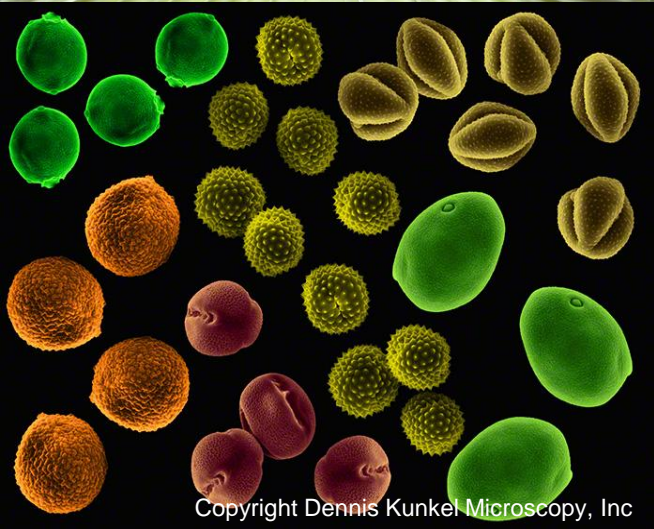


Title: Lecture 10 – Flower and Fruit
Structure and Function
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Created by: Teresa Koenig, Kim Kidwell



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Flower and Fruit Structure and Function

Types of flowering plants:

A. Determinant:

- Flower only once
- Vegetative growth ceases at floral initiation

Ex. Grasses, small grains, corn

B. Indeterminant:

- Continue to grow vegetatively after floral initiation
- Flower for a longer period of time

Ex. Beans, cotton, petunia

Function of flowers:

- Reproduction
- Attracting pollinators for reproduction

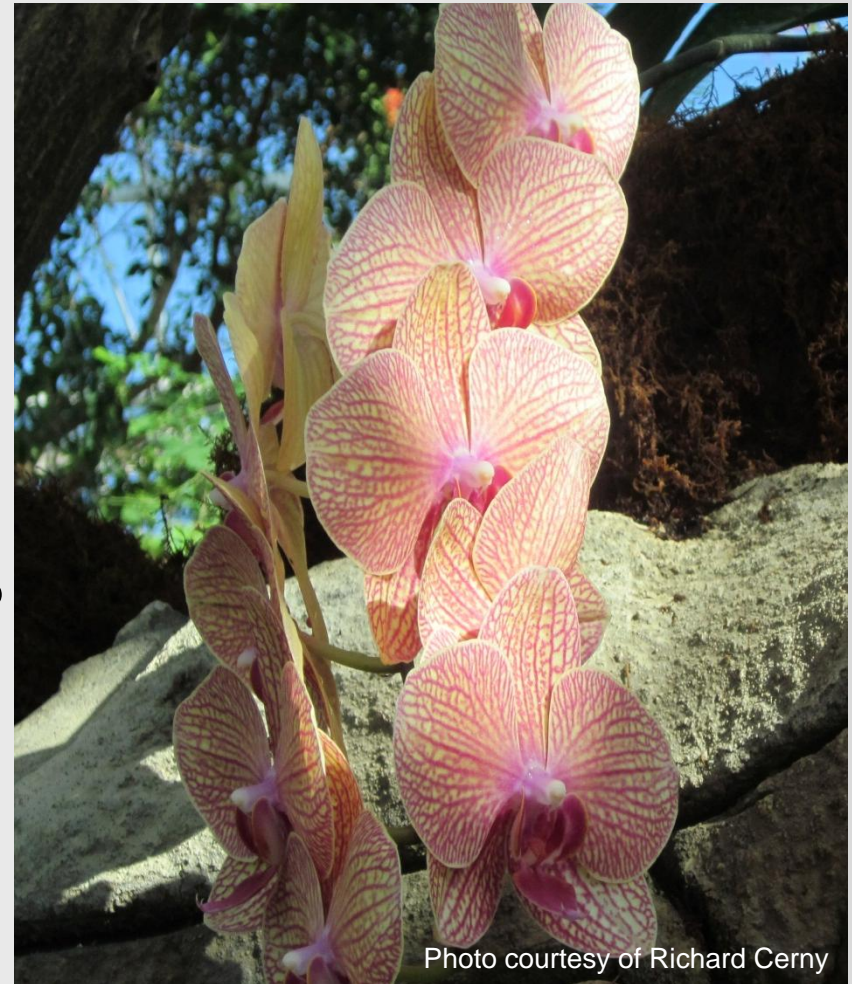


Photo courtesy of Richard Cerny

Simple vs. compound flowers

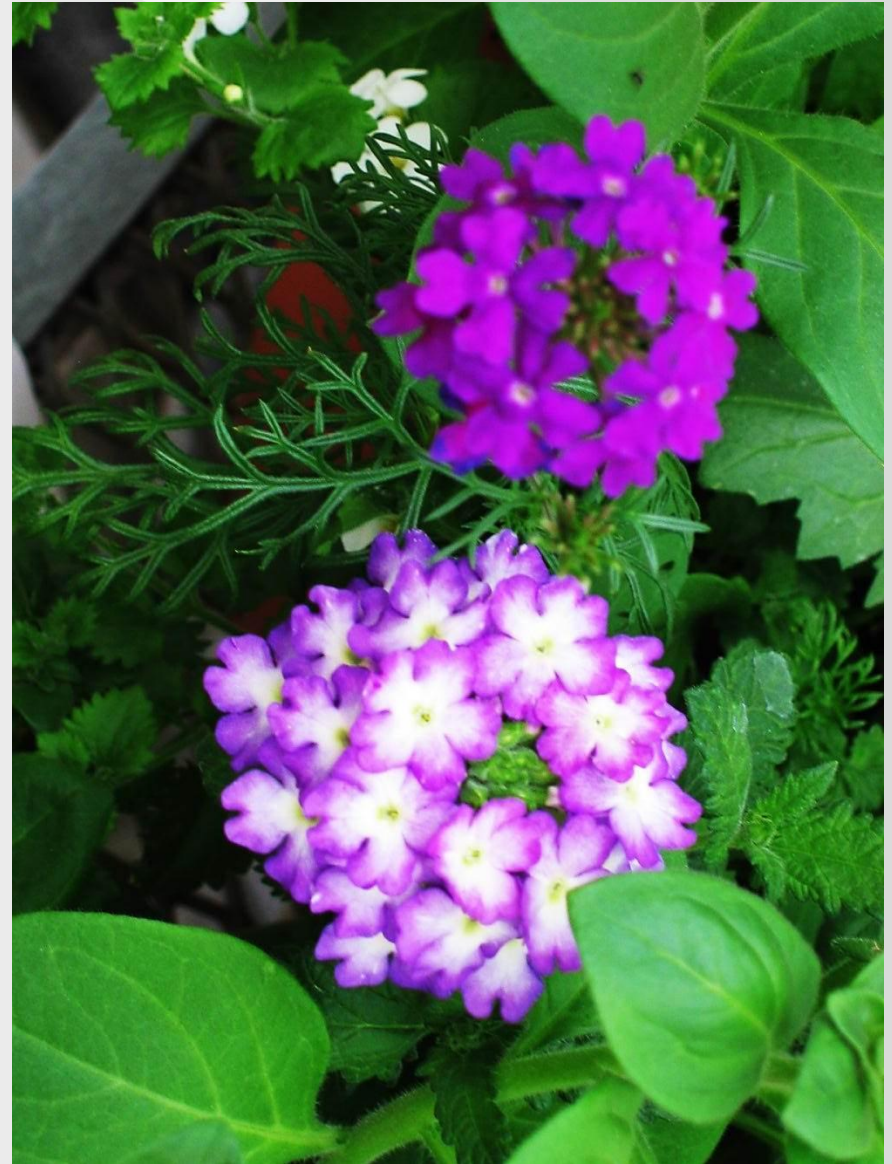
1. Simple flowers

- Borne singly on a stalk
- Solitary flowers



2. Compound flowers

Arranged in multiples or clusters often called an inflorescences

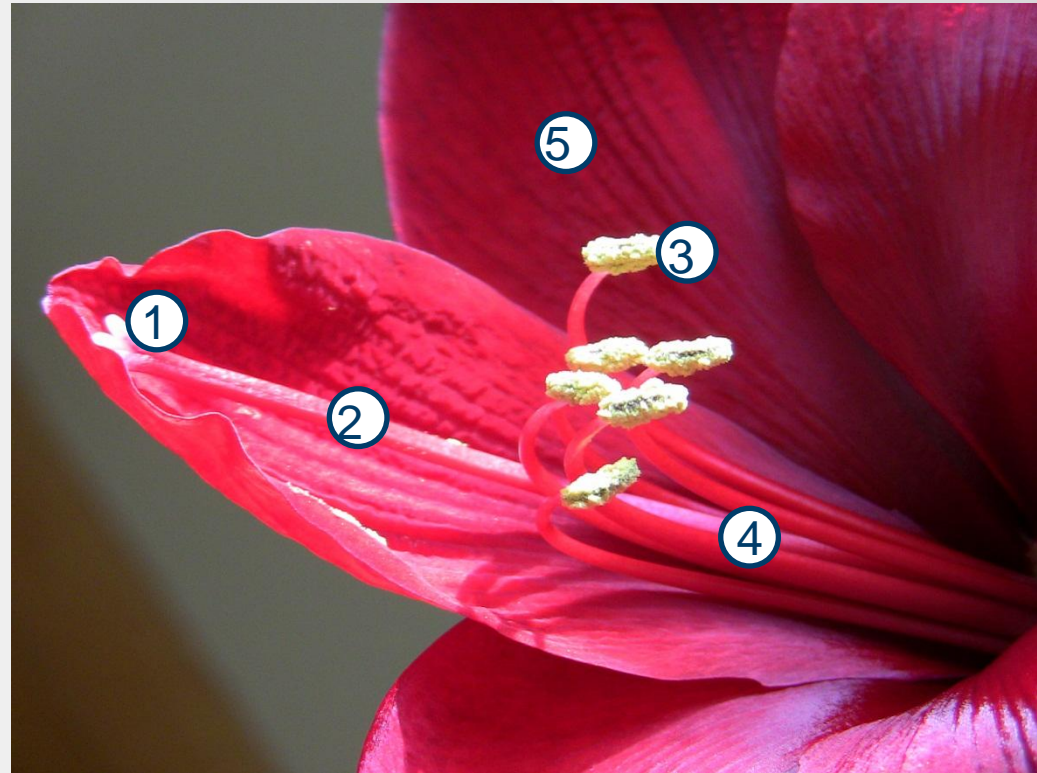
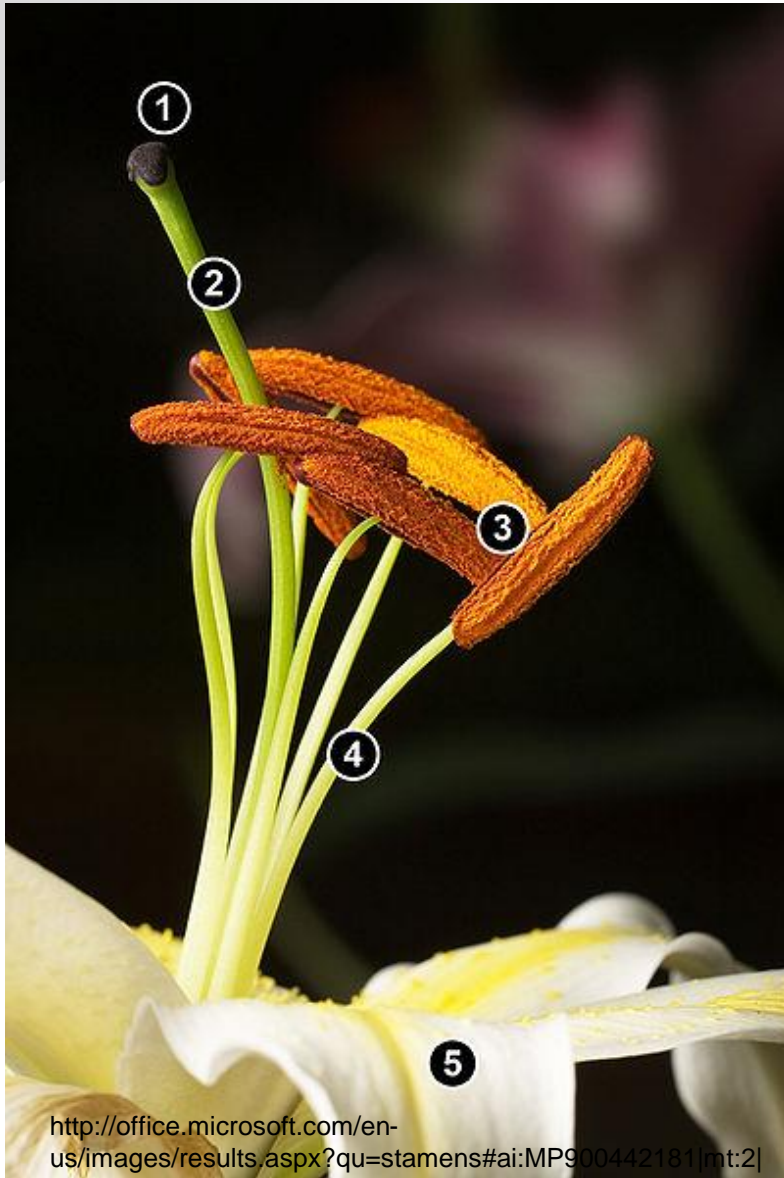


Flower Structure:

Impacts the breeding habit of the plant



1. Stigma, 2. Style, 3. Stamens, 4. Filament, 5. Petal



1. Structural Parts

a. Sepals:

- Small, green, leaf-like structures below the outermost whorl of petals
- Enclose the flower bud

b. Calyx:

- All of the sepals collectively

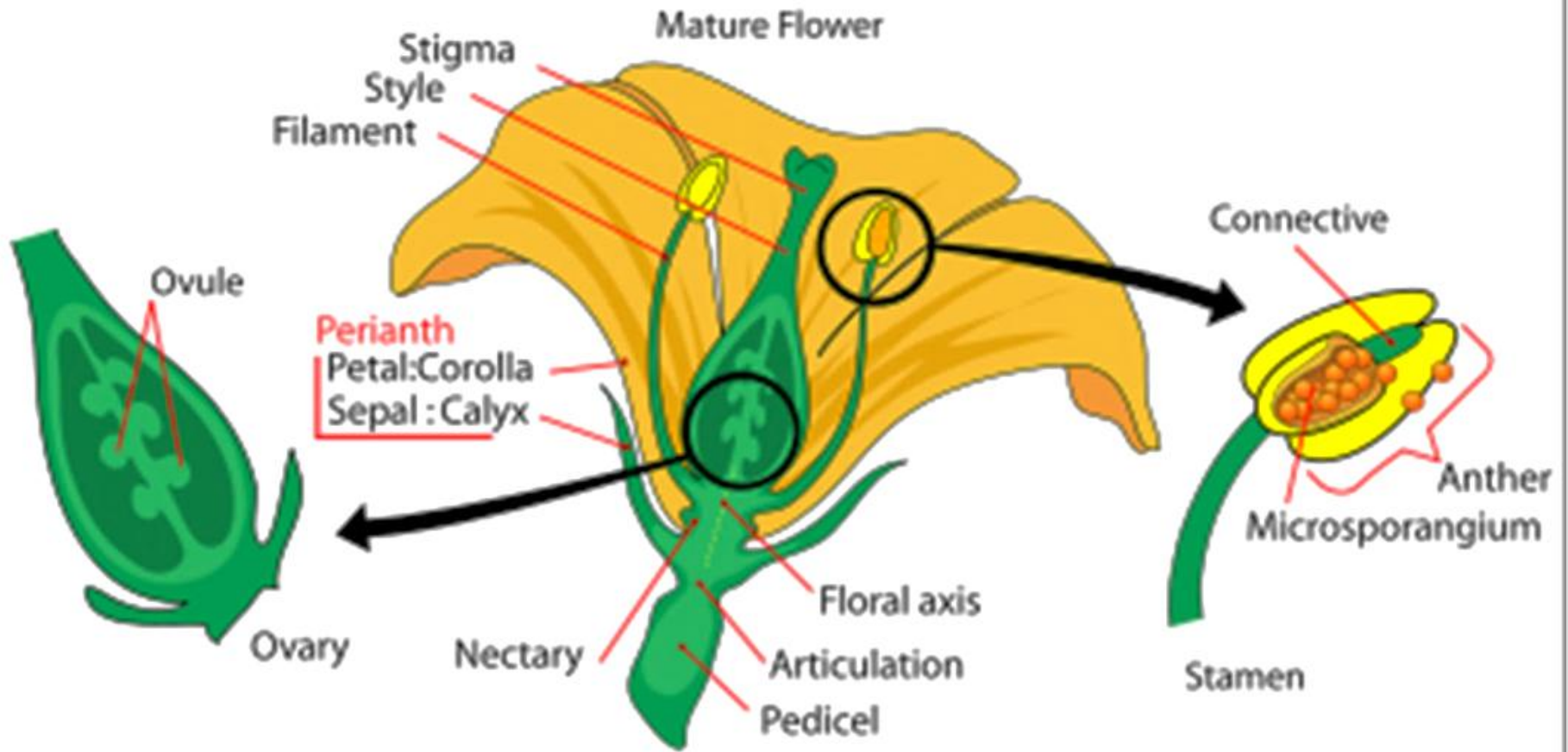
c. Petals:

- Above or inside the sepals
- Ornately colored
- Attract insects pollinators

d. Corolla:

- All of the petals collectively

e. Perianth = calyx + corolla



2. Reproductive Parts:

a. Stamens:

- Male reproductive structures

1. Usually 3 or more per flower



2. Composed of:

a. Anther:

- Produces pollen (male reproductive cells)

b. Filament:

- Stalk that supports the anther

Anther + Filament = Stamen

Anther



Filaments



b. Pistil:

Female reproductive structure
May be more than one per
flower

Contains a single or multiple
carpels (sections of the pistil)

2. Composed of:

- a. Stigma: Receives the pollen
- b. Style: Connects the stigma to the ovary
- c. Ovary: Contains the female reproductive cells





Ovary

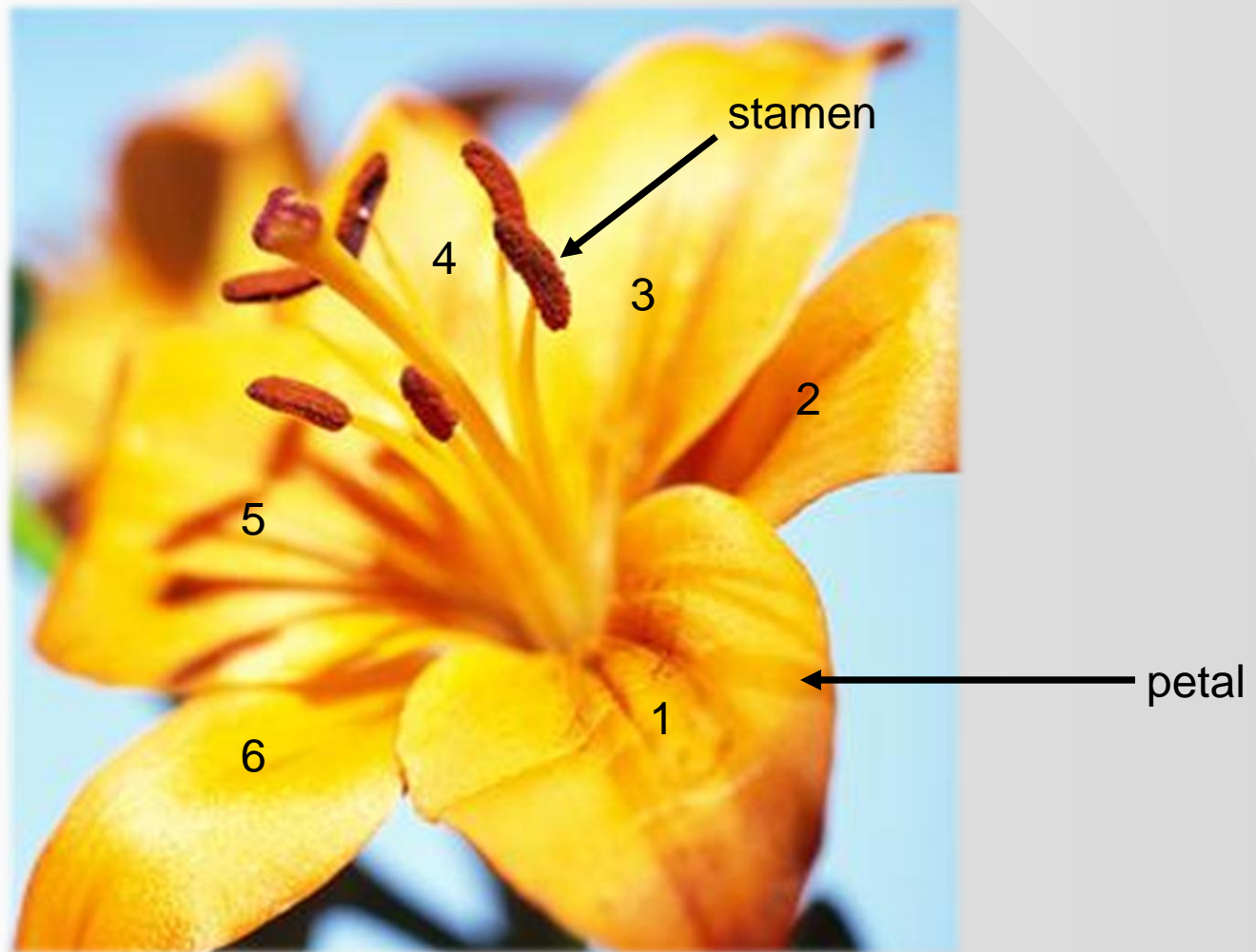
Stigma

Style

Stigma + Style + Ovary = Pistil

Monocot vs. dicot flowers

Monocot flowers: Sepals, petals, and stamens develop in 3's or 6's



Dicot flowers: Sepals, petals, and stamens develop in 4's or 5's



Grass flower: (a specific type of monocot flower)



<http://en.wikipedia.org/wiki/Spikelet#Description>

Structure:

1. Bracts: Replace the calyx and corolla of dicots
2. Spikelet: Individual grass flower, which is called the inflorescence
3. Glumes: Two leaf-like bracts at the base of each spikelet

4. Florets:

Located above the glumes; each contains the stamens and pistil together with other bracts.

- a. Contains the stamens ~ 3 per floret
- b. Contains the pistil: has two stigmas but only one ovary

Classification based on flower parts:

1. Complete:

Contains sepals, petals, pistil and stamens.

Most dicots have complete flowers

2. Incomplete:

One or more of the four flower parts is missing

All grass flowers are incomplete because they have no sepals or petals

Classification based on sexual expression:

1. **Perfect** (also called hermaphroditic):

Contain both the pistil and stamens

2. Imperfect:

Missing either stamens or pistil

True or False

All complete flowers are perfect
and
all perfect flowers are complete?

That statement is **false**.

Why?

Review:

Stamen and **pistil** are considered reproductive (essential) parts of a complete flower.

Calyx and **corolla** are considered structural (accessory) parts of a complete flower.

All complete flowers are perfect, because they contain both pistil and stamens.

Not all perfect flowers are complete. Example: a grass flower contains pistil and stamens but does not have petals and sepals.

1. Pistillate (female) flower:

Contains only the pistil



<http://en.wikipedia.org/wiki/Corn>

Example: Corn ear

2. Staminate (male) flower:

Contains only stamens

Example: Corn tassel



3. Monoecious ('one house'):

Have pistillate and staminate flowers on the same plant

Corn is monoecious

- Ears are pistillate
- Tassel is staminate
- Corn flowers are imperfect
- The plant is monoecious



<http://en.wikipedia.org/wiki/Corn>

4. Dioecious ('two houses'):

Have only staminate or pistillate flowers (not both). Male and female flowers are imperfect and are found on separate plants.

- a. Have male and female plants
- b. Often are propagated asexually
- c. Must out-cross to produce seed

Ovules ready for fertilization



http://en.wikipedia.org/wiki/Ginkgo_biloba

Ginkgo biloba is dioecious

It has separate
male and female plants

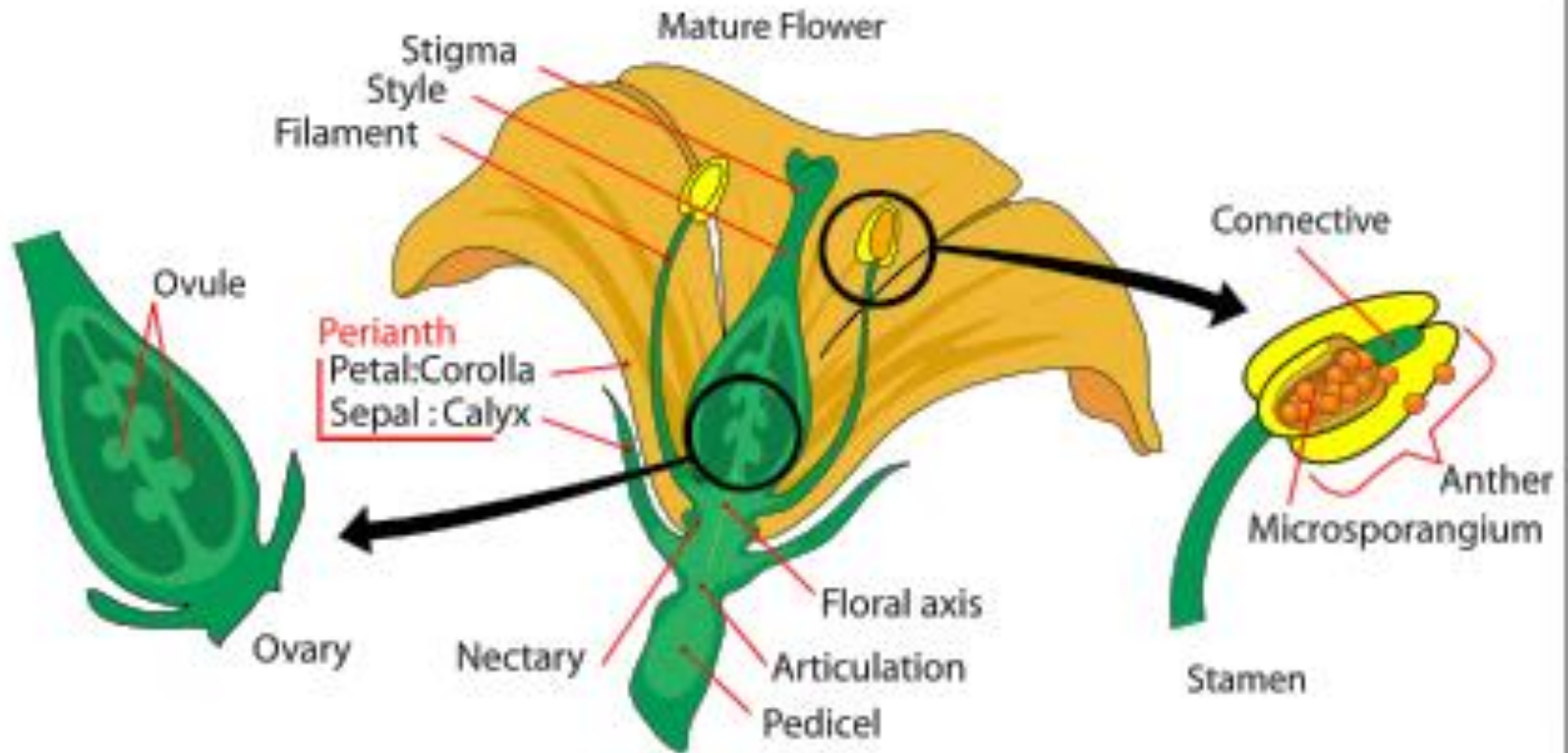


Pollen-bearing structures

Flower formation

All flowers parts are modified leaves

Signal changes from vegetative to floral : Sepal (first to develop), then the petals, stamens, and pistils



Fruit:

develops from the **ovary** of the flower

Seed:

develops from the **ovule** of the flower

Fruit: Mature ovary plus its associated parts

Function: to protect and disseminate the seeds



Photo courtesy of USDA ARS

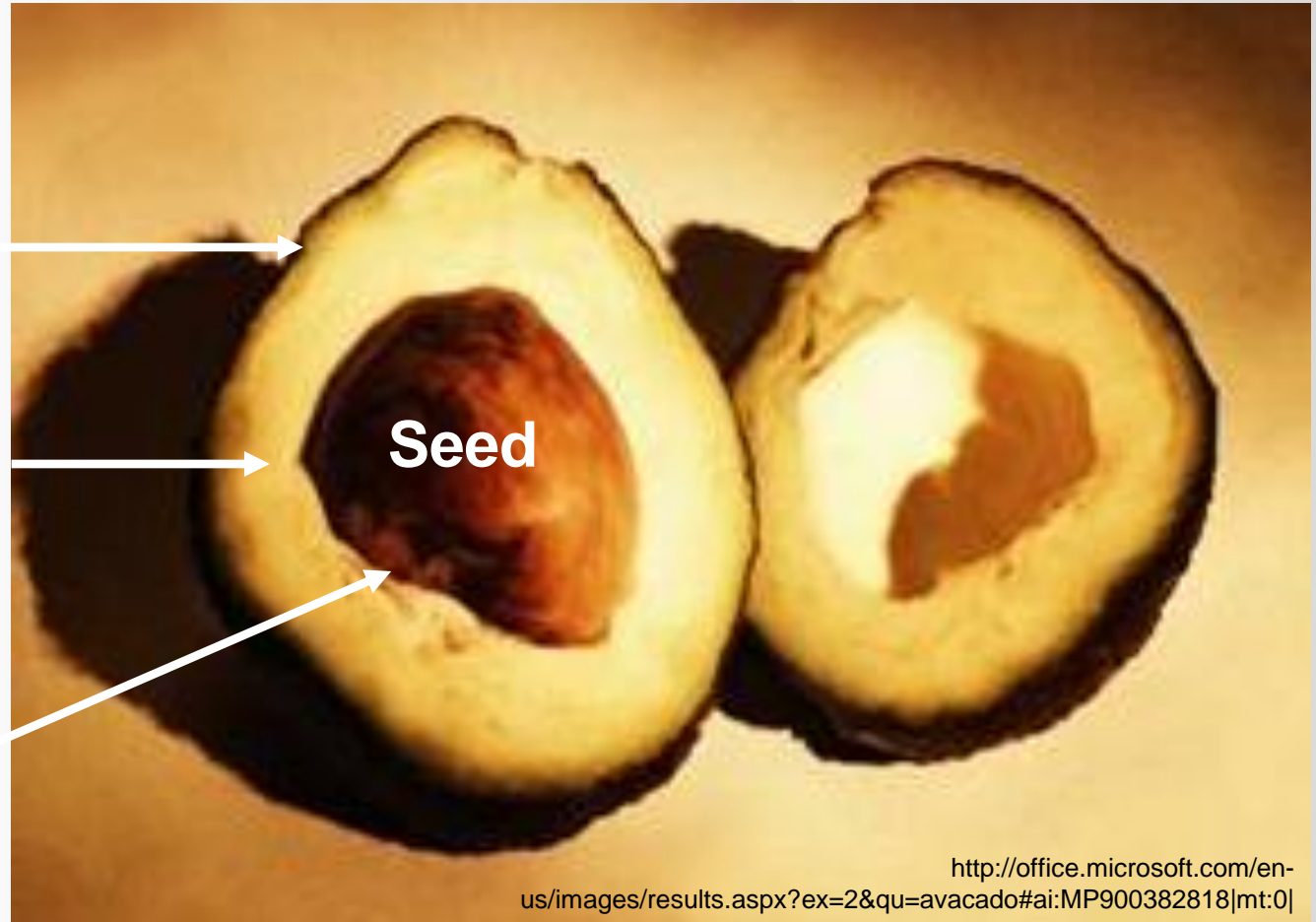
Types of fruit

Simple fruits: have a single ovary formed from one flower

Aggregate and multiple fruits: form from several ovaries



Simple Fruit



Pericarp

Exocarp
Skin or rind

Mesocarp
Main part of the
pericarp

Endocarp
Layer surrounding
the seed

Seed

Fleshy Fruits

Berry

Bananas, dates, grapes, tomatoes

Hesperidium

Orange, lemon, lime

Pepo

Cucumbers, melons, squashes

Drupe

Peaches, plums, cherries, apricots

Pome

Apple, pear



Photo courtesy of Eric Cerny

Dehiscent fruits

Fruits split at maturity to expose seeds

- Most common examples: beans or peas
- Milkweed pods are also dehiscent fruits



Indehiscent fruits

Fruits do not split open when mature

- Achene
 - Strawberry
- Caryopsis (grain)
 - Corn, rice, wheat, barley
- Nut
 - Acorn, chestnut, walnut



Photo courtesy of USDA NRCS



Aggregate fruit

Develop from many ovaries on a single flower

Strawberries: made of many achenes attached to the receptacle.

Blackberries and raspberries: made of many drupes attached to the receptacle.

Multiple fruit

- Develops from individual flowers on an inflorescence
- As the individual fruit grows, they fuse together
- Example: Pineapple



<http://office.microsoft.com/en-us/images/results.aspx?ex=2&qu=pineapple>