Introduction to Basic Botany

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Master Gardener Class

Suzanne Braunschweig
sbraun@umbc.edu
Outline of Workshop

Plant Ecology: What do you know?

Photosynthesis: World’s greatest metabolic pathway!

Plant Anatomy
(and hands on activity)

Plant Circle of Life
(and hands on activity)

Wrap up and final questions
Photosynthesis (and Respiration)  
Two sides of the same coin

Photosynthesis

- Carbon Dioxide plus water plus sunlight yields sugar (Glucose) and oxygen
- \( \text{CO}_2 + \text{H}_2\text{O} + \text{sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \)

Respiration

- Sugar (Glucose) and oxygen yield (chemical) energy and carbon dioxide
- \( \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2 + \text{ATP} \)

Plants provide the oxygen that allows us to respire; BUT don’t forget, plants respire as well!

*An aside: ATP = Adenosine Tri-phosphate; stored energy is released when the bond holding phosphorus to the rest of the molecule is broken*

Plant Anatomy

Parts is parts
- Stems – reach for the sky
- Roots – anchor in place
- Leaves – let there be light
- Inflorescences – blossoming away

Monocots and Dicots
Monocot vs. Dicot
What’s in a name? Plant Taxonomy

- **Kingdom:** Plantae
  - **Division:** Magnoliophyta
    - **Class:** Magnoliopsida
    - **Order:** Rosales
    - **Family:** Rosaceae
  - **Genus:** Prunus
  - **Species:** serotina

**Scientific name:** *Prunus serotina*

(some) Common names:
“Black Cherry” “Rum Cherry”
“Wild Cherry”.....

https://www.ohio.edu/plantbio/staff/cantino/trees/Prunus%20serotina.htm
Identification Keys and how to use them

Keys are usually Dichotomous

- di = 2
- Chotomous = branching/pathway

They use paired characteristics to lead you to an identification.

They are vocabulary dense, extremely picky, and very useful.

Are range specific and may be seasonal (ex a Winter Tree ID Guide)
Break and Time for Practice 😊

- Winter tree ID’ing

- Use the keys provided to see how many trees your group can identify.....
Outline of Workshop

Plant Ecology: What do you know? √

Photosynthesis: World’s greatest metabolic pathway! √

Plant Anatomy √
- Stems, Roots, Leaves and Inflorescences
- Monocots vs Dicots
- Taxonomy and Identifications
- Hands on Activity

Plant Circle of Life
- General Life cycle
- Flowers and Fruits
- Hands on Activity

Wrap up and final questions
Alternation of Generation (aka Plants are peculiar)

http://www.bio.miami.edu/dana/dox/altgen.html
Parts of a Flower

http://www.amnh.org/learn/biodiversity_counts/ident_help/Parts_Plants/parts_of_flower.htm
Male and Female parts
Ovules ➔ seeds; ovary ➔ fruit

https://upload.wikimedia.org/wikipedia/en/0/01/Colorful_Photo_of_Vegetables.png
Fruit types

**Simple**: one flower, one ovary (green pepper, pumpkin)

**Aggregate**: one flower, multiple ovaries (blackberry)

**Multiple**: entire inflorescence makes up what we consider “the fruit” (pineapple)

**Accessory**: structures in addition to the ovary (eg the flower receptacle) are part of the fruiting structure (apple)

Fruits may be **fleshy** (as in a tomato) or **dry** (as in a sunflower or peanut)

Dry fruits may be **dehiscent** (have one or more seams and open easily such as a peanut) or **indehiscent** (difficult to open, need to be cracked as in a sunflower)
Fruit Structure

The ovary (fruit) wall is sometimes called the **carpel**; the space ovules (seeds) occupy is called a **locule**.

Often the characteristics of the carpels can help botanically identify the type of fruit a plant has. The carpels can be divided into layers: **exocarp** (outer), **mesocarp** (middle), and **endocarp** (innermost).

For example, a **berry** is a simple fruit with a fleshy mesocarp and/or endocarp. It may have one or several locules (ex water melon!)
Practice!

- Work with your group to identify the fruits you have. You may find some surprises!
Final Questions

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Thank you!