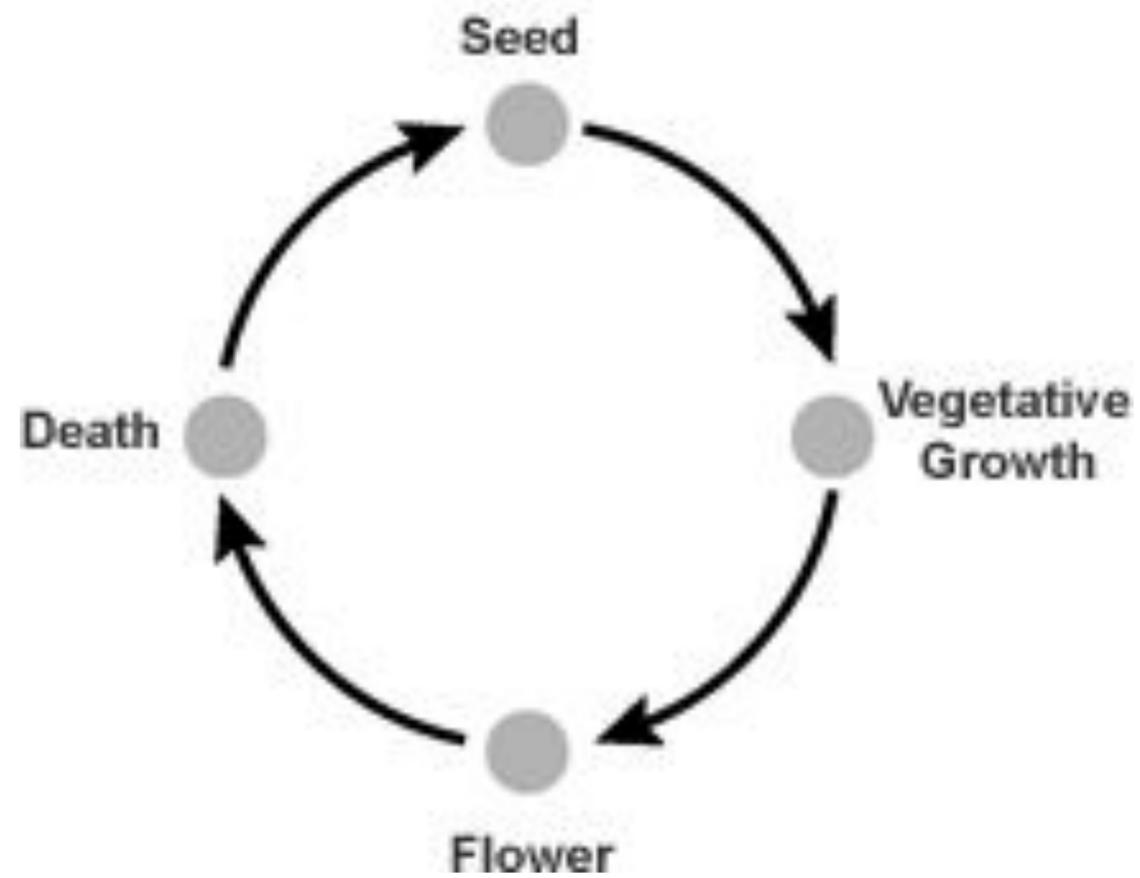
Plant Life Cycles

Plants fit into various classifications which relate to their life cycles, characteristics, features and uses.

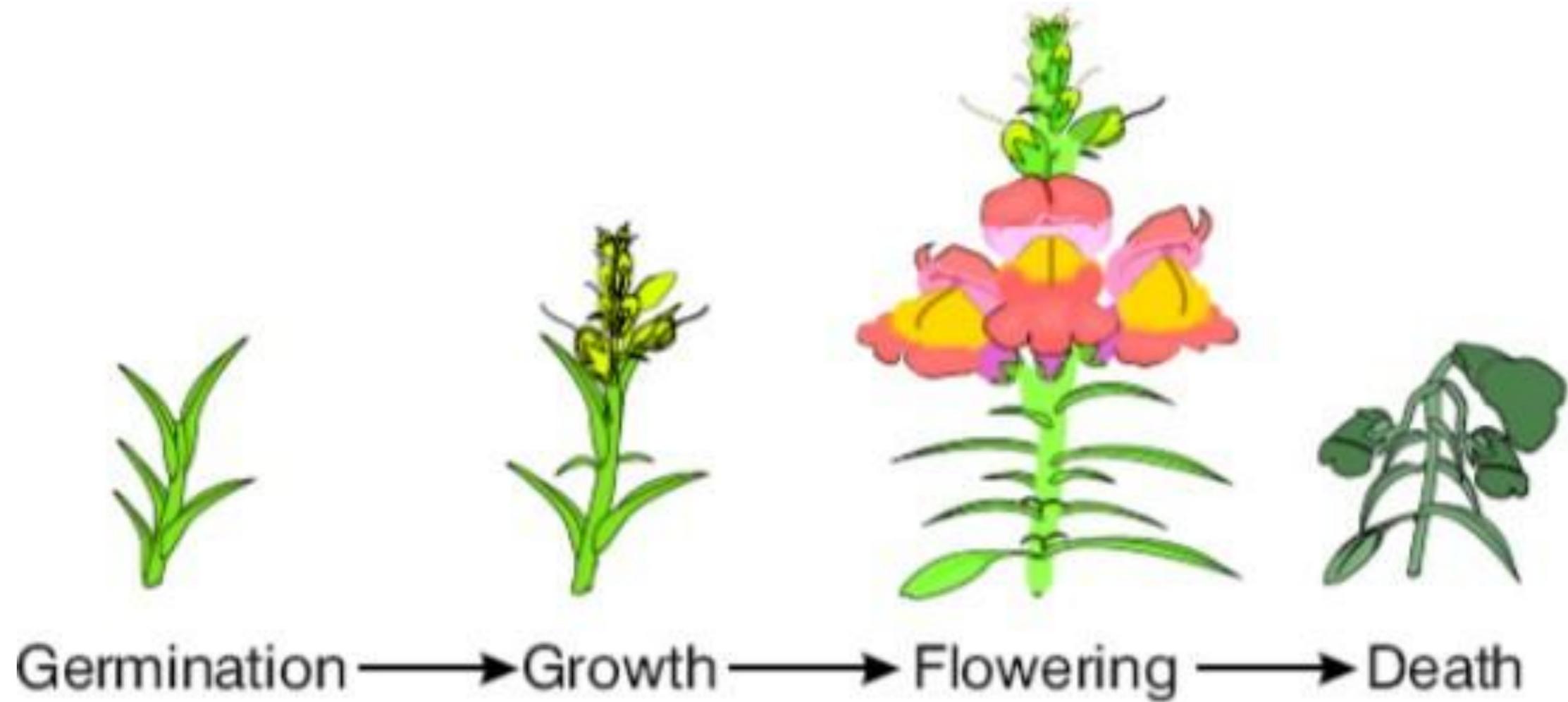


Annuals

Annual Growth Cycle



Annuals



Annuals

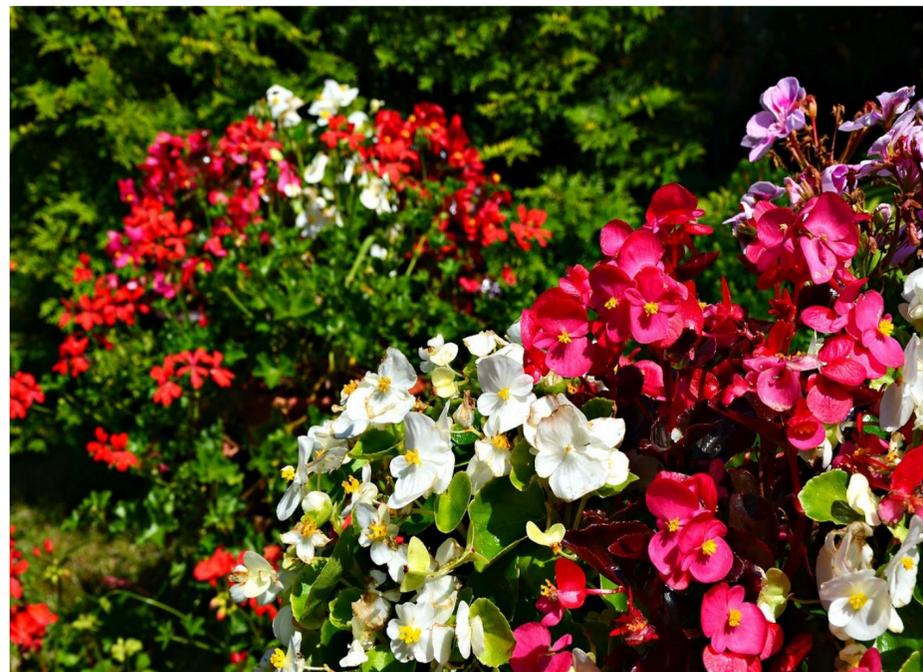
Top left
Zonal Geraniums



Top Right
Morning Glory



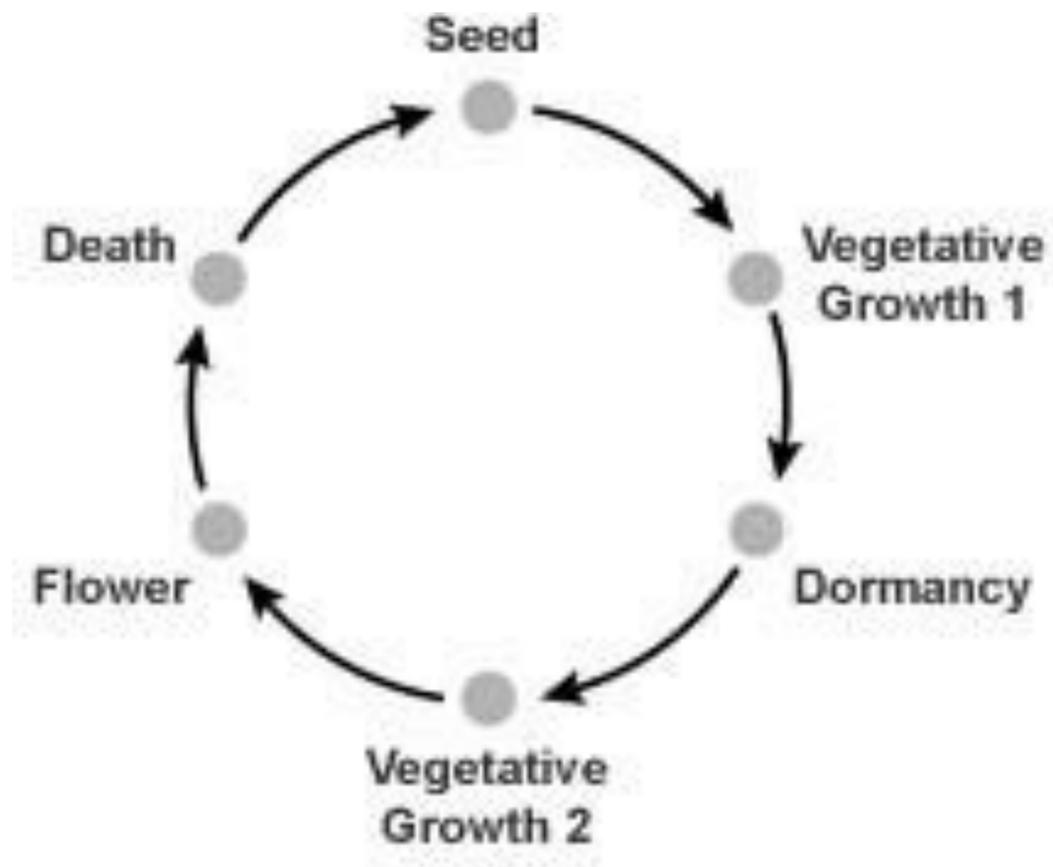
Bottom left
Fibrous Begonias



Bottom right
Sweet Alyssum



Biennials

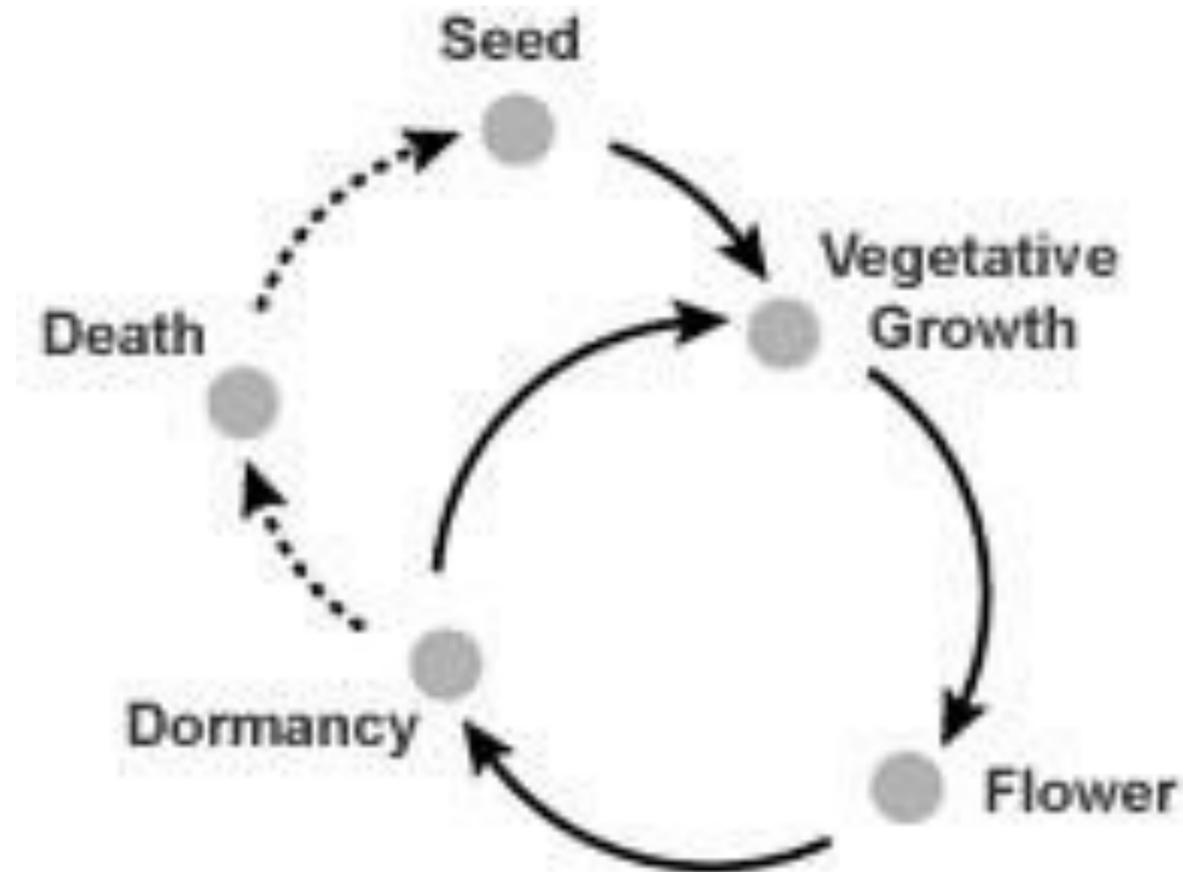


- Grows in 2 years
- First year: grows vegetatively and overwinters
- Second year: grows vegetatively, flowers and fruit, then dies



Perennials

- Lives for more than 2 years...
- Ex. *Salvia nemorosa* 'Salvatore Blue' Grows and blooms over the spring and summer
- Dies back in autumn and winter Returns in spring from the rootstock



Perennials

Top left: Hosta

Hosta



Top right: Purple Coneflower

Echinacea purpurea



Bottom left: Astilbe species

Astilbe



Bottom right: Shasta Daisy

Leucanthemum x superbum



Plant Classifications

Plants fit into various classifications which relate to their life cycles, characteristics, features and uses.



A plant can be...

WOODY

Any plant with stems having a rigid outer surface

- Tree - Greater than 13 ft (~4m), have one central stem and a distinct canopy
- Shrub - Less than 13 ft (~4m), usually have more than 1 stem emerging from bottom of the plant



[\(-epsilon-, n.d.\)](#)

[\(Proven Winners, n.d.\)](#)



[\(chriscondello, 2013\)](#)

HERBACEOUS

- Any plant which does not have any woody growth
- Stem remains flexible throughout its life

Deciduous

- Leaves fall off in autumn
- Can take the form of a:
 - Tree
 - Shrub
 - Also includes plants grouped as “flowering” trees or shrubs



[Tilia cordat](#)

Flowering Shrubs

Top left: Forsythia

Forsythia x intermedia



Top right: Common Lilac

Syringa vulgaris



Bottom left: Downey Serviceberry

Amelanchier canadensis



Bottom right: Saucer Magnolia

Magnolia soulangeana



Evergreen

- Leaves remain attached to the plant all year-round Can be a tree or a shrub Some evergreen plants are referred to as conifers
- Does not mean they keep their needles for ever



Evergreens

Top left: Emerald Cedar
Thuja occidentalis 'Smaragd'



Top right: Blue Star Juniper
Juniperus squamata 'Blue Star'



Bottom left: Dwarf Alberta Spruce
Picea glauca 'Conica'



Bottom right: White Pine
Pinus strobus



Deciduous Conifers



Broadleaf Evergreens



While some plants can be a tree or a shrub, others can be an...

Annual

- A plant that completes its life cycle in one year. Usually cannot survive cold temperatures in Ontario
- Adds instant and constant colour and/or interest to a landscape
- Some plants sold as annuals are not actually annuals, they are actually different classifications of plants that are not hardy in a particular area.



Perennial

- A plant that lives for more than 2 years.
- Returns year after year, growing in size and stature, until full maturity is reached



Vine

- A plant with stems that cannot support themselves.
- Uses other plants or objects such as trellises and or arbours to rise above the ground



Groundcover

- Low-lying plants with a creeping or spreading habit
- Can cover sections of ground with minimal maintenance Other standard landscape perennial plants and shrubs can be used as a ground cover, ex. daylily and creeping juniper



Grasses

- Grasses are a large group of plants from the *Poaceae* family.
- Includes turf grasses, bamboo, and ornamental grasses



Houseplants & Indoor Flowering Plants

- Tropical plants that can be grown year round indoors
- Tropical, cacti, succulents, flowering indoor plants



(AnRo0002, 2014)

Water Plants

- Plants that live and grow in the water
- They can be floating, or rooted in pots or soil
- There are hardy as well as non hardy water plants used in ponds and water features. Fish are often featured in water gardens



Edible Plants

Fruit Trees, Small Fruits, Herbs & Vegetables

- Plants that are grown for home production of fruit, vegetables and herbs.
- Can be annual, perennial, trees or shrubs



Botanical Nomenclature

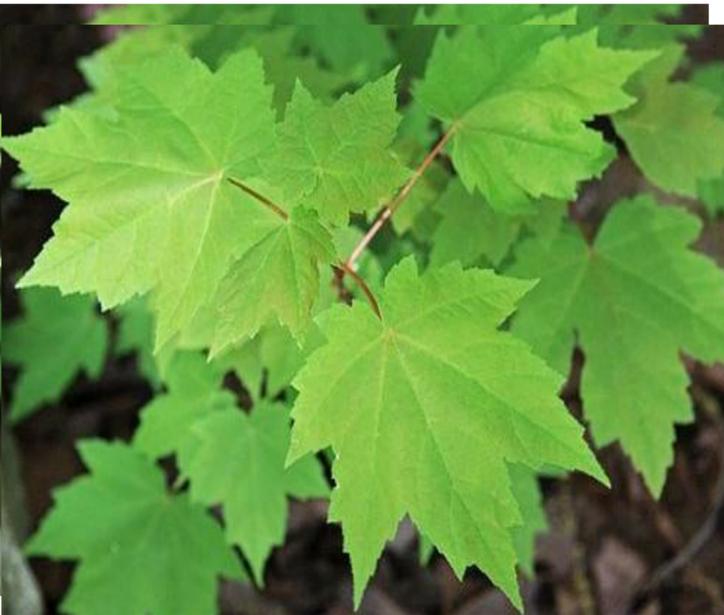


Which one is a “Red Maple”?



BOTANICAL NOMENCLATURE

Wow, this is a dilemma!! Who's right?

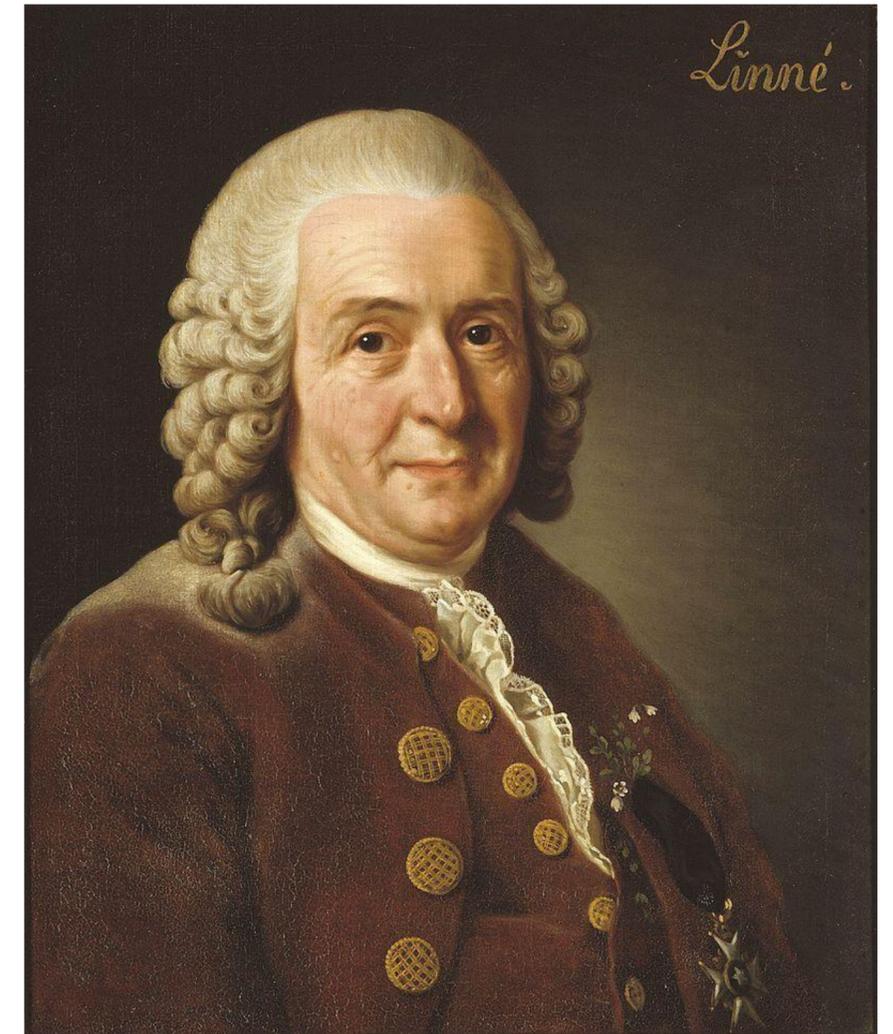


BOTANICAL NOMENCLATURE

Botanical Nomenclature is...

The formal, scientific naming of plants

- Developed by Carl Linneaus
- 1753 - He published *Species Plantarum* which consistently applied binomial names and it was the starting point for naming of plants.
- Each plant has a **universal binomial name**.
- Also referred as “scientific name” or “botanical name”
- Consists of two names or words (“binomial”) Accepted everywhere!*



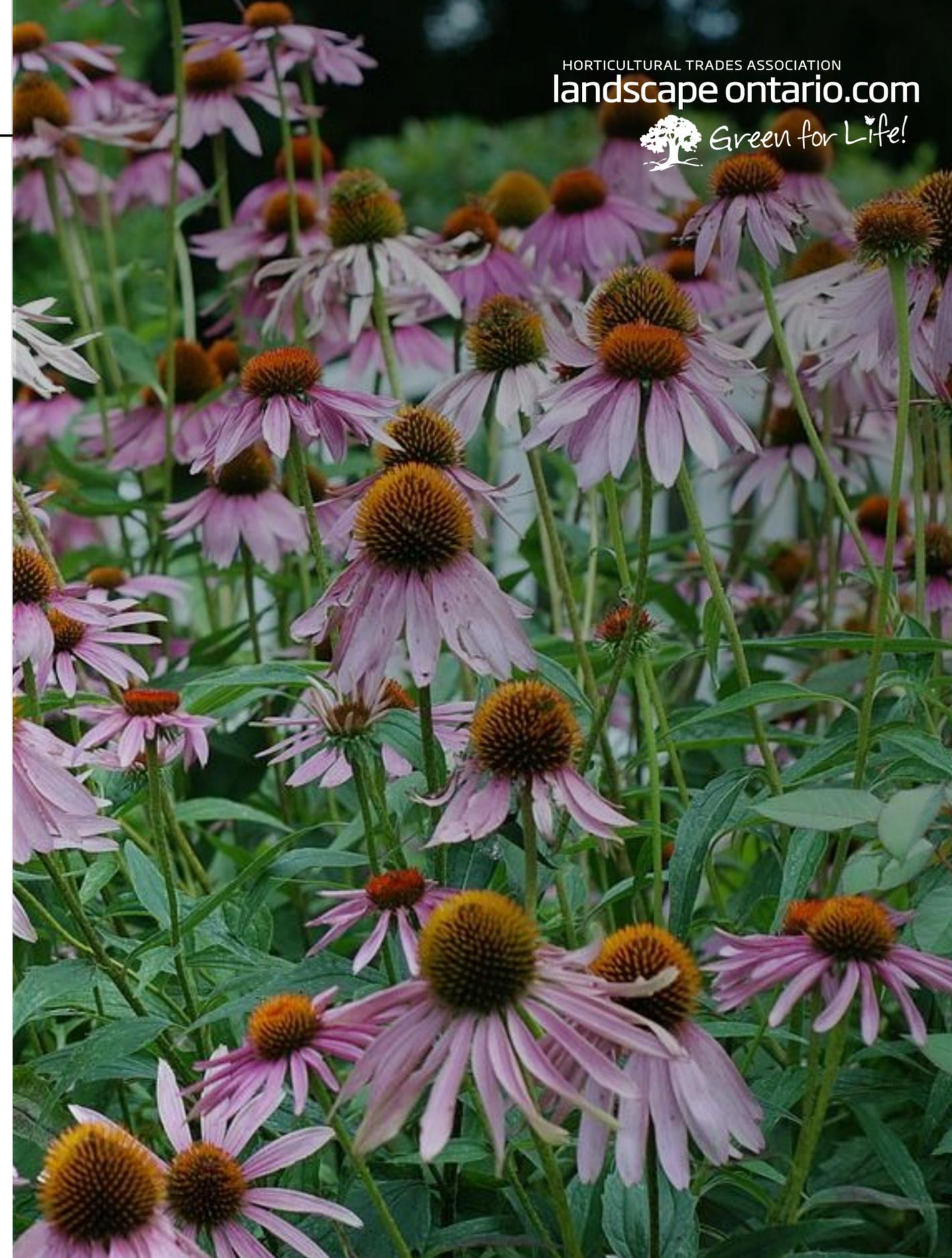
Botanical Name *is...*

The universal binomial name of a plant.

- Usually in Latin
- Consists of two parts:
 - GENUS;
 - SPECIFIC EPITHET, or species

Example: Echinacea purpurea (botanical name of Purple Coneflower)

- GENUS = Echinacea
- SPECIFIC EPITHET = purpurea



Cercis canadensis var. *alba*

(White Eastern Redbud)

Genus: *Cercis*

Specific Epithet: *canadensis*

Variety: var. *alba*



Picea abies

‘Nidiformis’

(Bird’s Nest Spruce, Norway Spruce ‘Nidiformis’)

Genus: *Picea*

Specific Epithet (species): *abies*

Cultivar: ‘Nidiformis’



Gleditsia triacanthos var. *inermis* ‘Sunburst’

(Sunburst Thornless Honey Locust)

Genus: *Gleditsia*

Specific Epithet: *triacanthos*

Variety: var. *inermis*

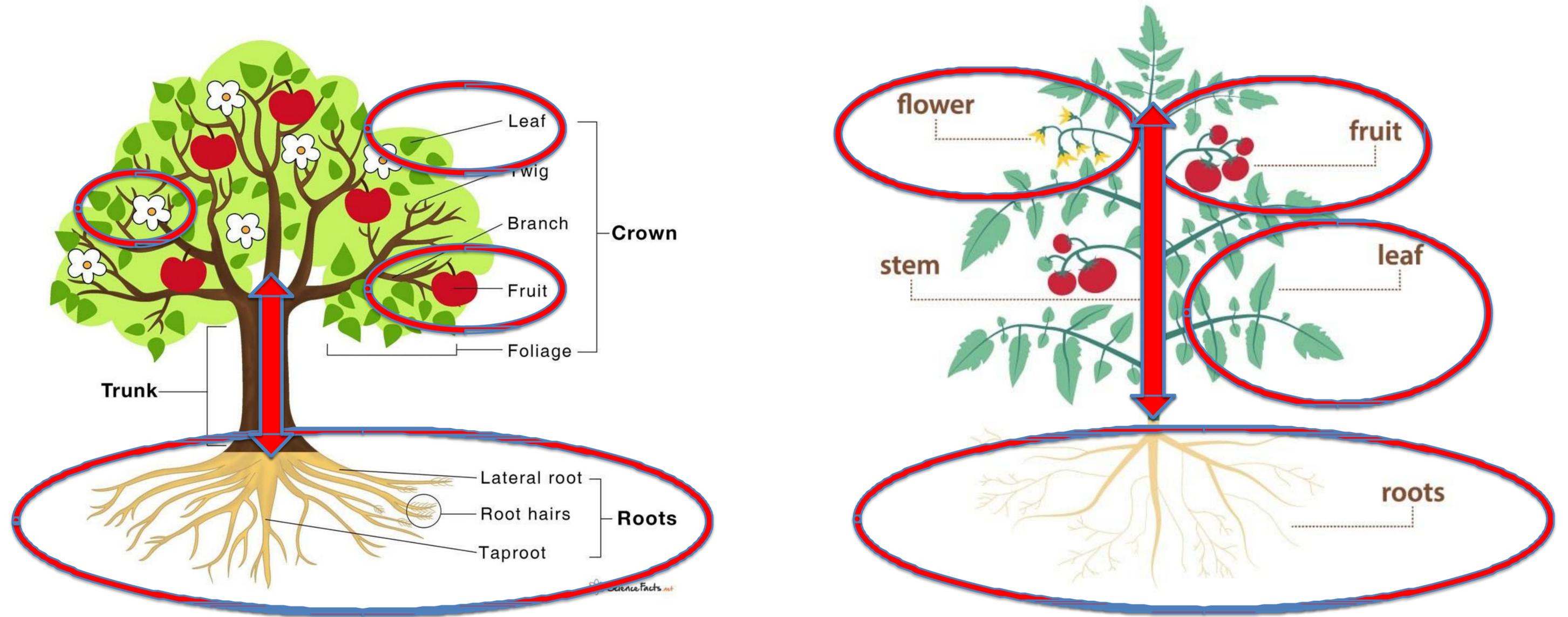
Cultivar: ‘Sunburst’



Parts of the Plant



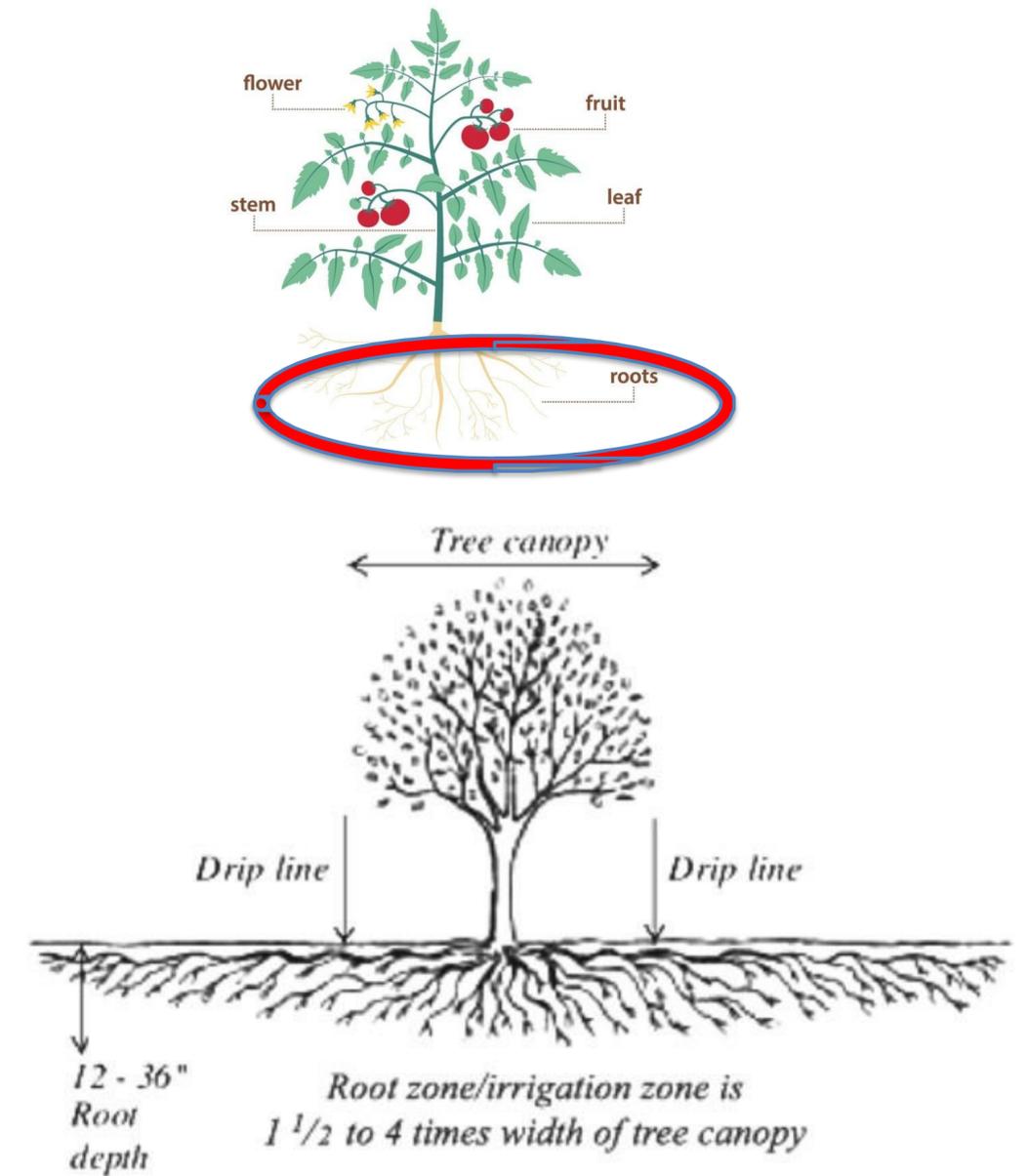
Woody Tree vs. Herbaceous Plant



Roots

Functions:

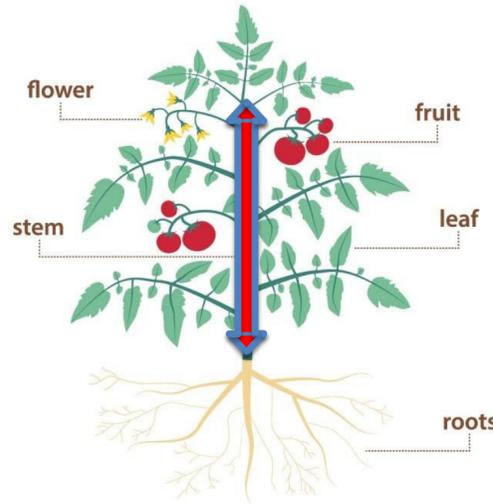
- Anchor and support
Absorb water and nutrients in the soil
- Stores food



Stems

Functions:

- Supports above-ground structure
- Connects and transports water and nutrients from roots to other parts of the plant

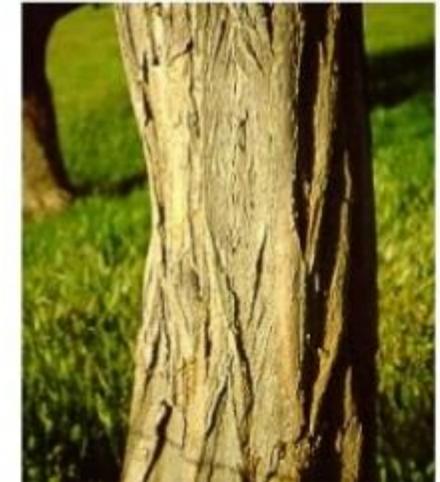
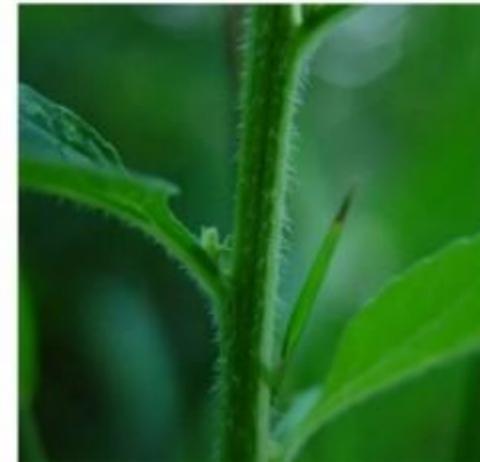


Types of stems

• Herbaceous

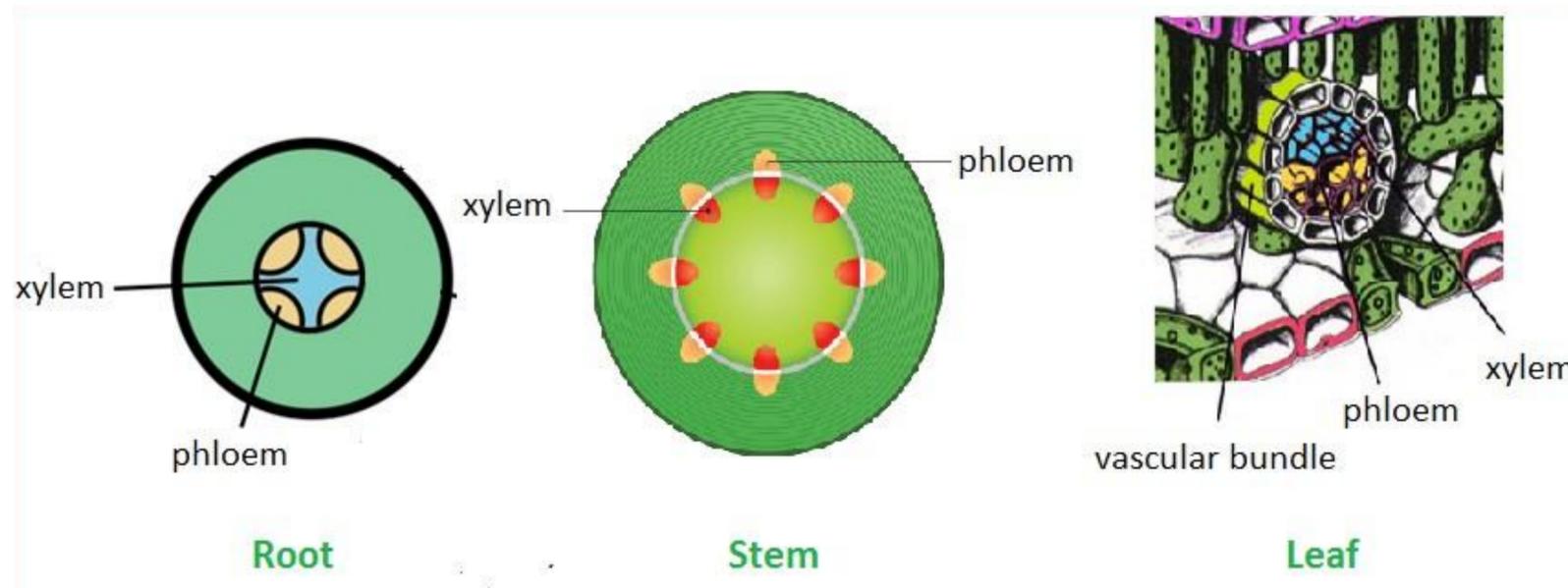
vs.

Woody stems



Vascular System

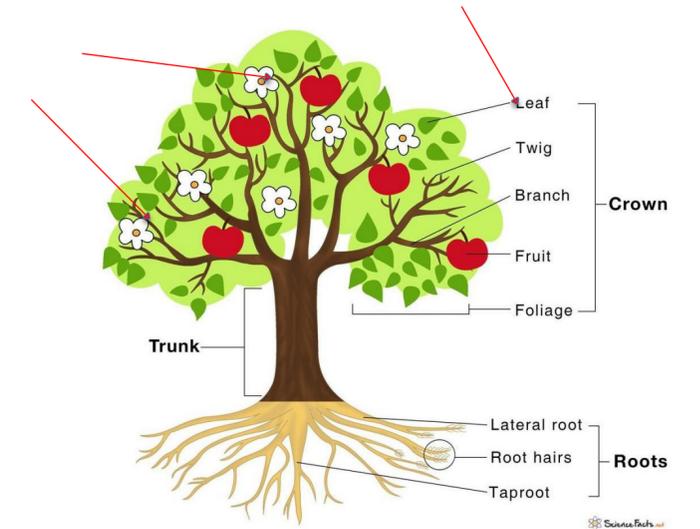
An essential network of tissues that interconnects all plant parts and delivers resources to various plant organs



1. Xylem – Transfers water and soluble minerals/nutrients from roots to other parts of the plant
2. Phloem – Transports food (sugars) from leaves to all parts of the plant

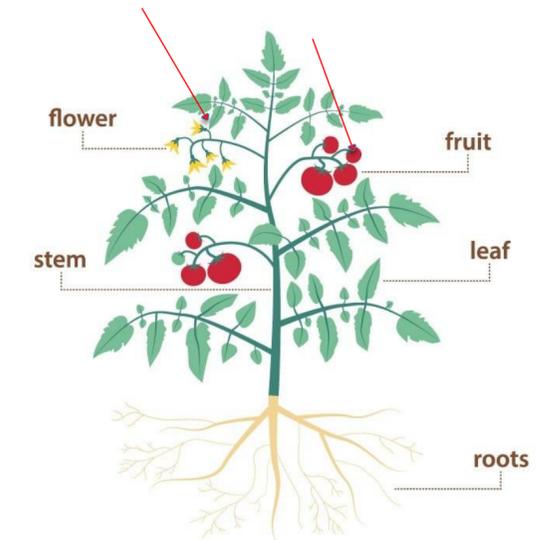
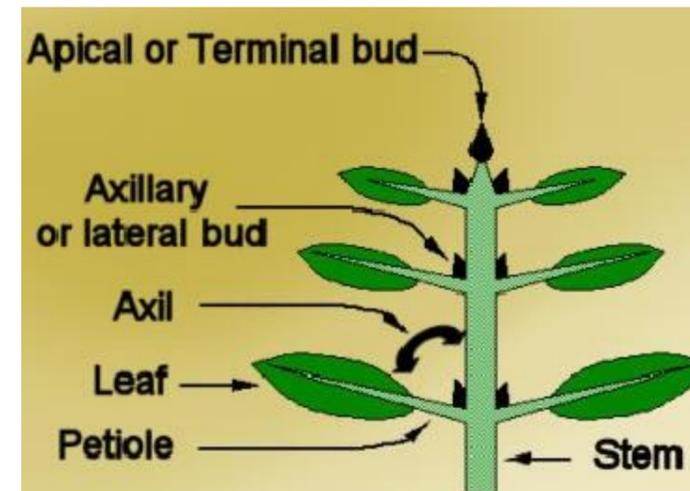
Buds

A small swelling on the stem that may develop into a flower, leaf, or shoot (another stem)



Can be found...

- Tip of stem (“terminal”)
- On each side of a stem (“lateral” or “auxiliary”)



Leaves

Can have many different shapes, sizes, textures, and colours

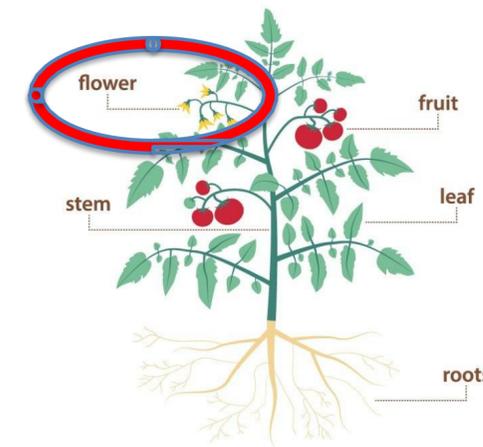


Flowers

Also called as “bloom” or “blossom” Comes in many shapes, sizes, textures, and colours

Function:

- Reproductive structure that facilitates the union of sperm and egg cells and produces seeds

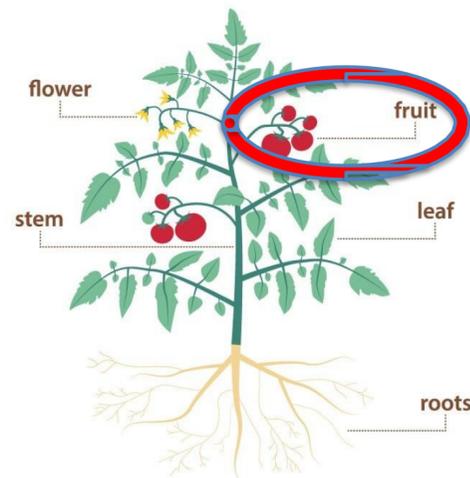
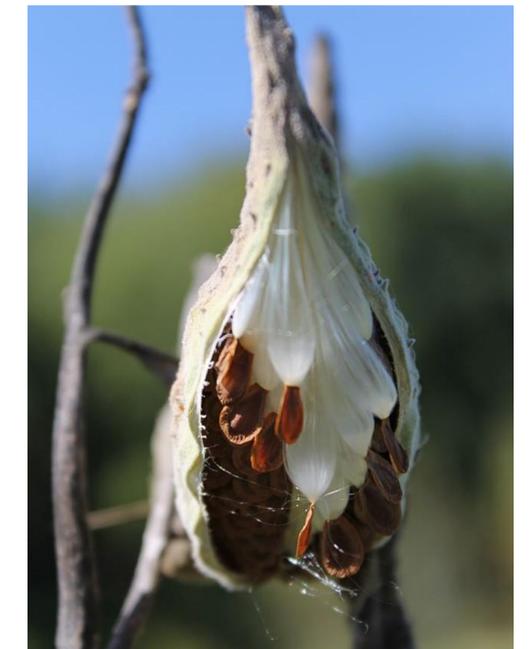


Fruit

Formed from the ovary after flowering

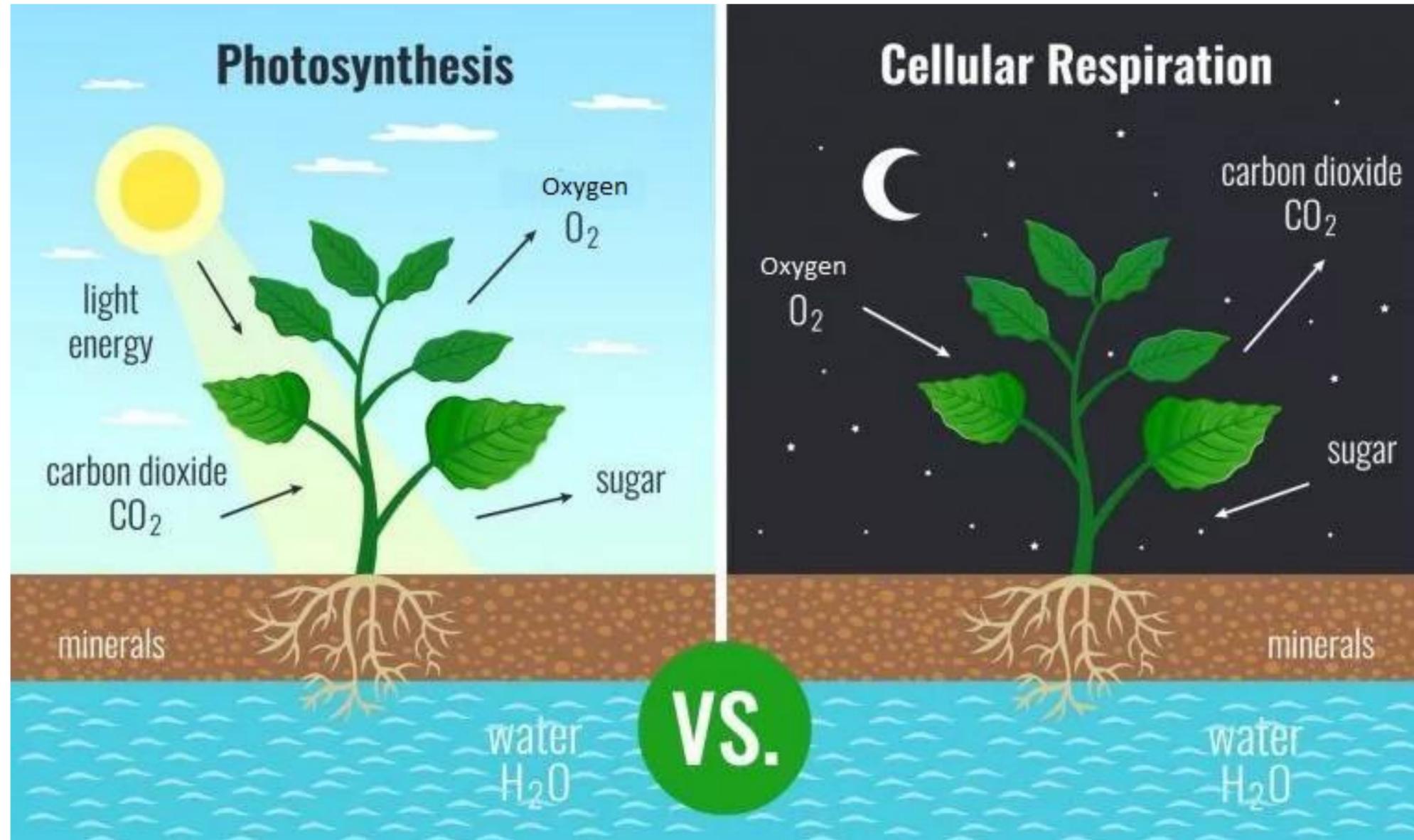
Function:

- Contains **seeds** of a plant, which carry genetic information for the next generation

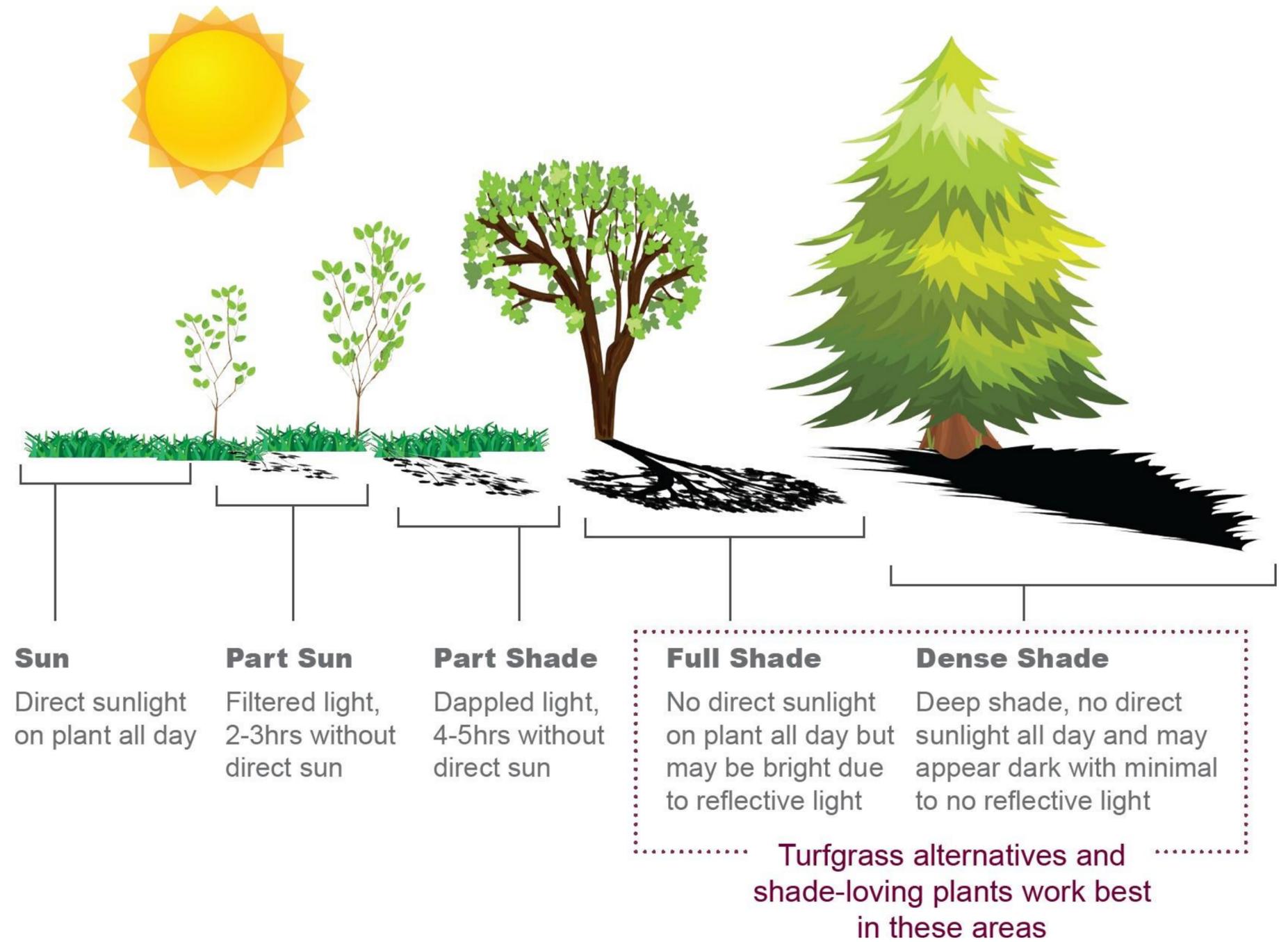


Fundamental Processes in Plants





Light



Light

- Access Intensity Quality
- Impacts... Ability to
- photosynthesize
Temperature &
- availability of water

Guide to Sunlight Hours

Before planting consider:

- **How much SUN/SHADE** do you have? Be observant!
- Most vegetables prefer **sunny protected positions**.
- **The sun provides energy** for plants to grow.
- **Record seasonal sun/shade** as it changes during the year.

Full sun	6 – 8+ hours of direct sunlight daily
Partial sun (Unknown)	4 – 5 hours of direct sunlight daily
Partial shade	2 – 4 hours of direct sunlight daily
Full shade	< 1 hour of direct sunlight daily

Water

- Maintains turgidity in plant cells, helping the plant to stand instead of drooping
- Acts as a solvent, transporting nutrients throughout the plant
- Serves as a raw material for chemical process such as photosynthesis



Water

Water inside a plant is affected by...

- Transpiration
- Access to water from the soil
 - Temperature and mulching
 - Soil texture and structure
 - Plant rooting depth



Factors Affecting Growth

Temperatures

- Temperature and plant growth are correlated:
- Warmer temperature > Plant develops quicker
- Cooler temperature > Plant growth slows down



Hardiness



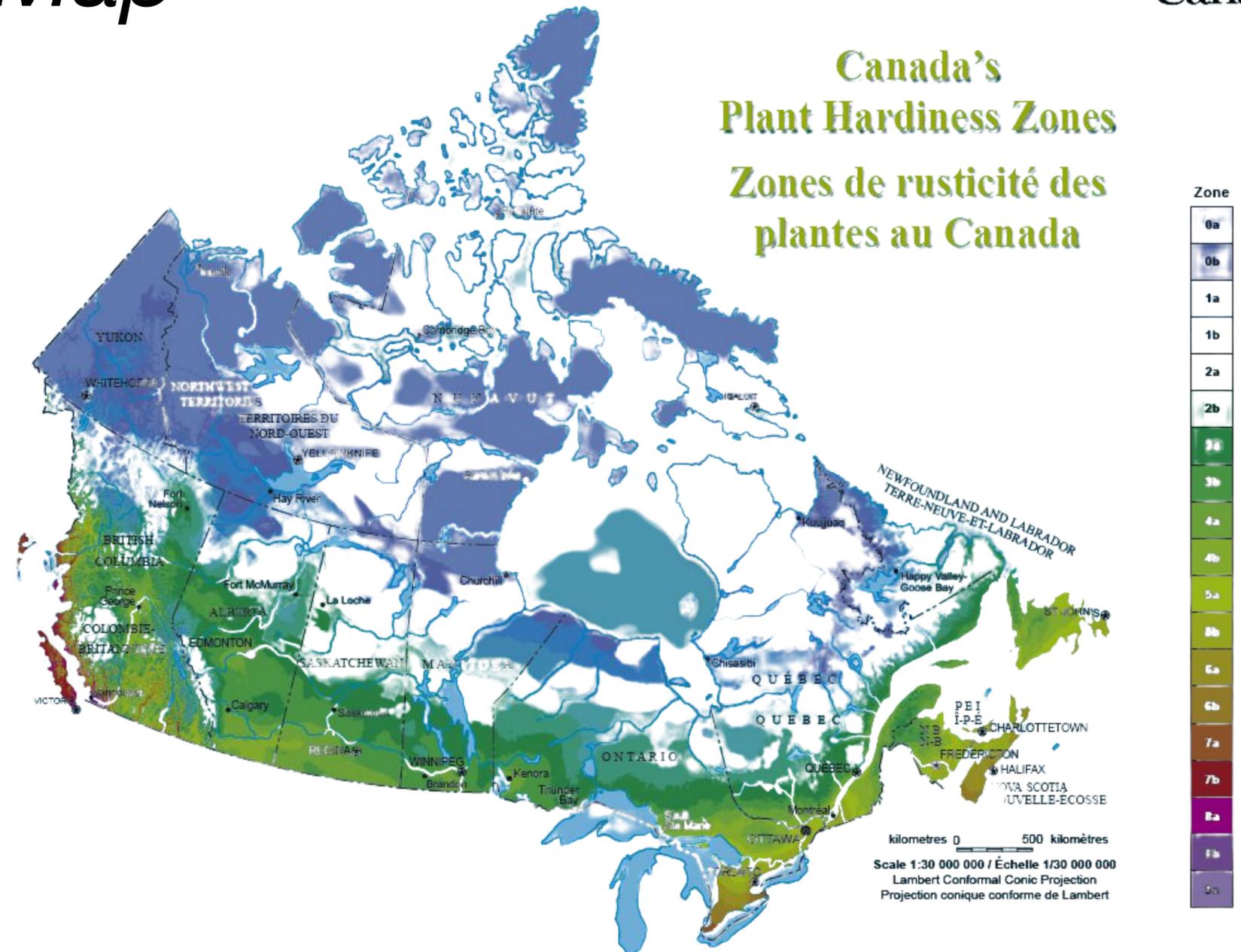
What does it mean if a plant is “hardy”?

Hardiness of plants describe their ability to survive adverse growing conditions.

This relationship is shown in plant hardiness maps, which are used to understand & select which plants can survive in a certain area.

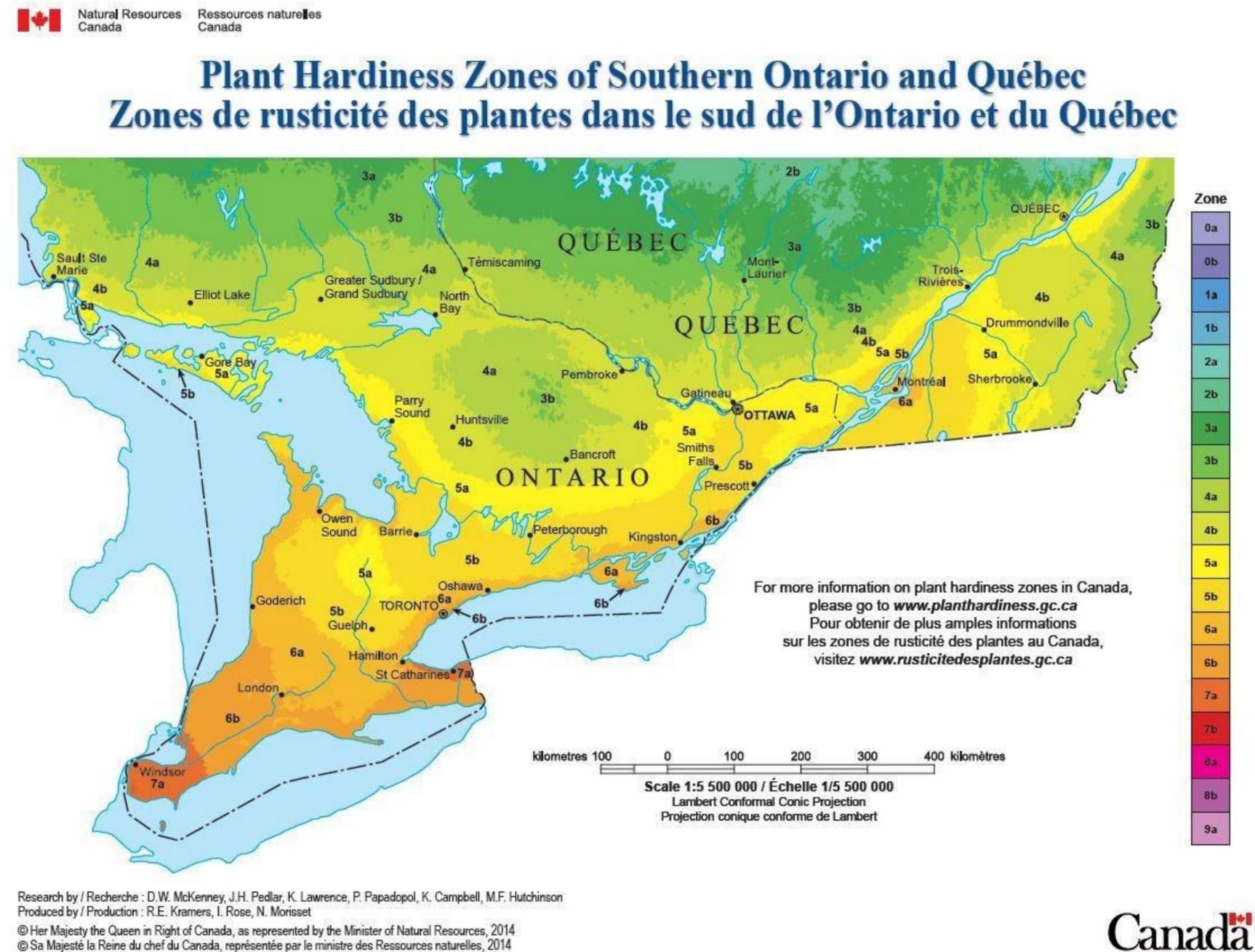
Canada Plant Hardiness Map

- Temperature and plant growth are correlated:
- Warmer temperature > Plant develops quicker
- Cooler temperature > Plant growth slows down



planthardiness.gc.ca

Ontario Plant Hardiness Map



HARDINESS

plantmaps.com/interactive-ontario-plant-zone-hardiness-map.php

Questions



Training Opportunities

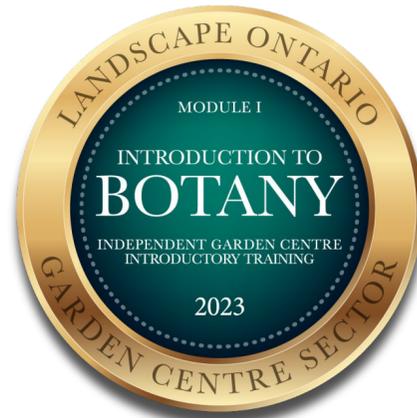
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Workforce
Development



Next Steps



MODULE I:
Introduction to Botany

- Badge of Completion



MODULE II:
Applied Watering

- **April 20, 2023**
Start: 5:30 PM - 7:00 PM
- **Complete Online**



MODULE III:
Turf Maintenance

- **April 27, 2023**
Start: 5:30 PM - 7:00 PM
- **Complete Online**

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Upcoming Events

Independent Garden Centre Training Module 2

April 20, 2023 / 5:30PM

Independent Garden Centre Training Module 3

April 27, 2023 / 5:30PM

Trial Gardens at Landscape Ontario

August 17, 2023 / 9:00AM



*Connect to more training, workshops and
events online.*

www.horttrades.com/event