

# Chapter 7 Lesson 3

## Seed Reproduction

- Demonstrate an understanding of sexual reproduction in flowering plants
- Describe various methods of plant pollination

# What You'll Learn

- Examine the life cycles of typical gymnosperms and angiosperms
- Describe the structure and function of the flower
- Discuss methods of seed dispersal in seed plants

# Importance of Pollen and Seeds

- Fruits and vegetables come from seed plants



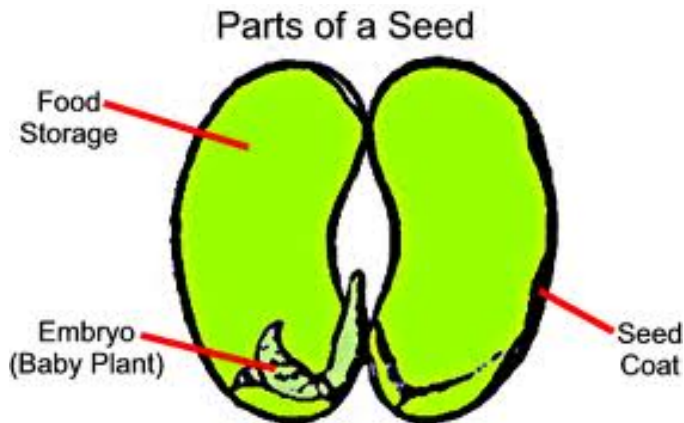
# Importance of Pollen and Seeds

- Pollen

- pollen grains = water resistant covering containing male gametophyte parts that produce sperm
- Sperm DOES NOT need to swim to female parts.
  - Carried by gravity, wind, water currents, or animals
  - Transfer of pollen grains to female parts = pollination
  - When pollen grains reach female part, sperm and pollen tube are produced.
  - Sperm moves through pollen tube fertilization occurs
- <https://www.brainpop.com/science/cellularlifeandgenetics/pollination/>

# Importance of Pollen and Seeds

- Seeds
  - After fertilization, female part develops into a seed
- Seed is made of 3 Parts
  1. Embryo: structure that produces stem, leaves, and roots
  2. Stored food: provided energy to embryo when it begins to grow
  3. Protective seed coat
- Because a seed contains an embryo and stored food, it grows faster than a seed from a spore.
- Gymnosperms and Angiosperms = seed plants
  - Gymnosperms develop in cones
  - Angiosperms develop in flowers and fruits



# Gymnosperm Reproduction

- Cones are reproductive structures
- Each Gymnosperm species has a different cone  
EX: pines, firs, spruces, cedars, ginkgoes, etc.



# Gymnosperm Reproduction

- Cones
  - Male and Female gametophyte structures are produced in cones
  - Pine trees are sporophytes that produce male and female cones
  - **Mature female cones**
    - Spiral woody scales on short stem
    - Base of each scale are 2 ovules
    - Egg is produced in ovule
  - **Pollen grains produced in smaller male cones.**
    - Spring time: clouds of pollen released from male cones



# Gymnosperm Reproduction

- Gymnosperm
  - Pollen carried from male to female cones by wind
  - Pollen must be blown between scales of a female cone
  - Here it is trapped in a sticky fluid secreted by the ovule
  - If pollen grain and female cone are same species, fertilization and formation of a seed can take place
  - It takes a long time for seeds to be released from the female pine cone
  - As soon as pollen grain falls onto the female cone until seeds are released could be 2-3 years.



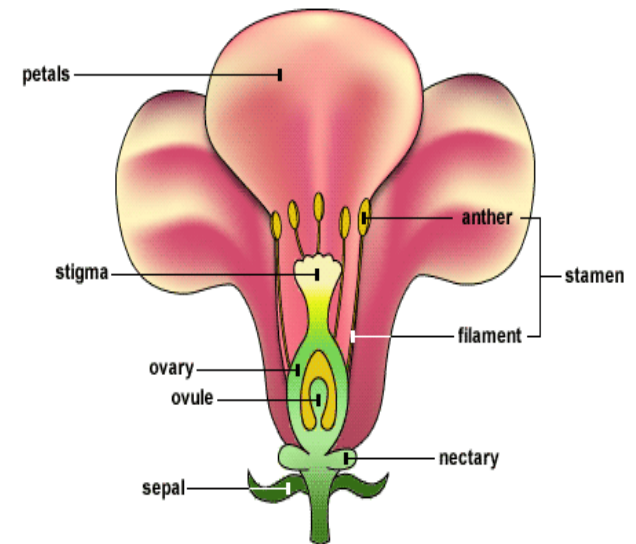
# Angiosperm Reproduction

- All angiosperms have flowers
- Sporophyte plants produce flowers
- Flowers are reproductive organs
- Contain gametophyte structures that produce sperm or eggs



# Angiosperm Reproduction

- The Flower
  - 4 parts
    - **Petals** – normally colorful
    - **Sepals** – outside of the petals (leaf like), form outside of the flower bud
    - **Stamen** – male reproductive organ (produces pollen)
    - **Pistil** – female reproductive organ
      - (ovary is here) swollen base of pistil
- Not every flower has all four parts!
  - EX: Holly Bush
  - What flower part is missing on a flower from a male holly plant?



# Angiosperm Reproduction

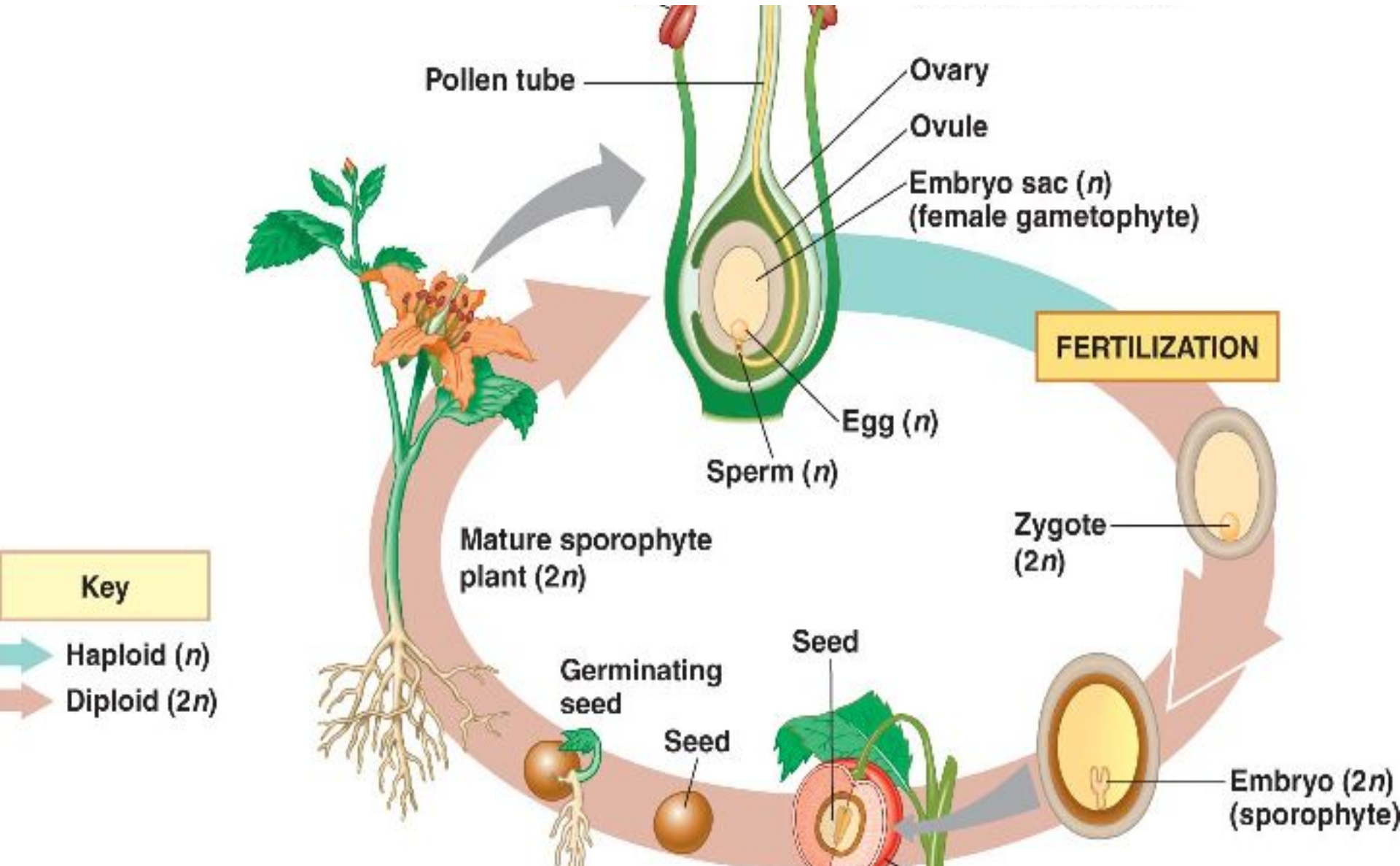
- Importance of **Flowers**
  - Some flowers have large, brightly colored petals
    - attract insects and other animals
    - Eat flower, nectar, or pollen
    - Move about flower – get pollen on wings, legs, and other body parts
    - Later, animals spread pollen to other plants they visit
  - Others depend on rain, wind, or gravity to spread pollen
    - Petals are small or absent
    - Flowers that open at night (cactus flower) have strong scents to attract pollinators
- After pollination and fertilization, ovules develop into seeds



# Angiosperm Reproduction

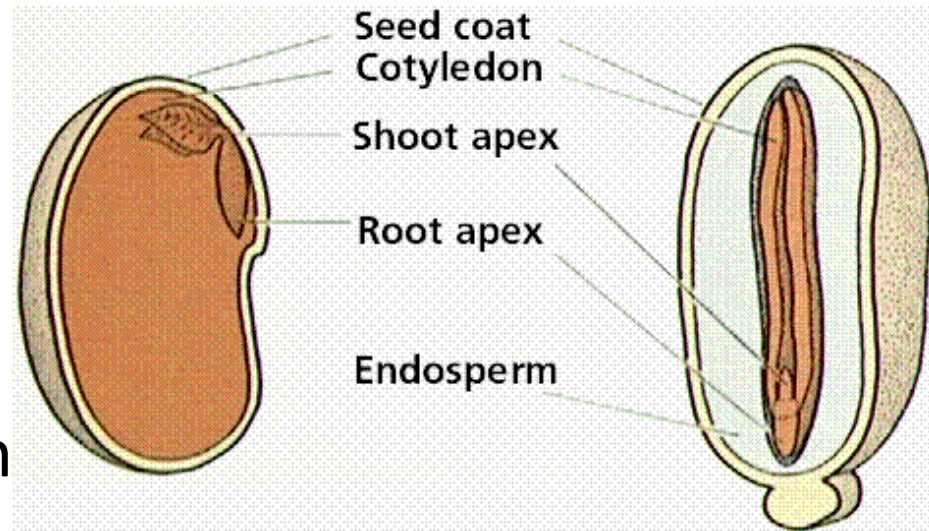
- Angiosperm Seeds
  - Pollen grain reaches stigma in a variety of ways-
    - Wind
    - Rain
    - Animals
- Angiosperms are pollinated when grains land on sticky stigma
- Pollen tubes grows from pollen grain down through the style
- Pollen tube enters the ovary and reaches the ovule
- Sperm travels down the pollen tube and fertilizes the egg in the ovule
- Zygote forms and grows into the plant embryo

# Angiosperm Reproduction



# Angiosperm Reproduction

- Seed Development
  - Parts of the ovule develop into food and seed coating that surround the embryo.
  - Some seeds such as beans and peanuts store food in structures called cotyledon
  - Others have food stored in tissue called endosperm



# Seed Dispersal

- Most seeds grow when placed on or in soil
  - Ways of Dispersal
    - **Gravity:** falls onto soil from parent
    - **Wind:** Seed has an attached structure that moves with air currents
    - **Water:** Rain can knock seeds out of dry fruit
    - **Animals:**
      - eaten with fruit, passed through digestive system
      - dispersed as animal moves from place to place
      - stored or buried by animals
      - attach to fur, feathers, clothing



# Seed Dispersal

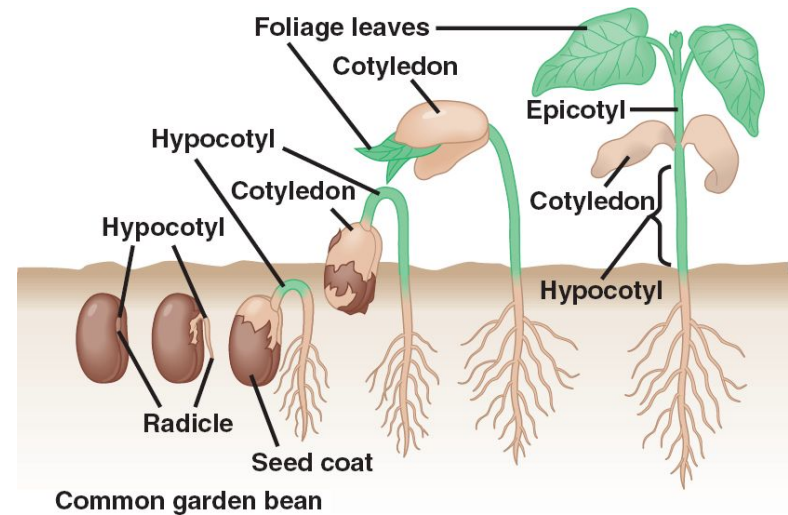
- Germination
  - Series of events that results in growth of a plant from seed
  - Some take a few days, others take weeks or months to germinate
  - FUN FACT: 1982, seeds of East Indian Lotus sprouted after 466 years.





# Seed Dispersal

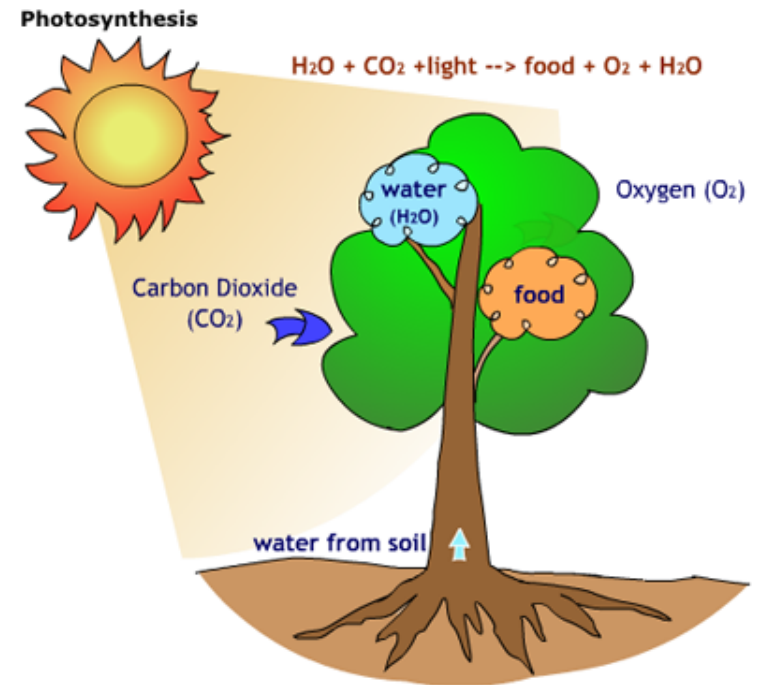
- Germination will NOT happen unless environment conditions are right.
  - Temperature
  - Presence of light
  - Availability of water
  - Amount of oxygen



- Germination begins when seed tissues absorb water
- Water causes seed to swell and seed coat to break open
- [https://www.youtube.com/watch?v=3lj1eW\\_gsrM](https://www.youtube.com/watch?v=3lj1eW_gsrM)

# Seed Dispersal

- Series of Chemical Reactions
  - Releases energy from stored food in the cotyledon or endosperm
  - Roots grow from the seed, followed by stem then leaves
  - After plant emerges from the soil, photosynthesis can begin
  - Photosynthesis provides food as the plant continues to grow



# Exit Ticket

- Complete section 3 review.