

24–1 Reproduction With Cones and Flowers



Life Cycle of Gymnosperms



What are the reproductive structures of gymnosperms?

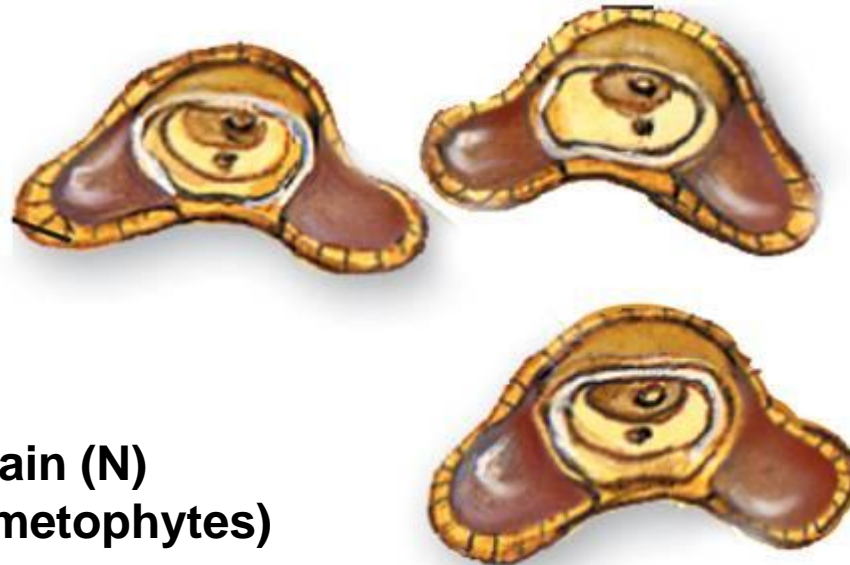


Reproduction in gymnosperms takes place in cones, which are produced by a mature sporophyte plant.

Gymnosperms produce two types of cones: pollen cones and seed cones.

Pollen Cones and Seed Cones

Pollen cones produce the male gametophytes, also called pollen grains.



Pollen grain (N)
(male gametophytes)

Seed cones produce female gametophytes and are generally larger than pollen cones.

Female gametophytes develop in two **ovules** located near the base of each scale.



Pollination

The gymnosperm life cycle typically takes two years to complete.

The cycle begins as male cones release pollen grains.

Pollen grains are carried by the wind and reach female cones.



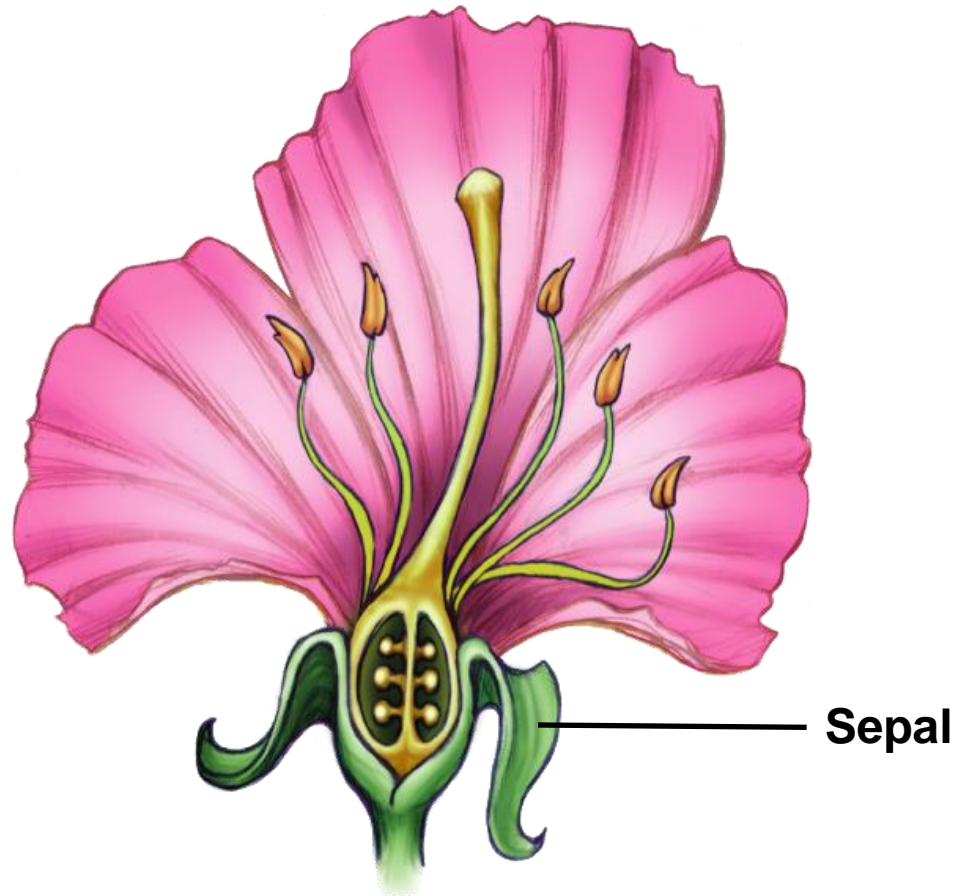
What are the reproductive structures of angiosperms?

Structure of Flowers



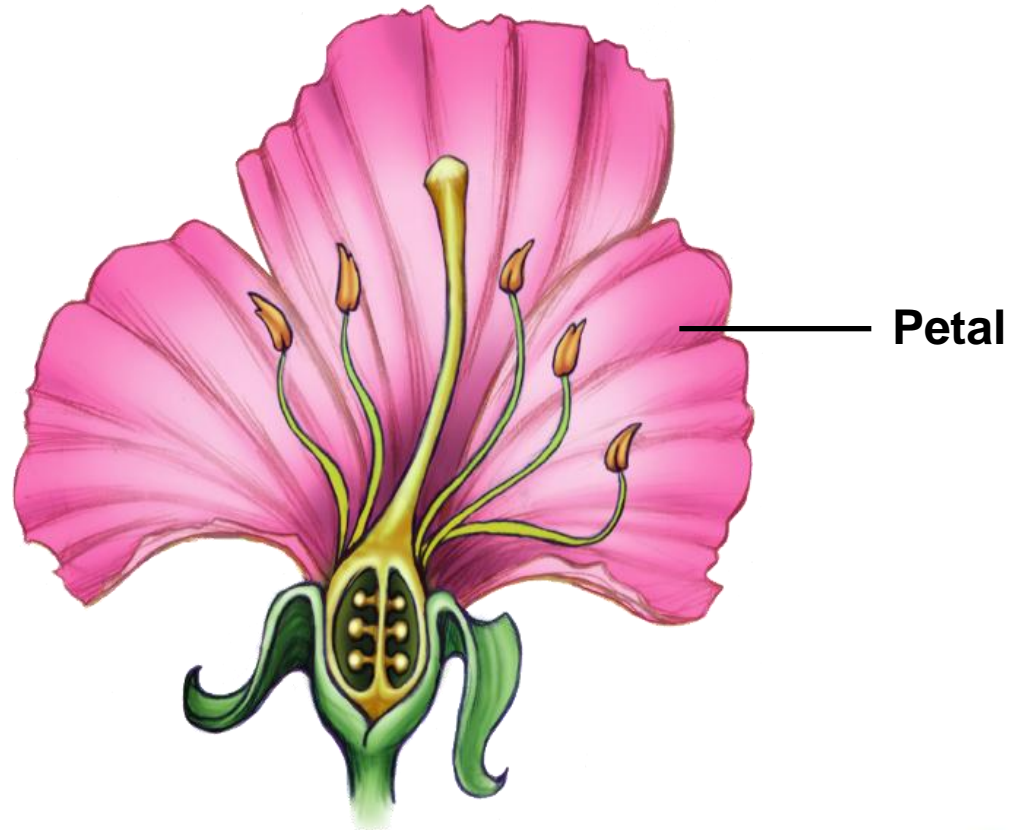
Flowers are reproductive organs that are composed of four kinds of specialized leaves: sepals, petals, stamens, and carpels.

Sepals enclose the bud before it opens and protect the flower while it is developing. (**CLIP...**)

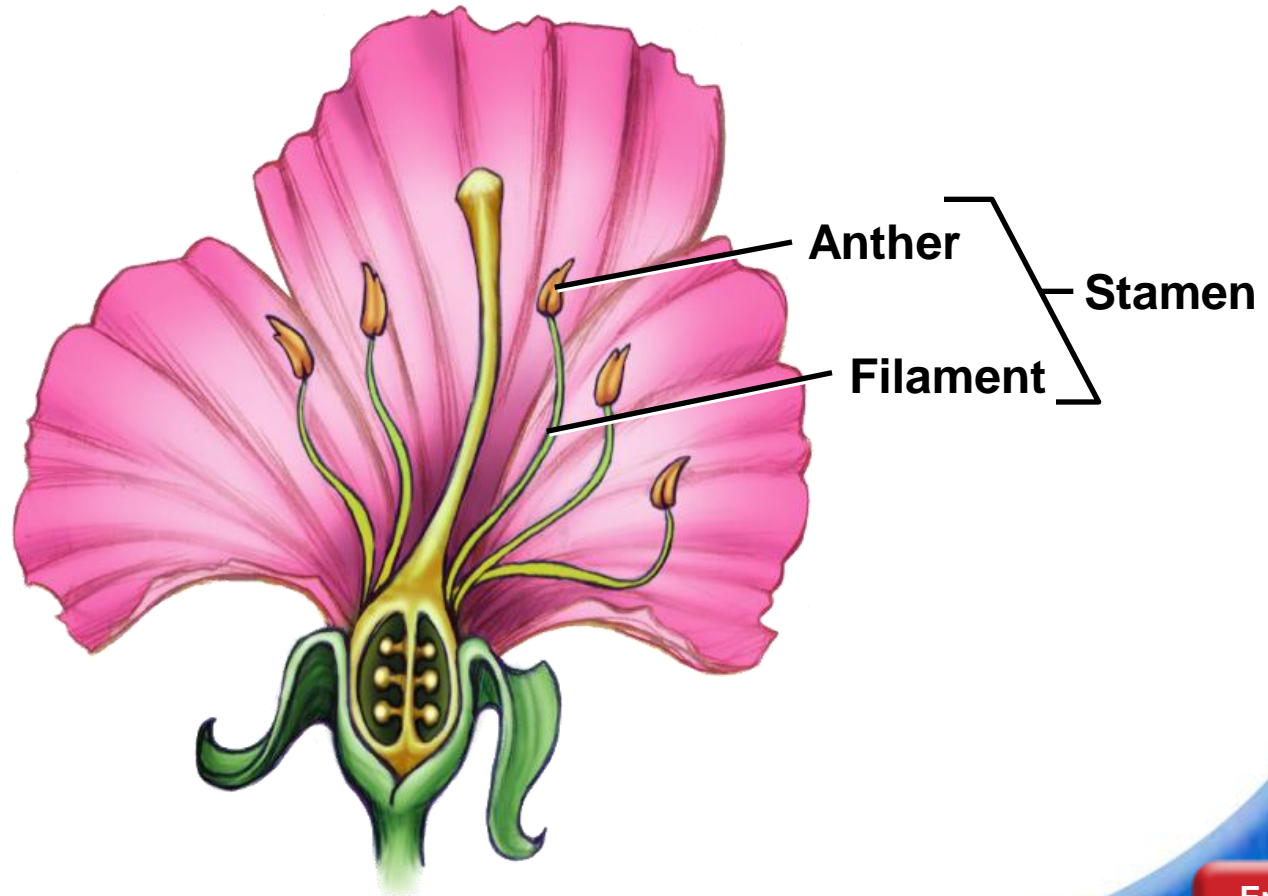


Petals are often brightly colored and are found just inside the sepals.

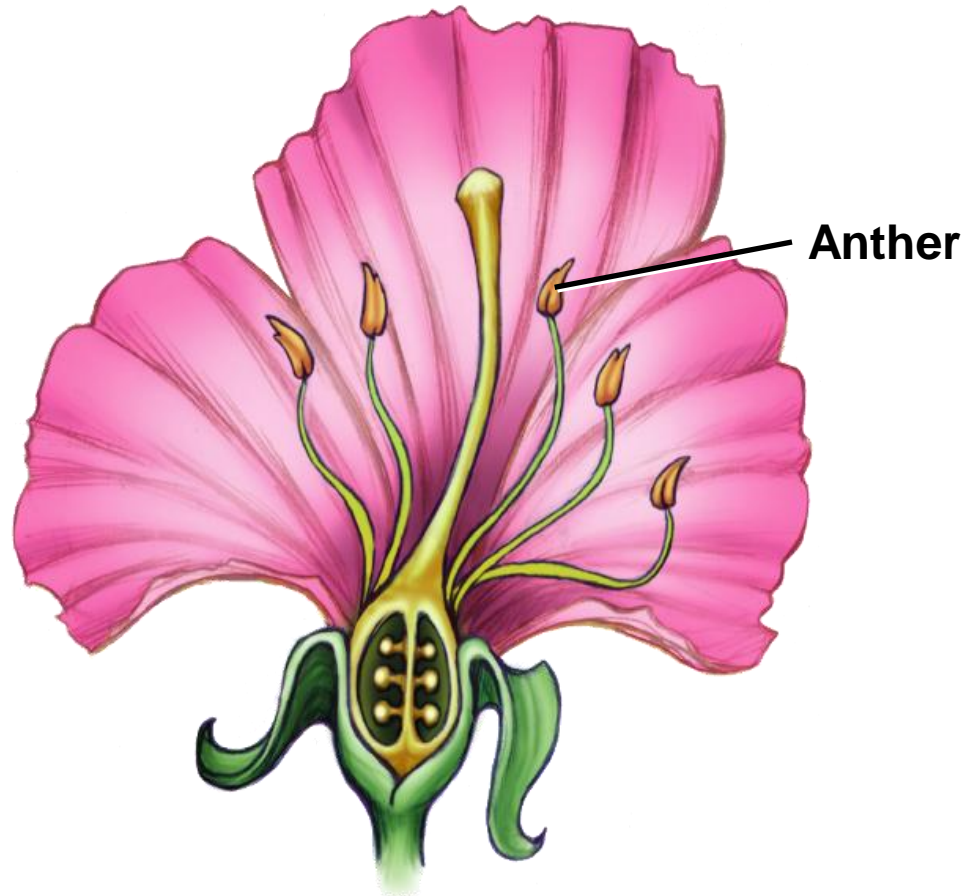
Petals **attract** insects and other pollinators to the flower.



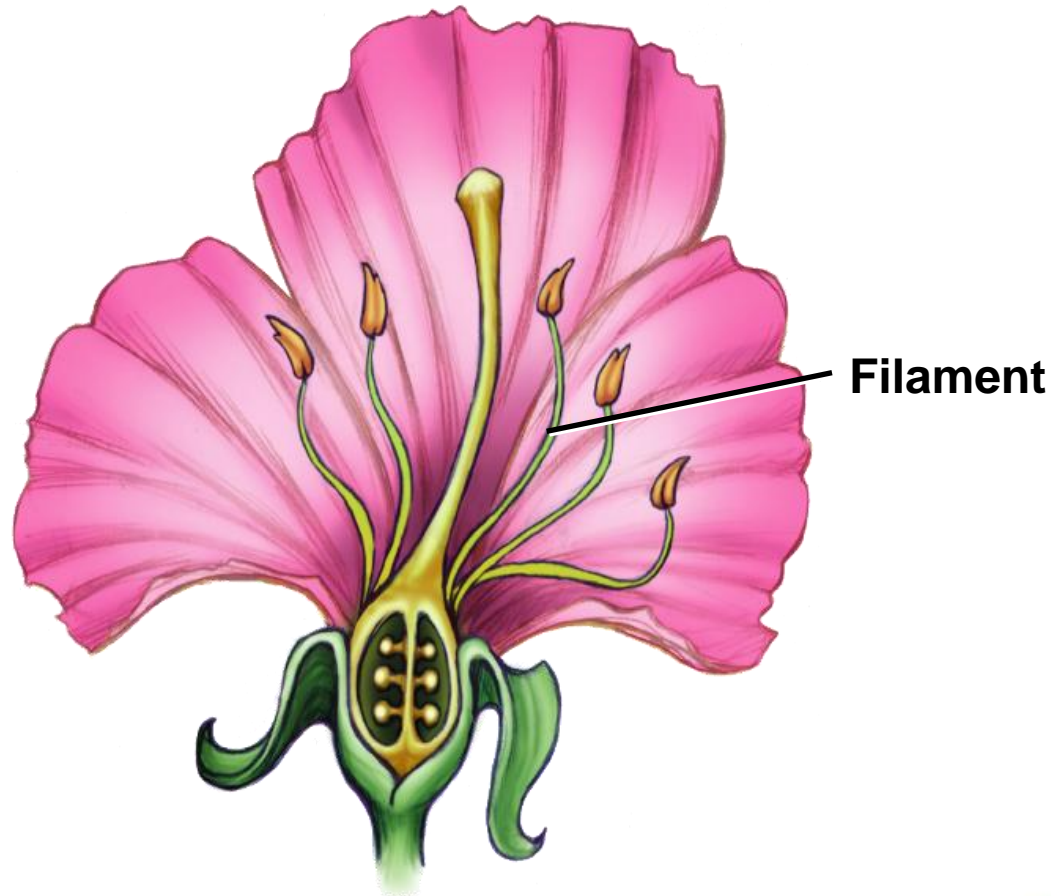
The **male** parts of a flower consist of an anther and a filament, which together make up the **stamen**.



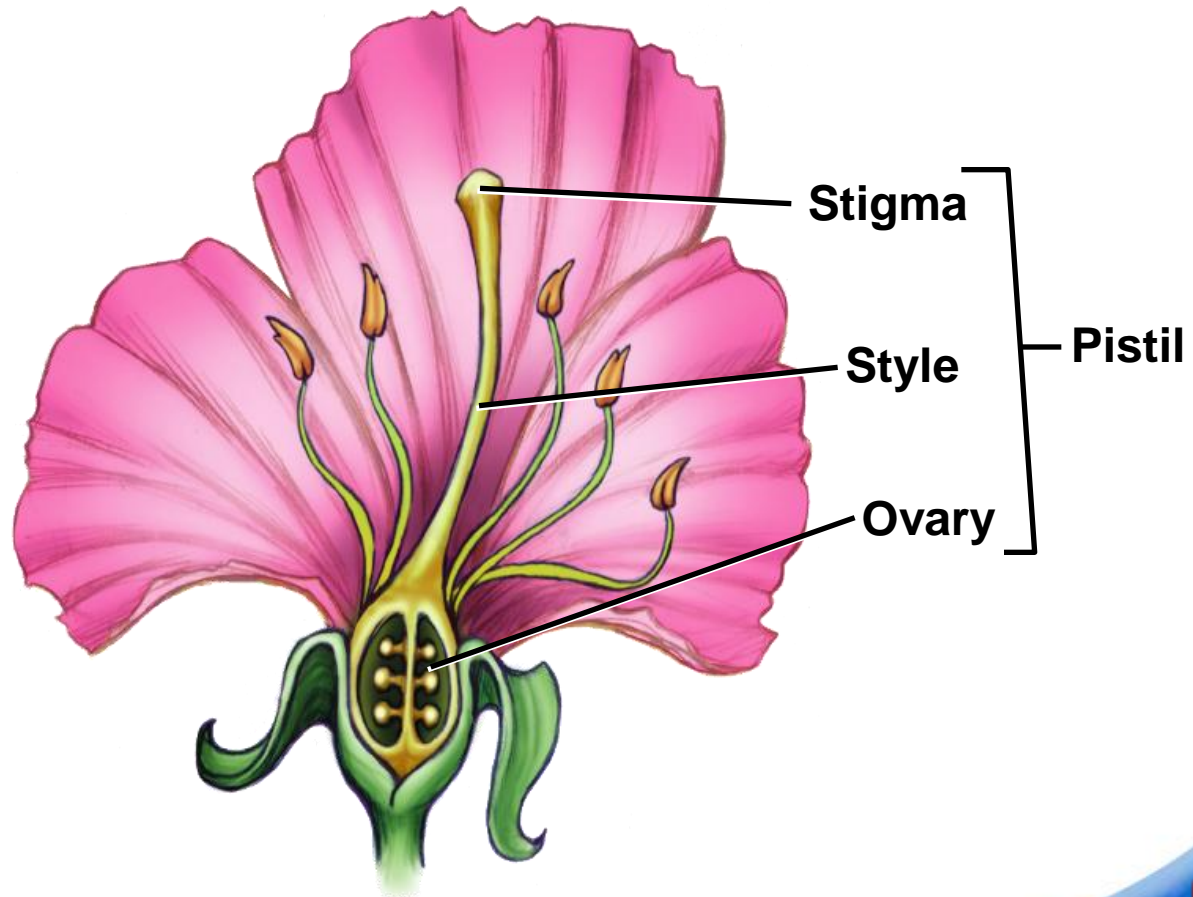
An **anther** is an oval sac where meiosis takes place, producing pollen grains.



The **filament** is a long, thin stalk that supports an anther.

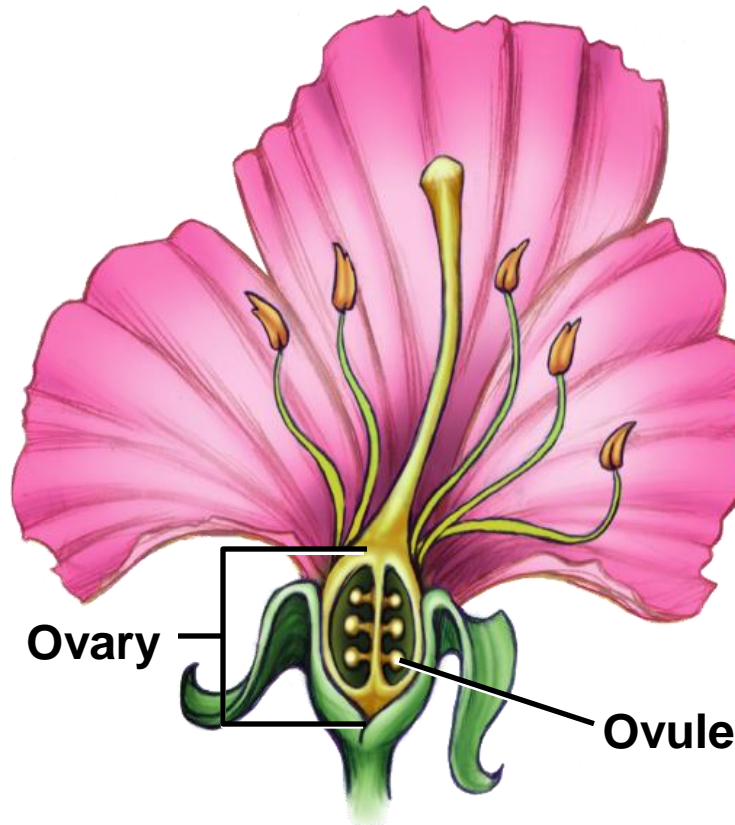


The innermost floral parts are carpels, also called **pistils**, which produce the **female** gametophytes.

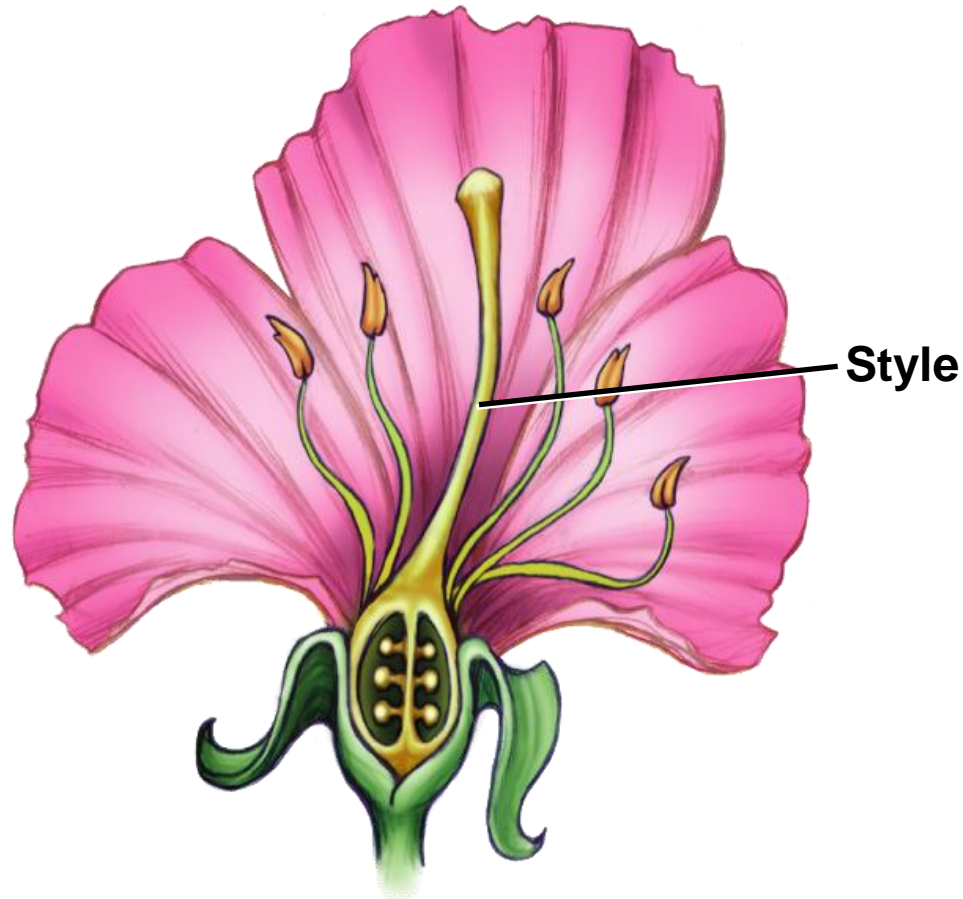


Each carpel has a broad base forming an **ovary**.

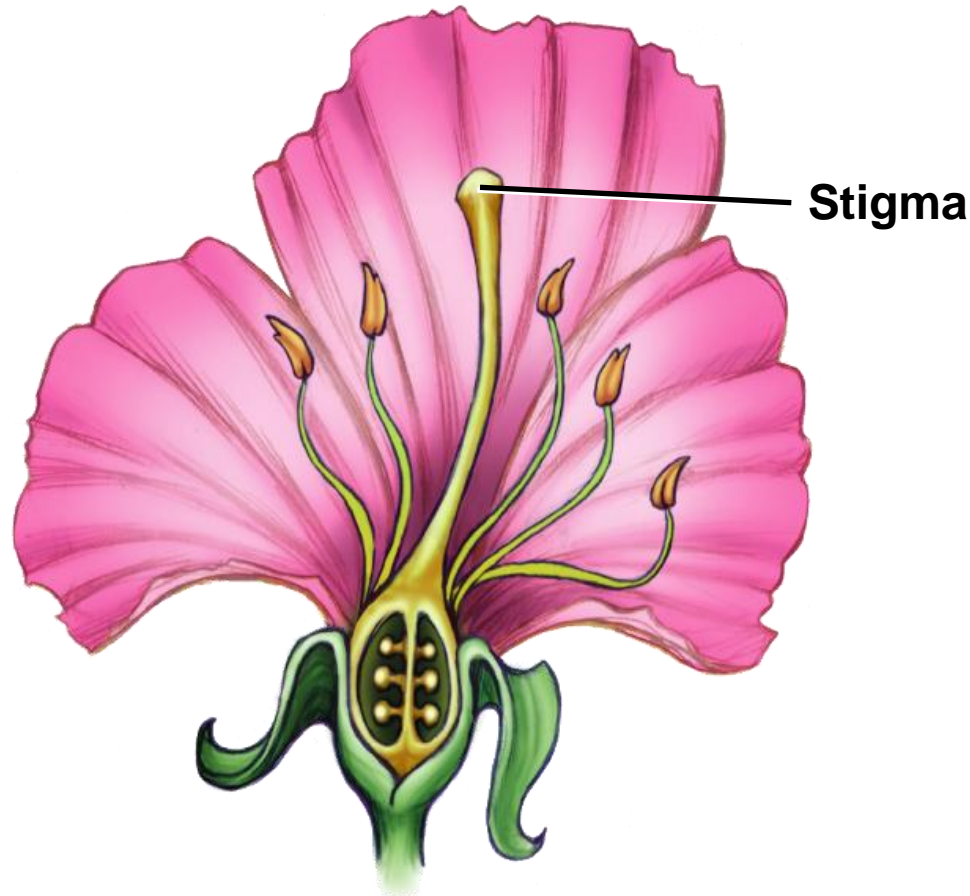
The ovary contains one or more ovules where female gametophytes are produced.



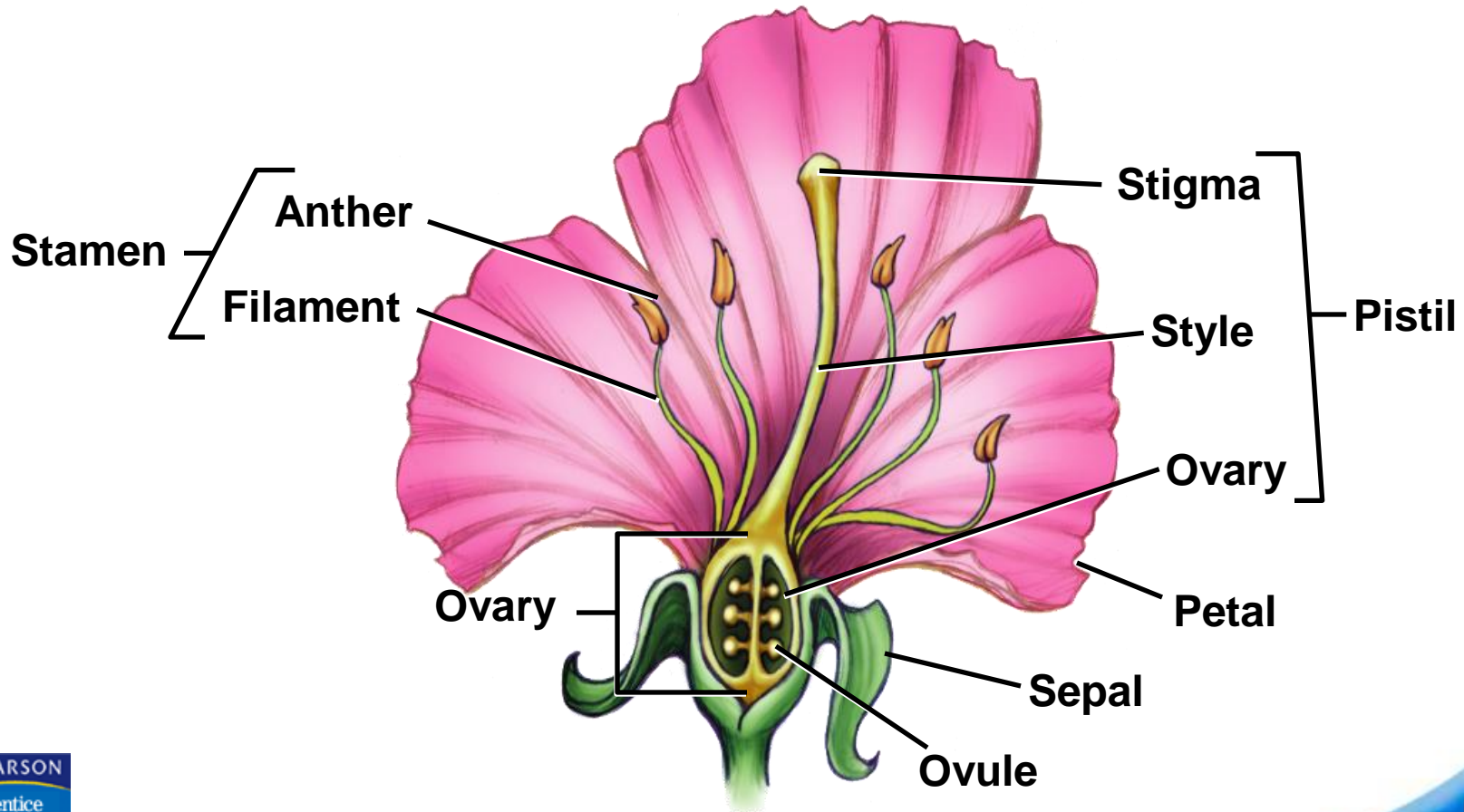
The narrow stalk of the carpel is the **style**.



At the top of the style is the **stigma**—a sticky portion where pollen grains frequently land.



Parts of a Typical Flower



A typical flower produces both male and female gametophytes.

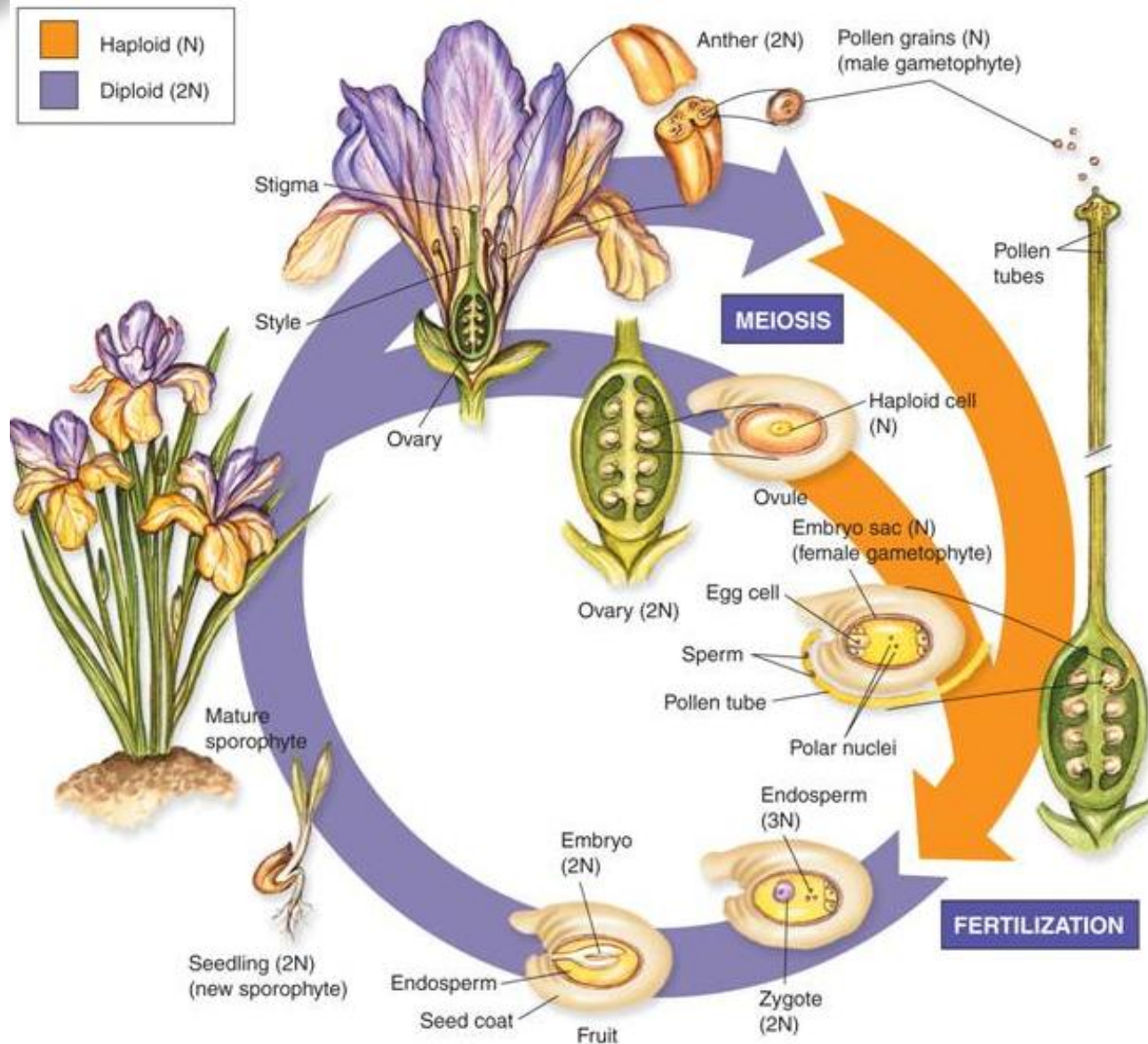
In some plants, male and female gametophytes are produced in separate flowers on the same individual.

Life Cycle of Angiosperms



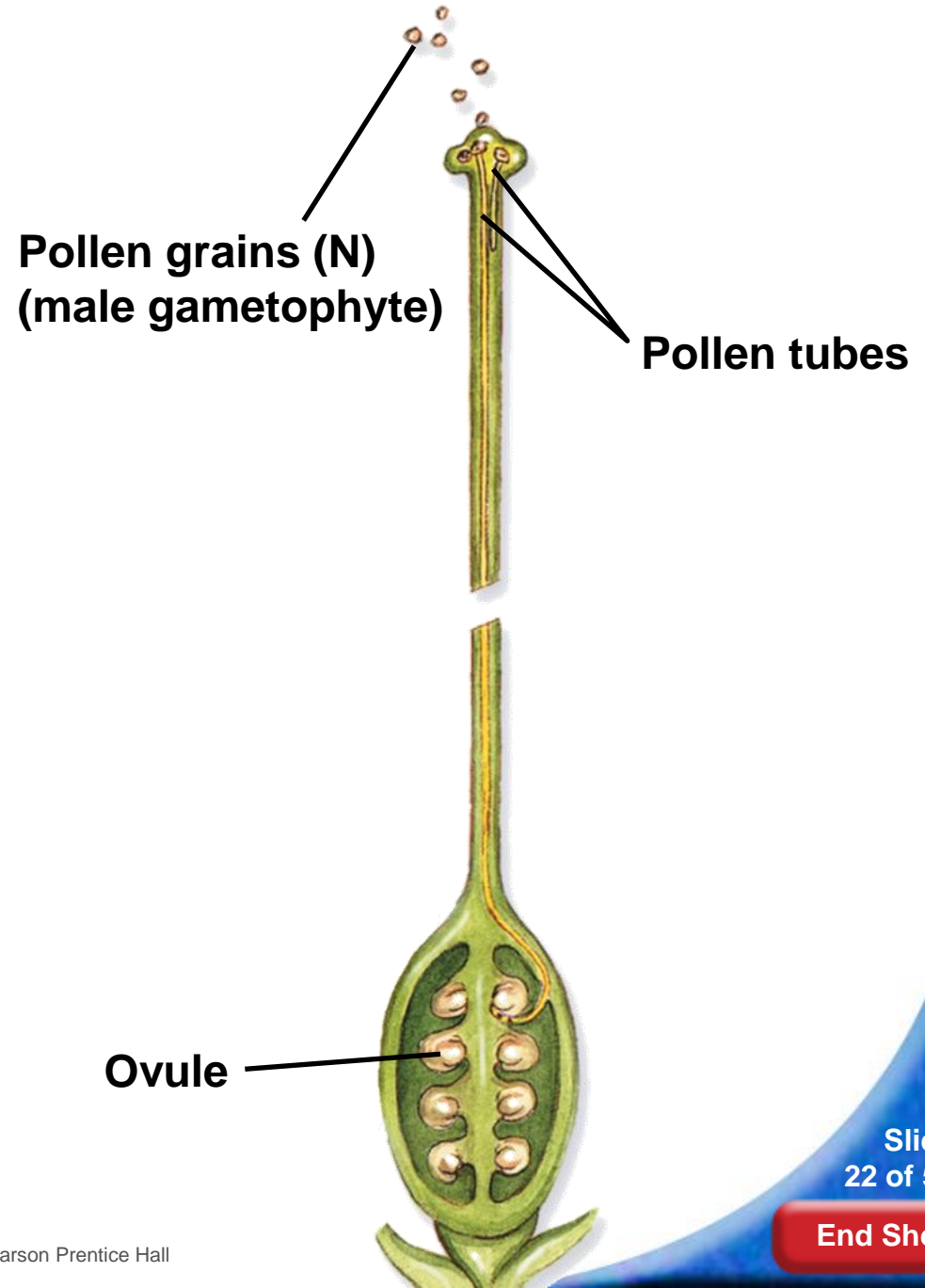
Reproduction in angiosperms takes place within the flower. Following pollination and fertilization, the seeds develop inside protective structures.

24-1 Reproduction With ➡ Life Cycle of Angiosperms Cones and Flowers



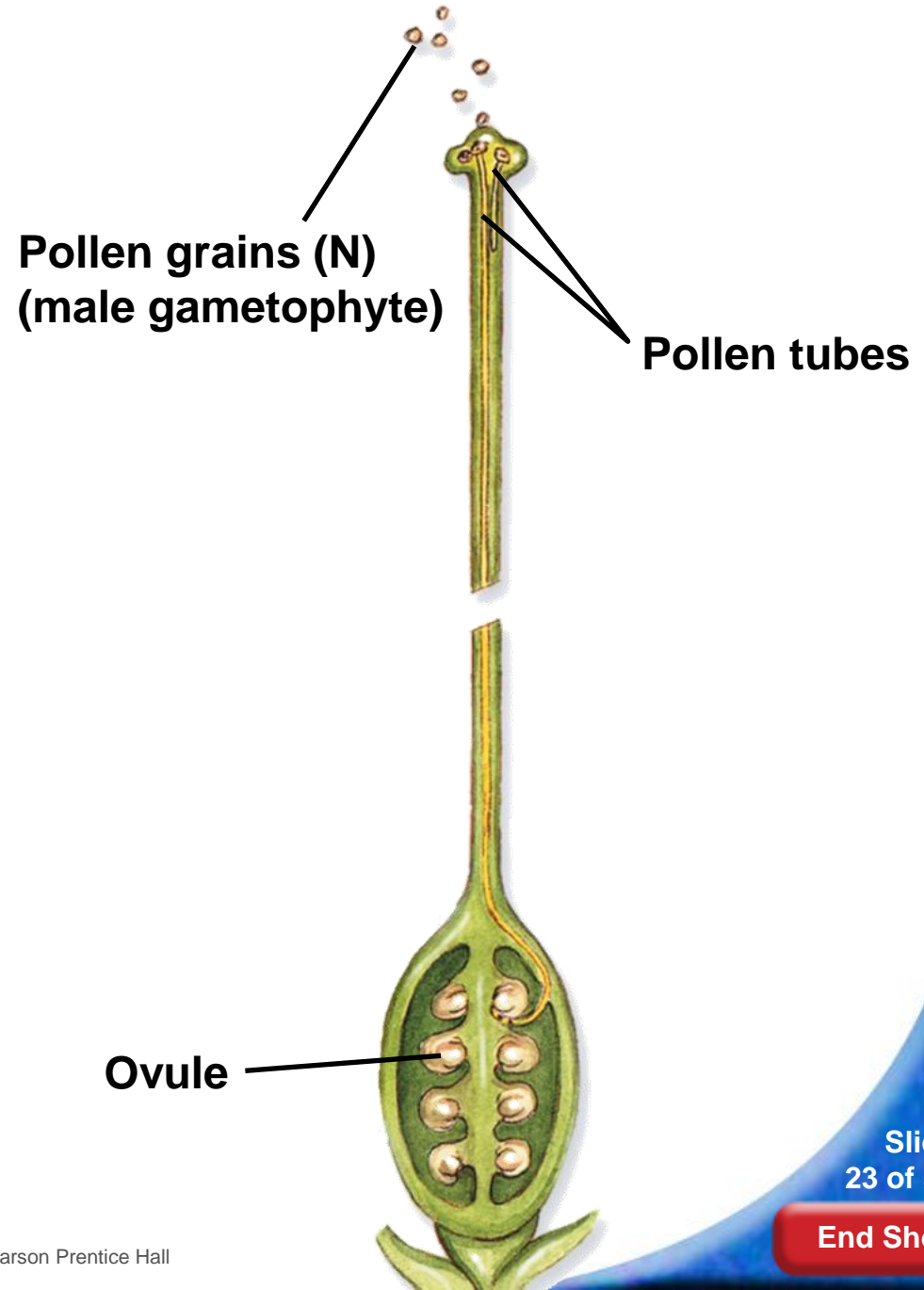
Fertilization in Angiosperms

1. If a pollen grain lands on the stigma of a flower of the same species, it grows a pollen tube.



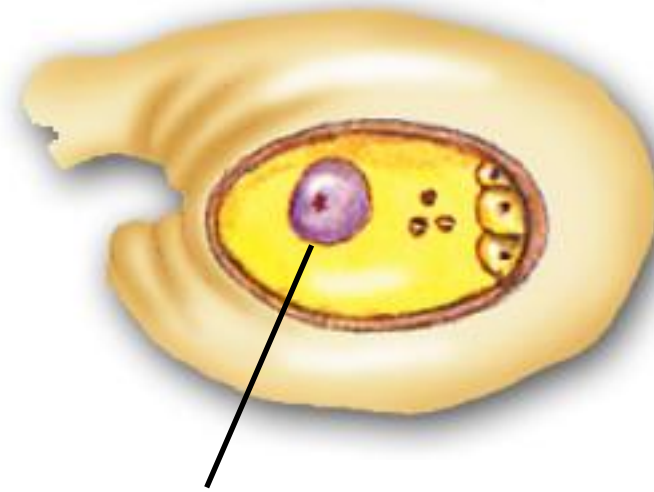
24-1 Reproduction With Cones and Flowers → Fertilization in Angiosperms

2. The pollen tube grows into the style, reaches the ovary, and enters the ovule.



3. One of the sperm nuclei fuses with the egg nucleus to produce a diploid zygote.

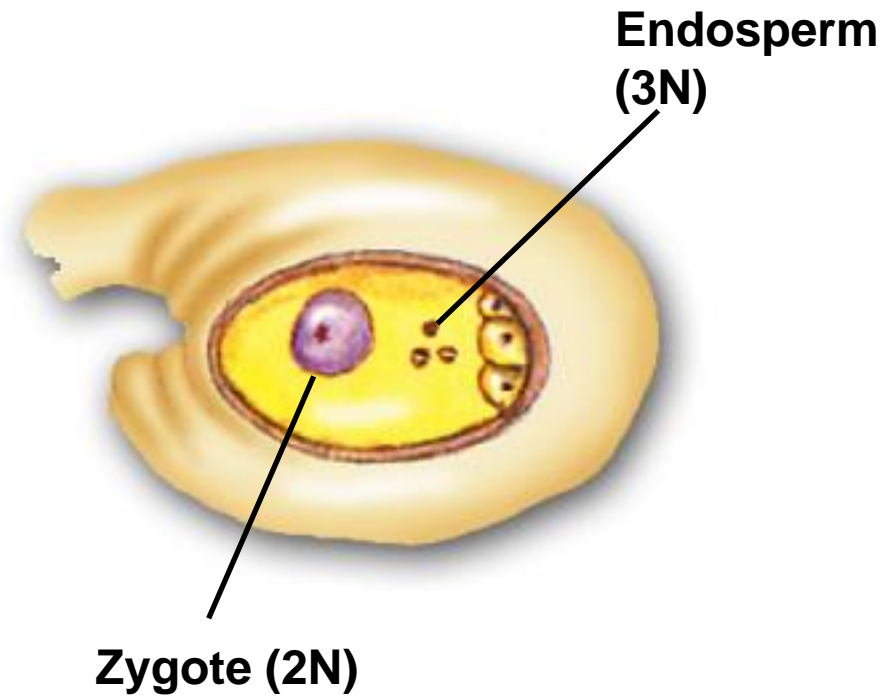
4. The zygote will grow into the new plant embryo.



Zygote (2N)

5. The other sperm nucleus fuses with two polar nuclei in the embryo sac to form a triploid (3N) cell.

6. This cell will grow into a food-rich tissue known as **endosperm**, which nourishes the seedling as it grows.



Because two fertilization events take place between the male and female gametophytes, this process is known as **double fertilization**.



How does pollination differ between angiosperms and gymnosperms?

Pollination



Most gymnosperms and some angiosperms are wind pollinated, whereas most angiosperms are pollinated by animals.

Wind pollination

- is less efficient than animal pollination
- relies on weather

Animal pollination

- plants have bright colors and sweet nectar to attract animals
- benefits both the plants and the animals that pollinate them

24-1 Section QUIZ

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Section QUIZ

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24-1 Section QUIZ

1 In a gymnosperm, fertilization occurs inside the

a. ovule.

b. pollen tube.

c. seed cone.

d. pollen cone.

2 The pollen-producing structure of angiosperms is the

- a. stigma.
- b. carpel.
- c. anther.
- d. sepal.

24-1 Section QUIZ

3

In an angiosperm, a structure that results from fertilization is the

- a. female gametophyte.
- b. pollen grain.
- c. zygote.
- d. ovary.

4 Which term applies to the chromosome number of a seed plant embryo?

- a. haploid
- b. diploid
- c. triploid
- d. polyploid

5 Pollination in most gymnosperms and some angiosperms is carried out by

a. water transport.

b. insects.

c. wind.

d. birds and bats.