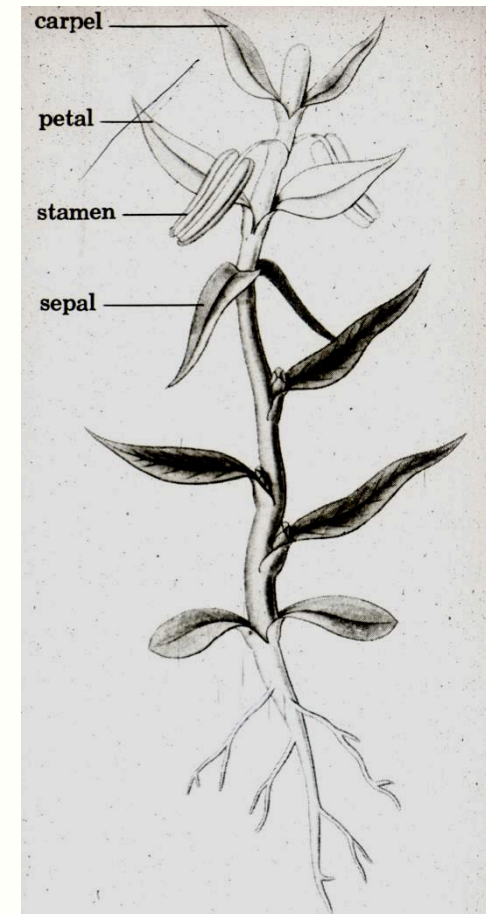


# The Flower

The outstanding and most significant feature of the flowering plants (and that which sets them out from other vascular plants) is the **flower**. Understanding the flower structure and names of the parts is important as they are the most important set of characters for recognizing, keying, and classifying species, genera, families, etc.

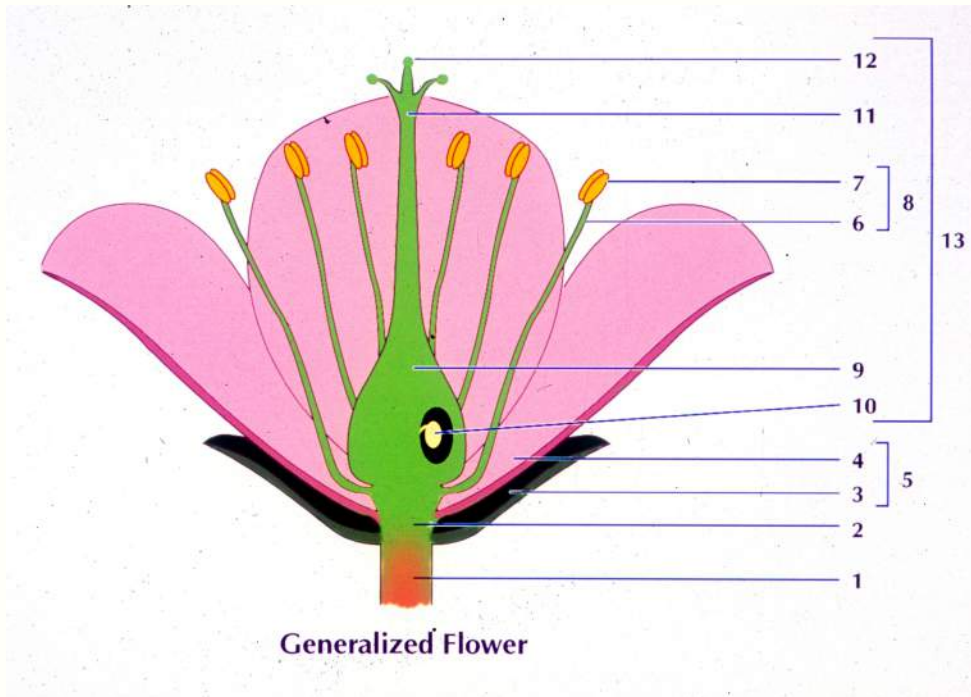


## What is the flower?

Flower: highly **specialized shoot** = **stem + leaves**. In flowers the shoot is highly **modified** and **determinate** (ceased to grow) and houses the reproductive structures.

from Schleiden 1855

# The Flower



1. **Peduncle**: floral stalk, the stem supporting the flower; sometimes referred to as the **pedicel**

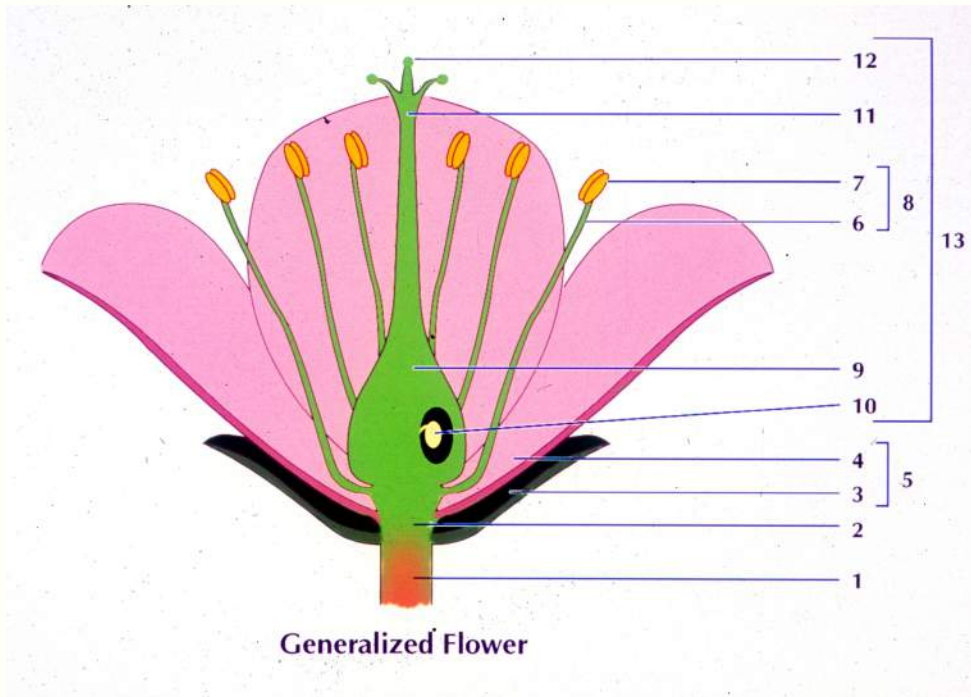
2. **Receptacle**: modified floral stem or axis from which arise the floral appendages or modified leaves

3. **Sepal**: the outer most whorl of leaves, typically green and protect the inner floral parts in buds; collectively all sepals are called the **calyx**

4. **Petal**: the second whorl of leaves, typically brightly colored and assist in attracting pollinators, collectively called the **corolla**

5. **Perianth**: collective term for sepals and petals; if perianth parts cannot be differentiated into sepals and petals, that is, they look so much alike, then they are called **tepals**

# The Flower

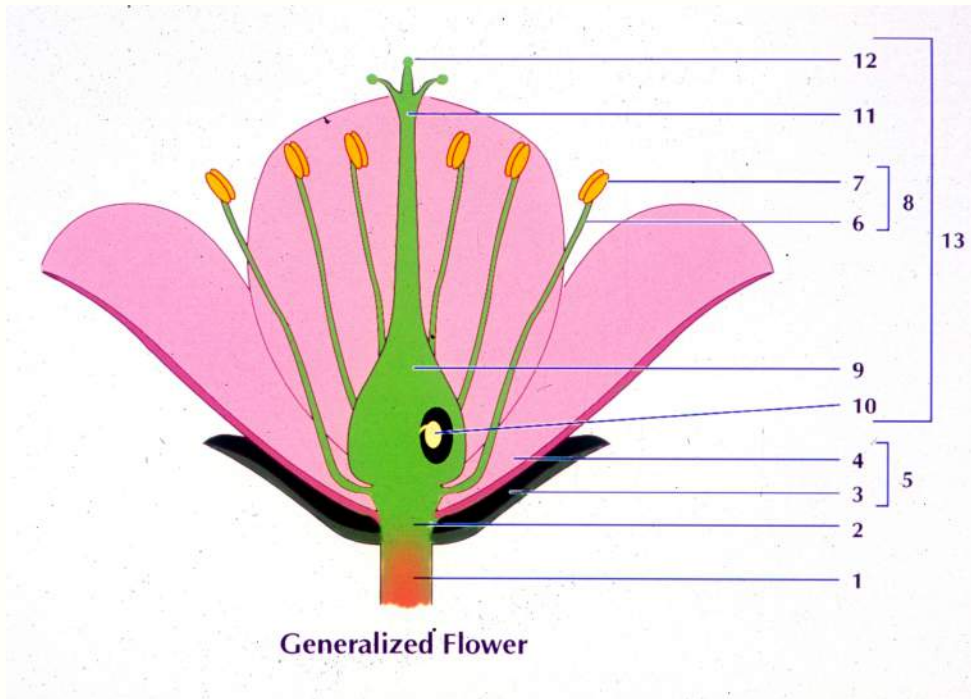


6. **Filament**: slender stalk of the stamen supporting the anther; permits exsertion of pollen out of flower

7. **Anther**: fertile portion of stamen that dehisces to release **pollen grains**; composed of **anther sacs**

8. **Stamen**: the male structure of flower comprising filament and anther; collectively, all the stamens are referred to as the **androecium** (= 'house of males')

# The Flower



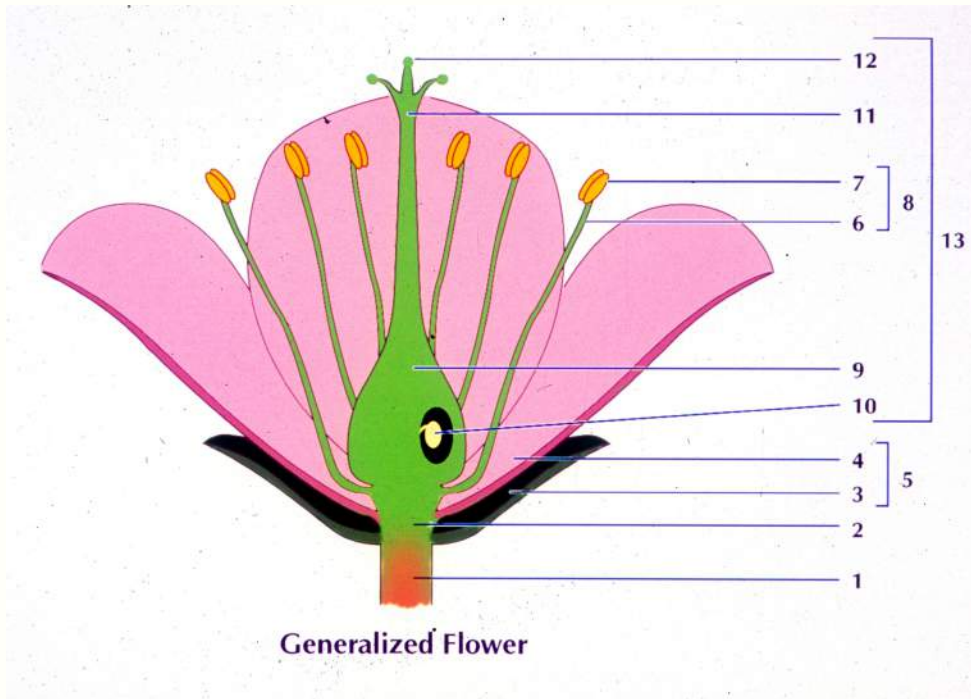
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**Nectaries** often near base of stamens; produce **nectar reward** for visitors who will move pollen ('pollinators')

# The Flower



9. **Ovary**: basal portion of pistil that contains ovules; at maturity becomes fruit with seeds

10. **Ovules**: fertile portions of pistil that contain female gametophyte (embryo sac); develop into seeds after fertilization

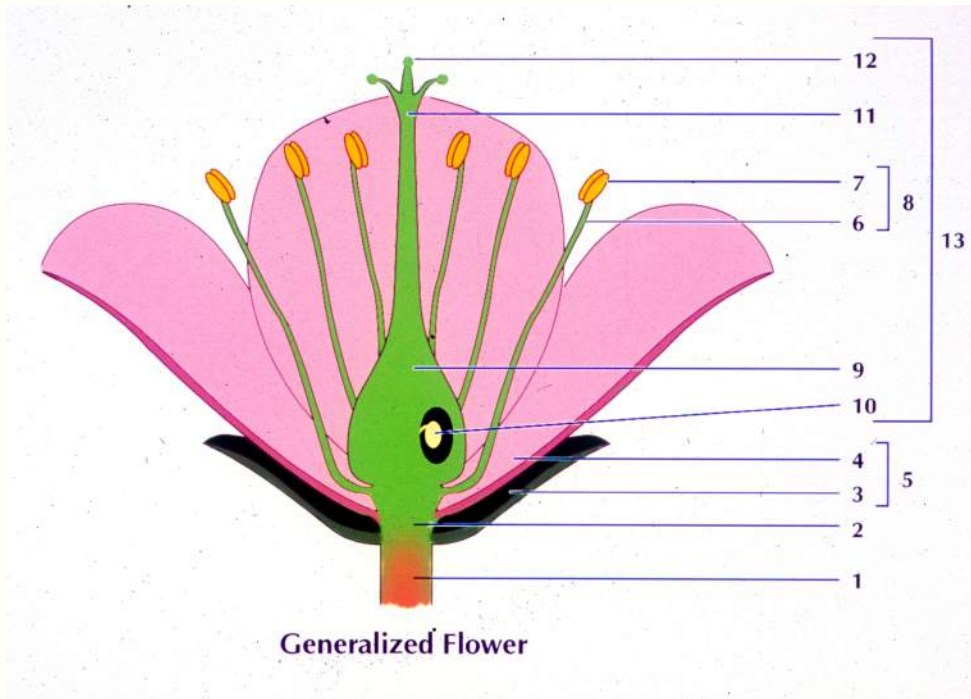
11. **Style**: slender stalk of pistil above ovary that the pollen tubes must pass through to reach eggs in ovules

12. **Stigma**: receptive portion at top of style that receives and recognizes pollen

13. **Pistil**: flask-shaped, female structure comprising three main parts; often referred to as **carpel**(s); all pistils (1 or more) are referred to as the **gynoecium** (= 'house of females').



# The Flower



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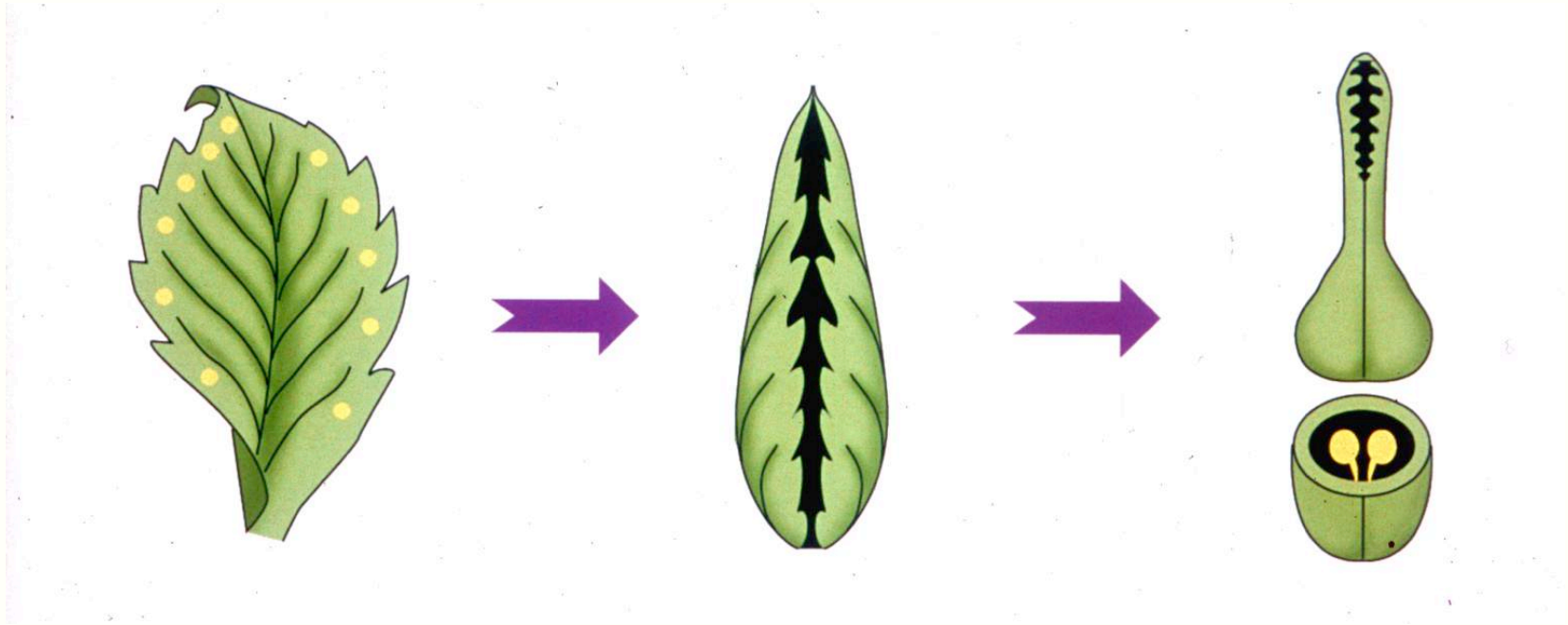
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**What is the difference between pistil and carpel?**

# The Flower



1 floral 'leaf' in gynoecium

Folded 'leaf'

1 carpel = 1 pistil

This gynoecium is  
**monocarpic**  
(one carpel)

# The Flower

- If 2 'leaves' in one flower each **separately** form carpels,
- then the flower has 2 carpels and 2 pistils,
- gynoecium is **apocarpic** (separate carpels)

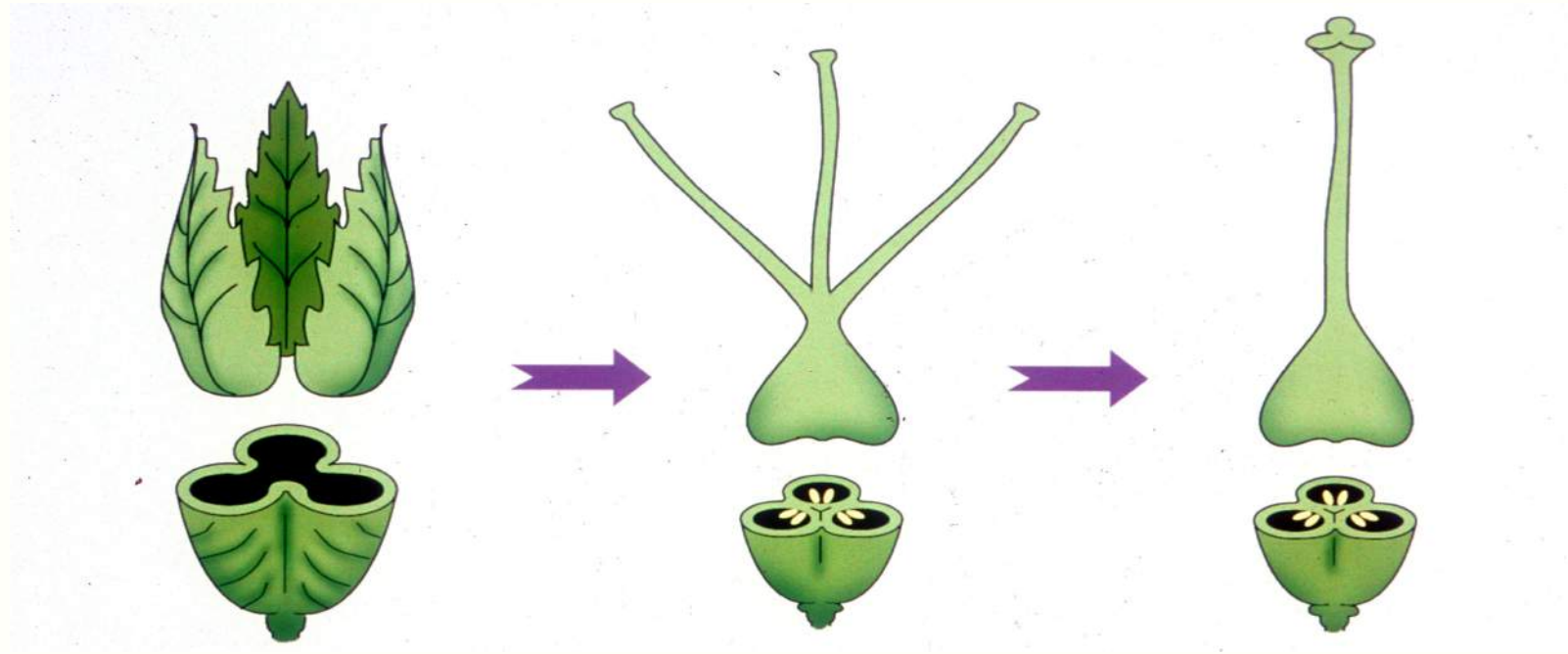


*Caltha palustris* - Marsh marigold

9 fruits (pistils) from 1 flower  
Gynoecium is apocarpic with 9 carpels or 9 pistils



# The Flower



3 floral 'leaves' in  
gynoecium **fuse**

3 carpels = 1 pistil  
3 styles

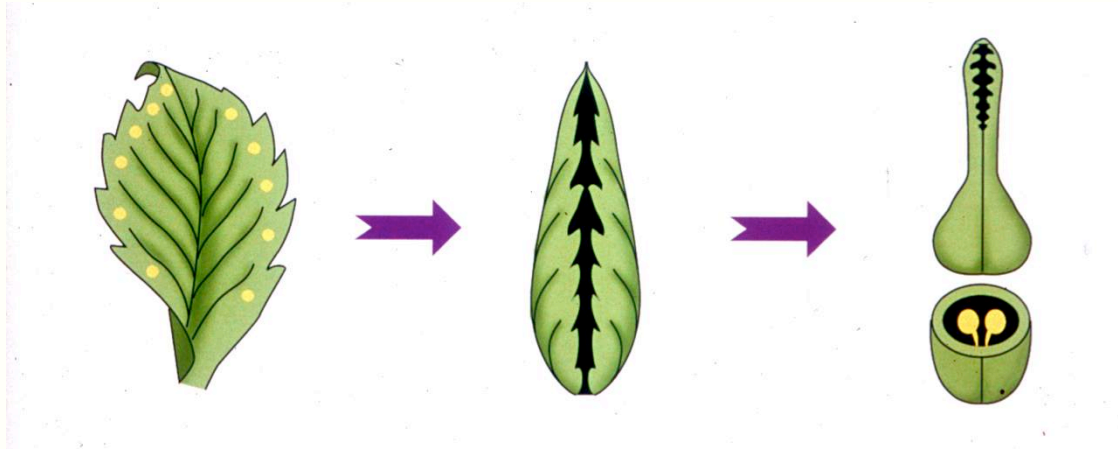
3 carpels = 1 pistil  
1 style

This gynoecium is  
**syncarpic**

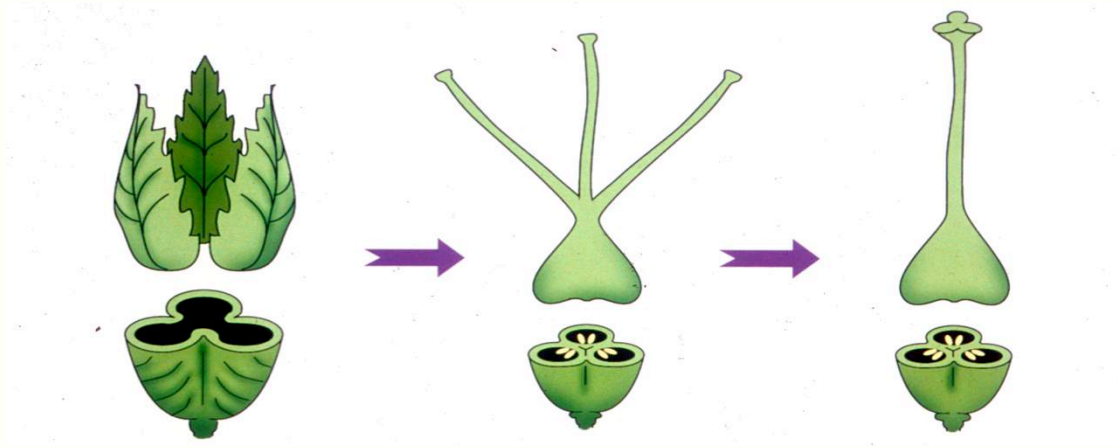
This gynoecium is  
**syncarpic**

# The Flower

**Placentation types-** arrangement of ovules



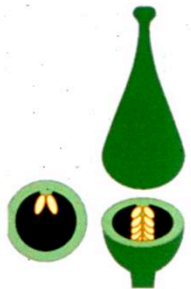
**Marginal** - found in all monocarpic or apocarpic pistils



**Axile** - found in some syncarpic pistils

# The Flower

**Placentation types-** arrangement of ovules



Marginal



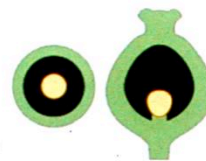
Axile



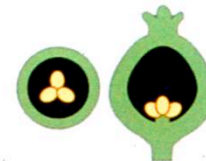
Parietal



Free-central



Basal



Basal

**Parietal** - found in many syncarpic pistils

**Free-central** - found in a few syncarpic pistils

**Basal** - found in some monocarpic, apocarpic, or syncarpic pistils

# The Flower

numerical plan



perianth spiralled



perianth 5-merous



perianth 4-merous



perianth 3-merous

# The Flower

symmetry



Flowers radially symmetrical

Flowers **actinomorphic**



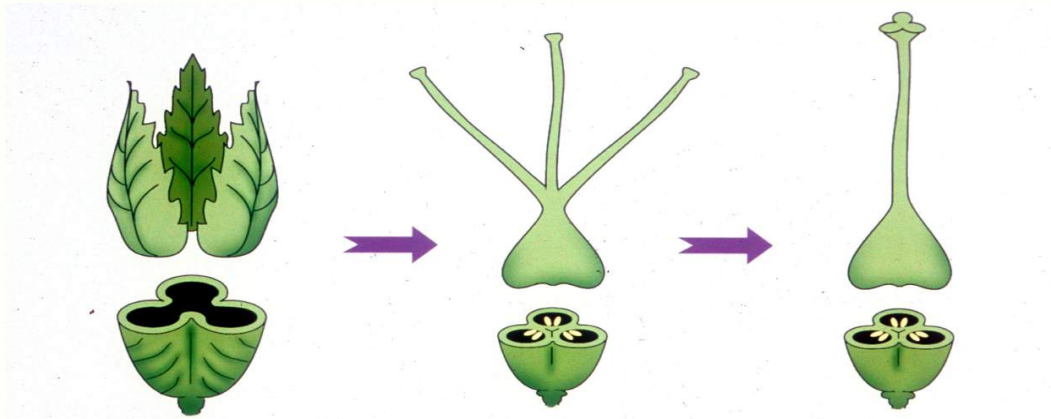
Flowers bilaterally symmetrical

Flowers **zygomorphic**



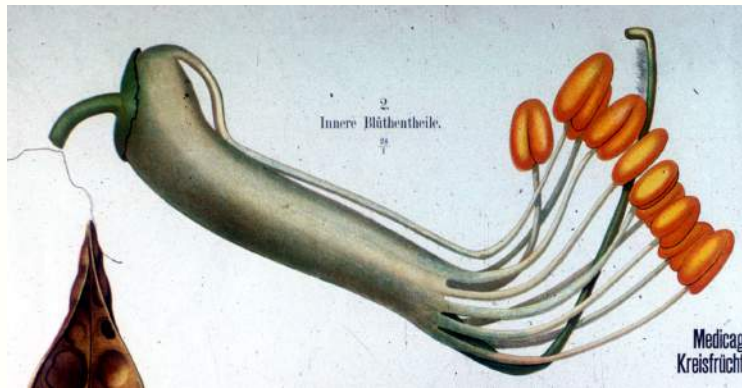
# The Flower

fusion of floral parts



Fusion of carpels → Syncarpic pistil

**Connation:** fusion of floral parts from the same whorl



Fusion of stamens → Staminal tube

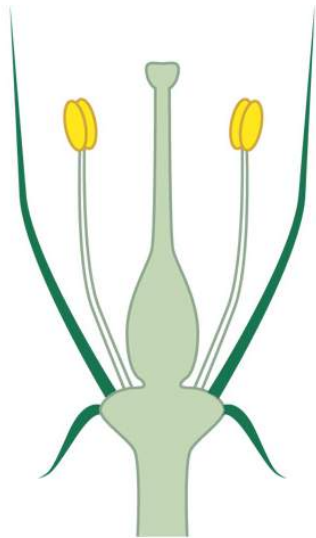


Fusion of petals → Corolla tube

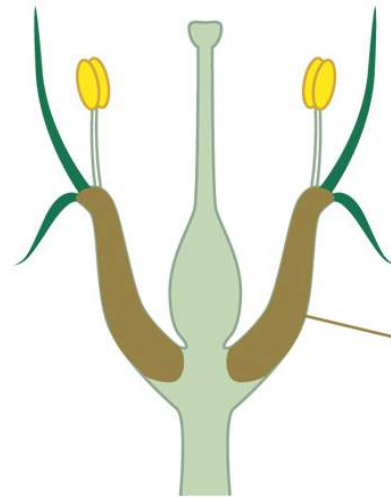
# The Flower

## fusion of floral parts

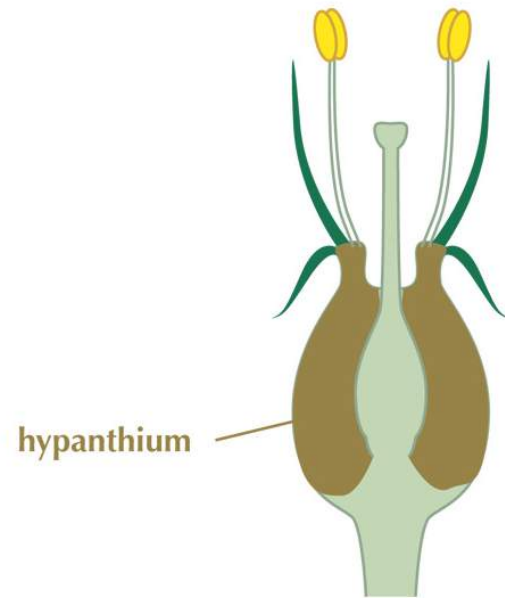
**Adnation:** fusion of floral parts from different whorls



Ovary superior  
Flower hypogynous  
No hypanthium



Ovary superior  
Flower perigynous  
Hypanthium present



Ovary inferior  
Flower epigynous  
Hypanthium present

# The Flower

floral formulas - short hand notation



$CA^4 CO^4 A^8 G^4$

4 sepals (**C**Alyx)  
4 petals (**C**Orolla)  
8 stamens (**A**ndroecium)  
4 carpels (**G**ynoecium)

*Oenothera biennis*  
Evening primrose  
Onagraceae

# The Flower

floral formulas - short hand notation



CA<sup>4</sup> CO<sup>4</sup> A<sup>8</sup> G<sup>④</sup> ←

4 sepals (CAlyx)

4 petals (COrolla)

8 stamens (Androecium)

4 carpels (Gynoecium)

Carpels fused = 1 pistil

*Oenothera biennis*  
Evening primrose  
Onagraceae

# The Flower

floral formulas - short hand notation



$CA^4 \quad CO^4 \quad A^8 \quad \overline{G^4}$

4 sepals (calyx)  
4 petals (corolla)  
8 stamens (androecium)  
4 carpels (gynoecium)

Carpels fused = 1 pistil

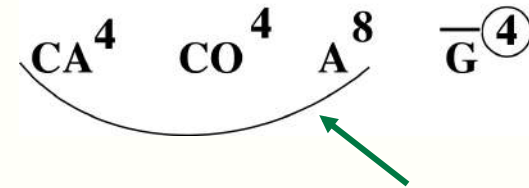
Ovary inferior

*Oenothera biennis*  
Evening primrose  
Onagraceae



# The Flower

floral formulas - short hand notation



4 sepals (calyx)  
4 petals (corolla)  
8 stamens (androecium)  
4 carpels (gynoecium)

Carpels fused = 1 pistil

Ovary inferior

Hypanthium (+ hypanthium tube)

*Oenothera biennis*  
Evening primrose  
Onagraceae