



Unit E: Plant Propagation

Lesson 1: Understanding Sexual Reproduction

Vocabulary

- Cross-pollination
- Diploid
- Endosperm
- Fertilization
- Gametes
- Genes
- Haploid
- Hybrids
- Pollination
- Seed
- Self-pollination
- Sexual reproduction
- Zygote

What Would Happen if Plants Did Not Have the Ability to Reproduce?

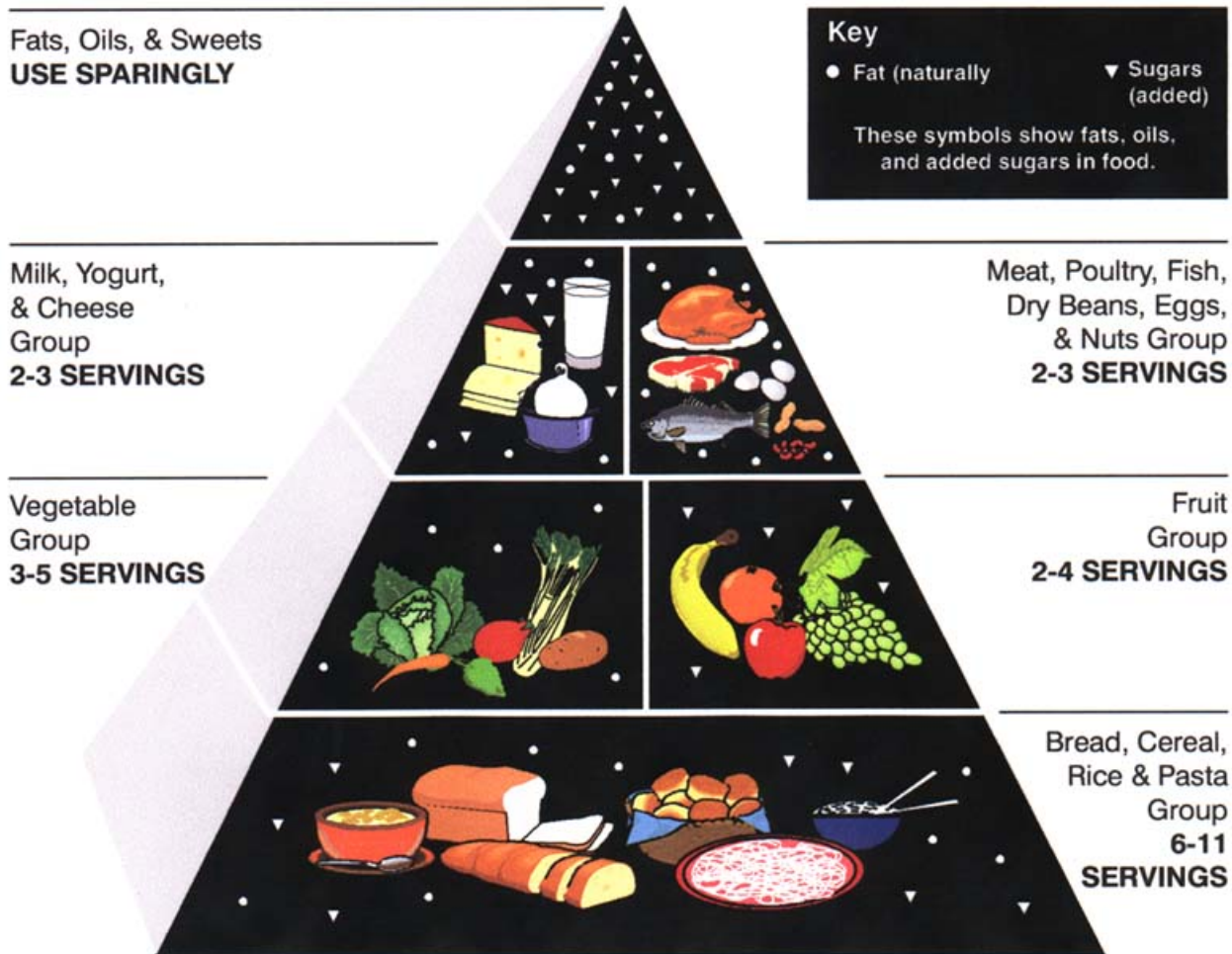
- Plants are essential for life as we know it on earth
 - They are the ecological producers of our planet
 - They produce food and shelter for other organisms, produce oxygen to support animal respiration, and enrich our environment
 - Throughout history people have relied on seeds and plant parts to grow new plants for food and fiber

- In more recent times, knowledge of plant reproduction has resulted in the development of plant hybrids that have enabled large scale agricultural production of food and fiber plants



THE IMPORTANCE OF PLANTS IN THE HUMAN DIET

Food Guide Pyramid A Guide to Daily Food Choices



Courtesy of
Interstate
Publishers

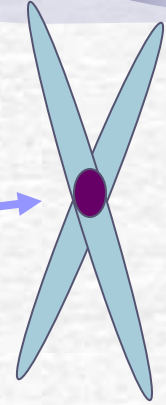
How Is Sexual Reproduction Different From Asexual Reproduction?

- **Sexual reproduction** occurs when the male sperm carried in the pollen unites with the female egg within a flower
- Most plants reproduce their own kind in nature by seeds that are the result of sexual reproduction
 - The male sex cell (sperm) and the female sex cell (egg) are known as **gametes**
 - The union of gametes produces the **seed** that contains the embryo plant and stores food



- Both the male sperm and the female egg contribute genetic information to the new embryo plant
 - This results in new combinations of genes producing new traits that add vigor to the offspring
 - The offspring resulting from this new combination of genes is known as a **hybrid**
 - People have greatly improved agricultural crops through hundreds of years of hybridization

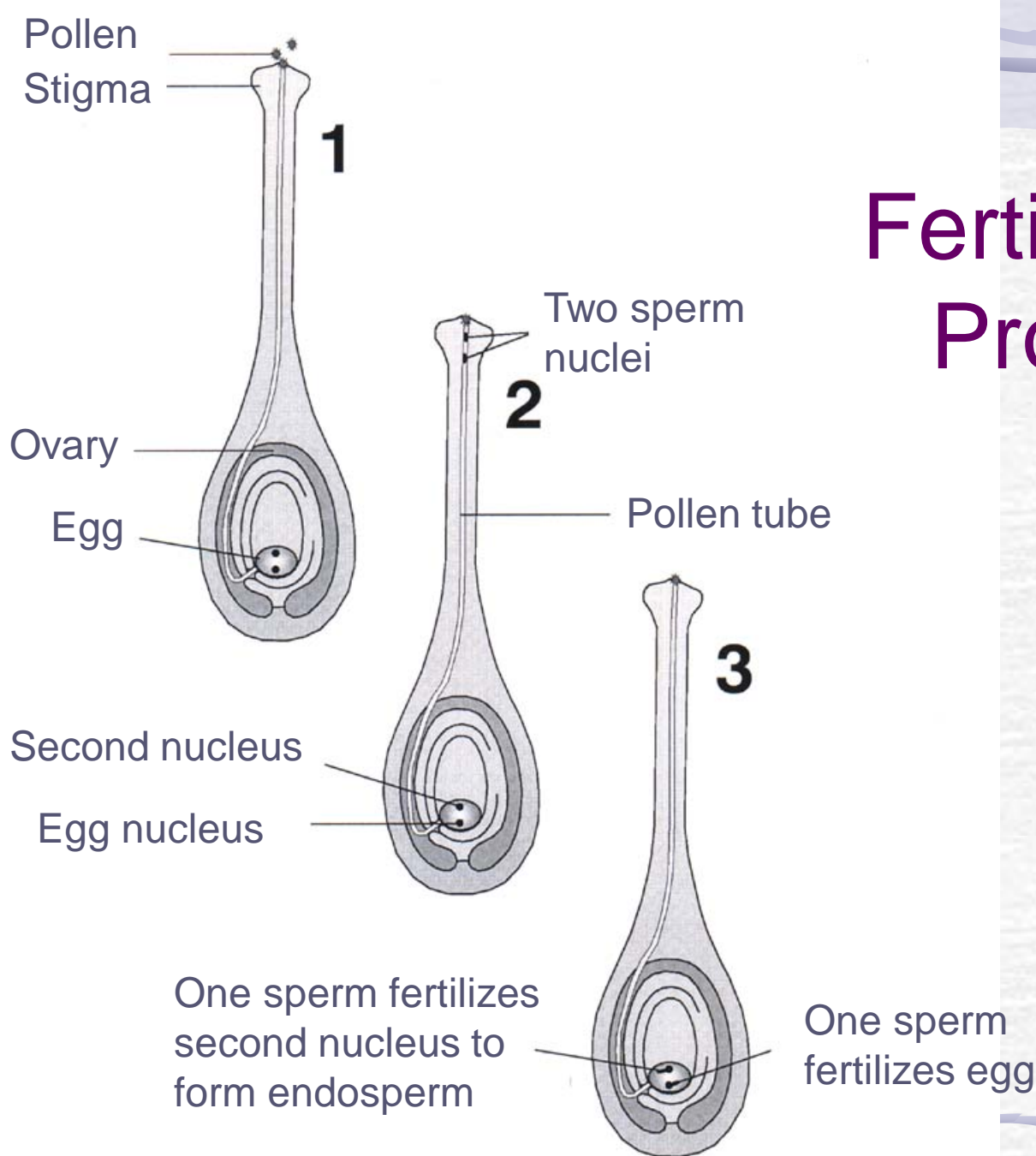
• The **genes**, made from DNA, are located in chromosomes




- Normal cells contain a pair of chromosomes and are said to be **diploid**
- Reproductive cells, the egg and sperm, contain a single chromosome and are said to be **haploid**

- ☞ Fertilization unites the single chromosome in the sperm nucleus with the single chromosome in the egg nucleus
 - This enables the fertilized egg or zygote to have a complete pair of chromosomes (diploid)
- ☞ Plant fertilization is unique because the sperm contains two nuclei
 - Causes the plant to become double fertilized
 - One sperm nucleus unites with the egg nuclei to produce a **zygote**
 - The second sperm nucleus unites with the nuclei of the embryo sac that develops into the **endosperm**

Fertilization Process



- 
- Pollination is the transfer of the male sperm carried in the pollen to the female part of the flower, the stigma
 - Plants rely on wind and water to transfer the pollen to the stigma
 - In addition, plants depend on animals to help with this process
 - Birds, insects, bats and other animals are attracted to brightly colored, scented flowers
 - These animals transfer pollen from the anthers of the flowers they visit to the stigmas of other flowers

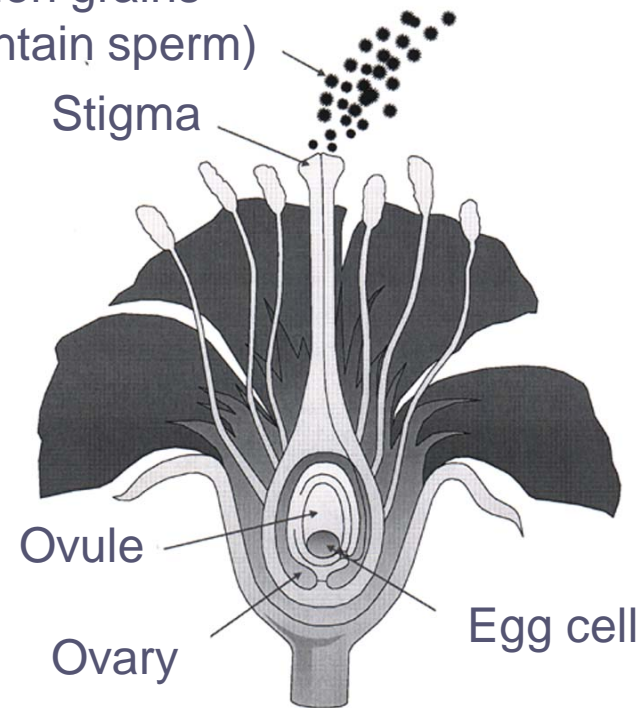
Pollination



A bat is covered with pollen from this flower. It will transfer this pollen to another flower when it searches for more nectar.

Pollen grains
(contain sperm)

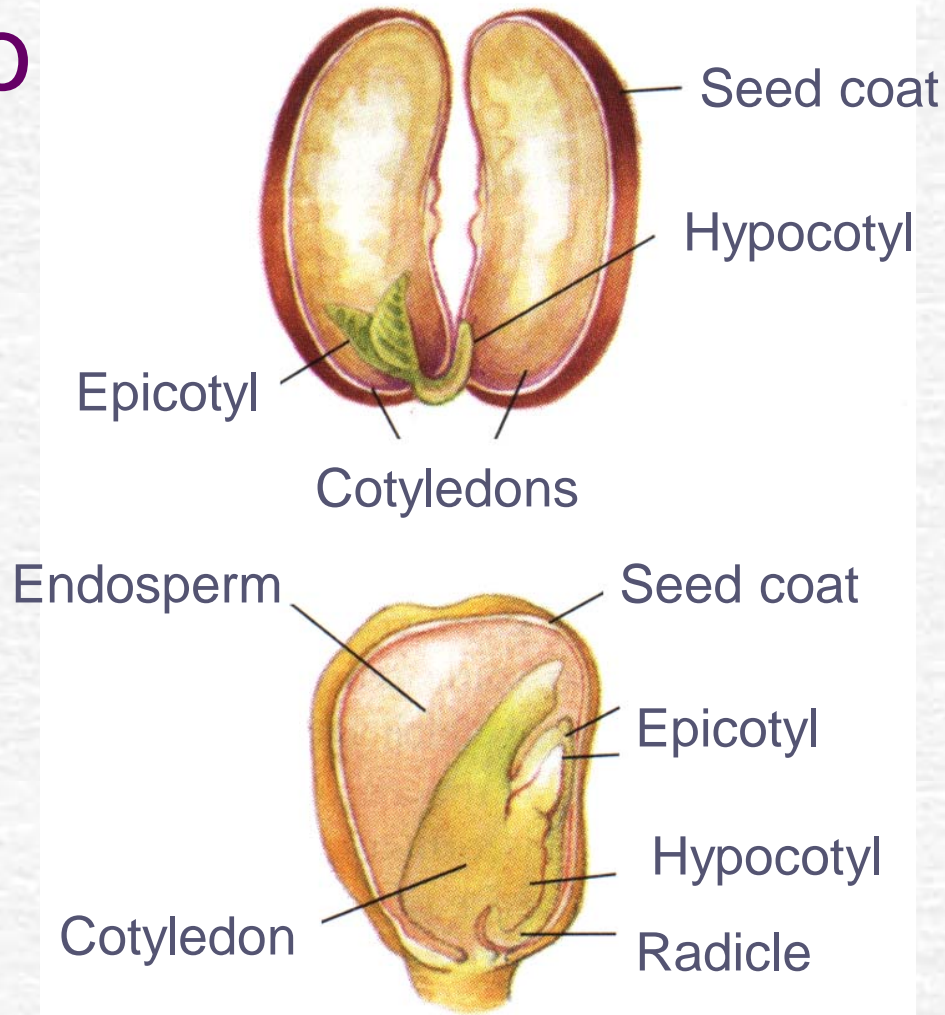
Stigma



Types of Pollination

- ☛ A. When the pollen of a plant pollinates a flower on the same plant, it is called ***self-pollination***
 - Many plants have this ability, others do not
- ☛ B. When the pollen of a plant pollinates the flower on another plant of the same species, it is said to be ***cross-pollination***

Embryo Parts



Seed Parts & Functions

Radicle	Lower part of the hypocotyl; forms the first root; first to emerge from the seed
Hypocotyl	Develops into the true stem
Epicotyl	Above the hypocotyl; develops into a pair of small leaves Tip is sometimes called the plumule – it is the terminal bud of the first shoot to emerge from the seed

Endosperm	Found in monocots in an area of high concentration of food; food source for the embryo
Cotyledon	Stores food absorbed from the endosperm when the seed is formed; provides energy until the plant produces its own food
Seed coat	Surrounds the seed and protects it from injury and dehydration

Summary

- ☞ Why are plants essential on earth?
- ☞ How is sexual reproduction different from asexual reproduction?
- ☞ What is another name for the sex cells of a plant?
- ☞ How is a haploid gene different from a diploid gene?
- ☞ Explain the process of pollination. What are the two types?
- ☞ How does fertilization in a plant occur?
- ☞ it germinates?