WHAT IS PLANT MORPHOLOGY?

A study of the physical form and external structures of plants

-wikipedia
HAND LENS / LOUPE
TODAY’S SESSION, YOU WILL GET BASIC UNDERSTANDING OF

- **Plant external structures**
- **Leaf types and features**
- **Flowering parts**
- **Basic fruits and seeds types**
- **Plant glossary**
- Look at plant samples
THE PLANT: EXTERNAL STRUCTURE
rhyzomatous

adventitious - rooting from non-root tissue

Photo by Dee Shea Himes
THE LEAF

- apex
- margin
- veins
- midrib
- base
- petiole
- axillary bud
- stipule

(modified leaf)

http://www.bio.miami.edu/dana/226/226F07_8print.html
LEAF TYPES

- Simple leaf: 1 Leaf
- Compound leaf: Multiple Leaflets

https://www.uwgb.edu/biodiversity/herbarium/trees/simple_compound_leaves01.htm
THE COMPOUND LEAF

Compound leaf

note that there is a bud at the base of the petiole, but not at the base of the leaflets

leaflet of compound leaf

bud

no bud

petiole of compound leaf

©2004, Gary Fewless

https://www.uwgb.edu/biodiversity/herbarium/trees/simple_compound_leaves01.htm
LEAF ARRANGEMENTS...

IMBRICATE

HTTPS://VPLANTS.ORG/PORTAL/PLANTS/GLOSSARY/PLATE02.PHP
LEAF COMPOUND TYPES


3 leaves
LEAF MARGINS

- Entire
  - Ciliate - fringed with fine hairs
  - Involute - rolled over top
  - Revolute - rolled under bottom

LEAF MARGINS...
HTTPS://VPLANTS.ORG/PORTAL/PLANTS/GLOSSARY/PLATE04.PHP

- Crenate - crenatum, looks like a bunch of CCCCC’s.
  - Dentate - dentata, tum..., looks like a bunch of DDDDD’s
  - Lobe - lobata
  - Serrate - saw-like, toothed pointing forward, seratum, serata,
  - Serrulate - multi serrated (finely serrated)
  - Sinuate - (strongly wavy)
LEAF APICES (LEAF TIP)

https://vplants.org/portal/plants/glossary/plate05.php
LEAF VENATION
https://vplants.org/portal/plants/glossary/plate05.php

Alternates       Opposite

PARALLEL VEINS - MONOCOTrys

Piperia transversa

Photo by Dee Shea Himes
LEAF BASES

https://vplants.org/portal/plants/glossary/plate05.php

LEAF SURFACES...
HTTPS://VPLANTS.ORG/PORTAL/PLANTS/GLOSSARY/PLATEo6.PHP

adaxial - top surface  
abaxial - under (bottom) surface

Photo by Dee Shea Himes
LEAF SURFACES, +30 TYPES

Leaf surface of Chalk Dudleya

farinaceous (white powder)

stoma, stomata, stomate

Photo by Dee Shea Himes
glands,
glandular
STEM AND LEAF PARTS, AND VARIATIONS...

https://vplants.org/portal/plants/glossary/plate07.php

FLOWER PARTS: ANGIOSPERM - EUDICOT

Sepals collectively are called calyx

Male

Petals collectively are called corolla

female / Carpel

FLOWER PARTS: ANGIOSPERM - EUDICOT

Sepals collectively are called calyx

Petals collectively are called corolla

https://media1.britannica.com/eb-media/06/63306-004-0406576D.gif
FLOWER PARTS:
ANGIOSPERM - MONOCOT - LILIACEAE

Tepals
peduncle

Photo by Dee Shea Himes
PISTIL AND CARPEL

Pistil / Carpel (used interchangeable) contains:
- Stigma
- Style
- Ovary

A flower can have a simple pistil / carpel or can be compound depending on genus/species.

E.g. Lilies - 3 carpels
Apiaceae - 2 carpels

FLOWER PARTS: CLOSER LOOK AT ANther, PolLEN

Photos by Dee Shea Himes
FLOWER PARTS:
BRACTS, LOOKING LIKE PETALS - MODIFIED LEAVES

- dogwoods
- poinsettia
- bougainvillea

https://www.thedailygarden.us/garden-word-of-the-day/bracts
FLORAL PARTS OF COMPOSITES

https://vplants.org/portal/plants/glossary/plate12.php

DISCS AND RAYS

Rays and discs

disc flowers only (rayless)

Rayless arnica

Mt. Hamilton Thistle

Photos by Dee Shea Himes
FLOWER STEMS...

Don’t forget leaf attachment is... Petiole

https://qph.fs.quoracdn.net/main-qimg-9e947a99cc65c954a0b2be8fcede8b3-lq

https://www.uwgb.edu/biodiversity/herbarium/trees/simple_compound_leaf.html
PERFECT / IMPERFECT FLOWER
COMPLETE / INCOMPLETE FLOWER

• Perfect / Complete flower
  • Having both male and female reproductive parts in a flower.

• Imperfect / Incomplete flower
  • Having either male (staminate) or female (pistillate) flowers.
**MONOECIOUS / DIOECIOUS FLOWER**

- **Hermaphrodite** - all flowers on the same plant are (complete flowers) bisexual, having both male and female reproductive parts on the same flower.

- **Monoecious** - one house (same plant)
  - Pistillate (male) flowers and staminate (female) flowers on same plant

- **Dioecious** - two houses (two plants)
  - Pistillate plant having only male flowers
  - Staminate plant having only female flowers

*Photos by Dee Shea Himes*
INFLORESCENCE TYPES...

https://vplants.org/portal/plants/glossary/plate08.php
FLOWER SYMMETRY

https://vplants.org/portal/plants/glossary/plate09.php

LOCATION OF NECTARY

- Nectaries are glands that produce nectar to attract pollinators.
- Nectar guides are markings, lines, or patterns that guides pollinators to the nectar or to locate “landing pads”.
- Located inside base of flowers or various parts to make pollinator rub against anthers to pick up and distribute pollen to stamens.
- The reward for the hard work of pollination.
FLOWER PARTS: ANGIOSPERMS VS GYMNOSPERMS

[Diagram showing the parts of an angiosperm flower and a gymnosperm seed, with labels for each part.]
FLOWER PARTS:
GYMNOSPERM - CONIFERS

[Image of flower parts diagram]

https://commons.wikimedia.org/wiki/File%3AGymnosperm_life_cycle_(en).png
MANY TYPES OF CONES

Photo by Dee Shea Himes
SEEDS: ANGIOSPERMS VS GYMNOSPERMS

Angiosperm Seeds and Fruit vs. Gymnosperm Seeds

https://2.bp.blogspot.com/-QRPK8EGe4ys/UOU9uJ6o8ZI/AAAAAAAAABhI/ZKOWmuZVYz8/s1600/Angiosperms%20and%20Gymnospemrs%20Differences.gif
OVARY POSITION
SUPERIOR, INFERIOR, HALF-INFERIOR

http://1.bp.blogspot.com/-eFLRhtM7QXU/TwxXLEzlpAI/AAAAAAAAAHs/yCUtVgnCjtTo/s1600/Picture6.jpg
OVARY POSITION

https://vplants.org/portal/plants/glossary/plate09.php

below around above
INFERIOR OVARY

Photo by Dee Shea Himes
INFERIOR OVARY

Sepals, pistils, stamens are above the ovary

Ovary that is enclosed by the hypanthium

Photo by Dee Shea Himes
FLOWER TO FRUIT
SUPERIOR OVARY

https://www.carlsonstockart.com/images/xl/Tomato-Flower-Fruit-Anatomy.jpg

Flower (enlarged)

Fruit - Berry
FLOWER TO FRUIT

Anatomy of an apple flower

- Pome

Basic Fruits and Seeds, fleshy

https://vplants.org/portal/plants/glossary/plate11.php

Basic Fruits and Seeds, dry

https://vplants.org/portal/plants/glossary/plate11.php

DRY

ACHENES

LOCULICIDAL

SEPTICIDAL

CAPSULES

PORICIDAL

Basic Fruits and Seeds, dry

https://vplants.org/portal/plants/glossary/plate11.php

SCREWBEAN MESQUITE
Prosopis pubescens

tightly coiled

Photos by Dee Shea Himes
SEDGES

https://vplants.org/portal/plants/glossary/plate12.php
GRASSES

https://vplants.org/portal/plants/glossary/plate12.php

MELICA SSP.

Photos by Dee Shea Himes
Plate 1: Stem and Root Types.
Plate 2: Leaf Composition, Parts, and Types.
Plate 3: Leaf Shapes.
Plate 4: Leaf Margins.
Plate 5: Leaf Apices, Venation, and Bases.
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Plate 7: Stem and Leaf Parts, and Variations.
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Plate 12: Sedges, Grasses, and Composites.
PLANT IDENTIFICATION TERMINOLOGY
AN ILLUSTRATED GLOSSARY
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- **Flower to Apple**: The Orchard Project, UK

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