√+

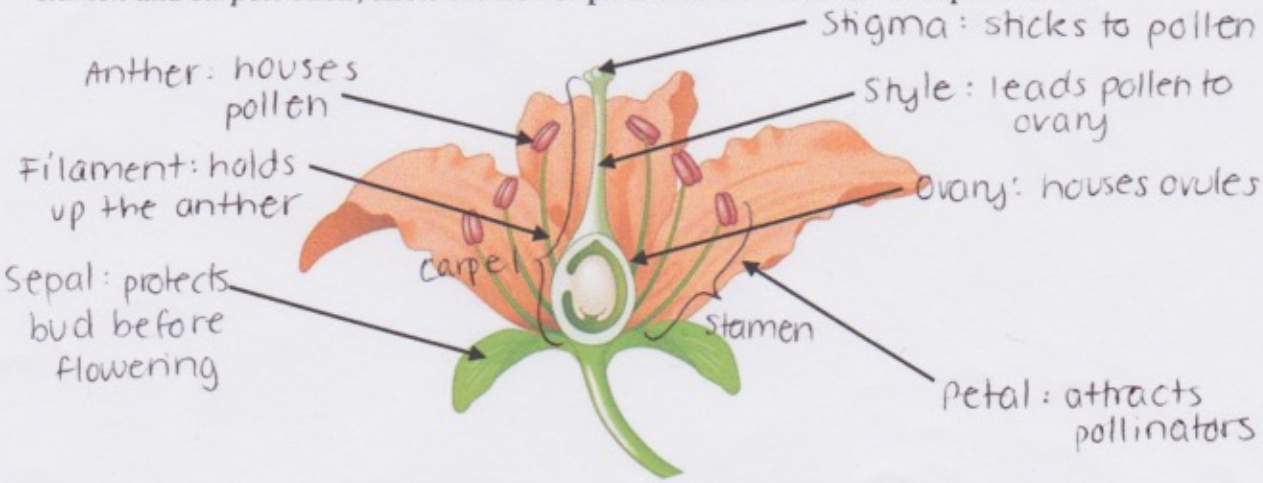
Name Leonie Hoeher **Period** _____

Chapter 38: Angiosperm Reproduction and Biotechnology

Concept 38.1 Flowers, double fertilization, and fruits are unique features of the angiosperm life cycle

This may be a good time for you to go back to Chapter 29 and review alternation of generation and the terms associated with it. Figure 29.5 would be a good starting point. Then, review Concepts 30.1 and 30.3 on angiosperm life cycles. The angiosperm life cycle has three unique features, all of which start with the letter *F*, a good memory aid: *F*lowers, *F*ruits, and double *F*ertilization. You will want to remember these!

1. On this sketch of a flower, label all floral parts and give the function of each. Label also the *stamen* and *carpel*. Then, circle the flower parts that are essential for reproduction.



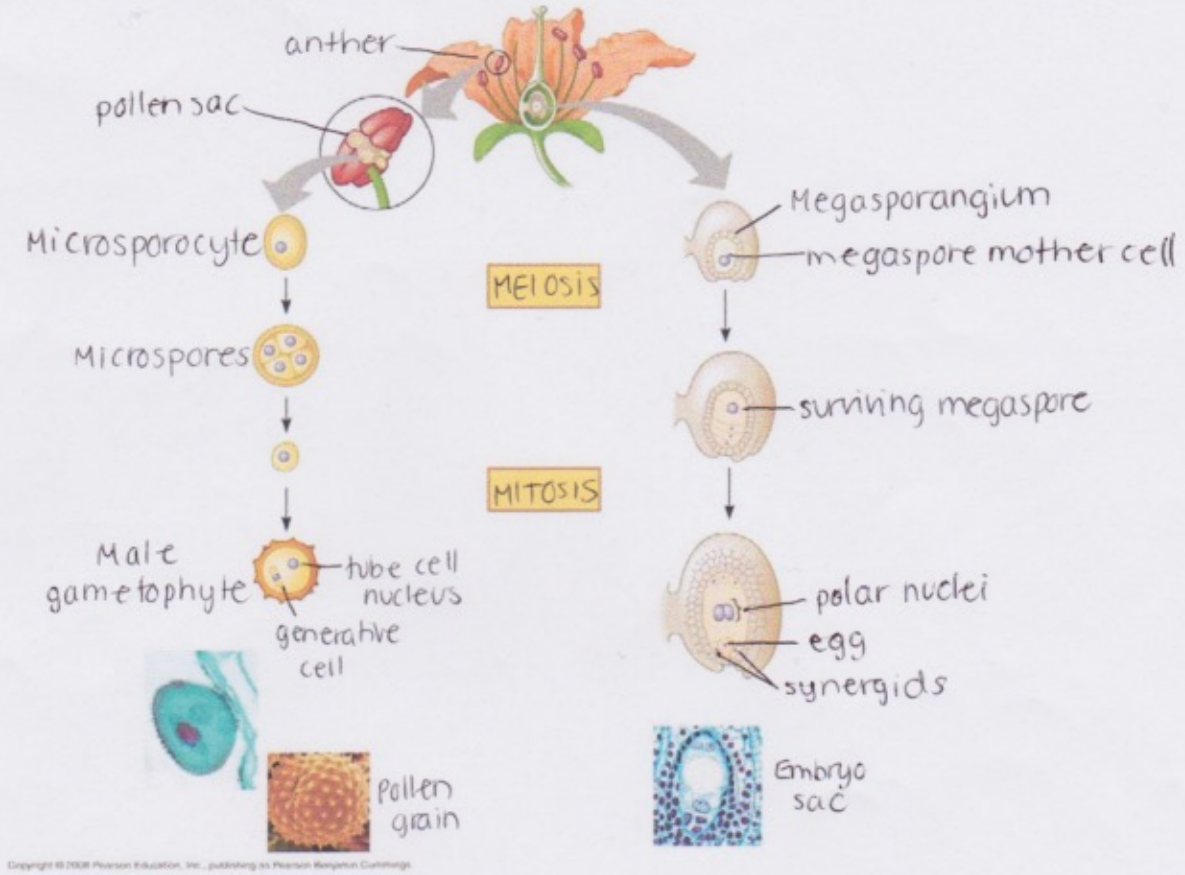
2. What is another name for the *microsporangia*?
Pollen sacs
3. Each *microspore mother cell* undergoes meiosis to form four haploid microspores.
4. Each *microspore* undergoes mitosis to produce the male gametophyte.
5. The male gametophyte is composed of only two cells. Name each cell, and tell what will come from each of them.

Male Gametophyte Cells	What does cell produce?
Generative Cell	Makes two sperm cells
Tube Cell	Forms pollen tube

6. What makes up a *pollen grain*?

The generative and tube cells

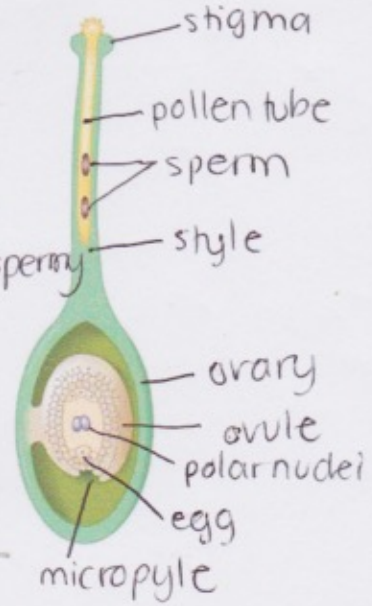
7. Label these parts: ~~*anther*~~, ~~*pollen sac*~~, ~~*microspores*~~, ~~*male gametophyte*~~, ~~*pollen grain*~~, ~~*generative cell*~~, ~~*tube cell*~~, ~~*megasporangium*~~, ~~*megaspore mother cell*~~, ~~*embryo sac*~~, ~~*surviving megaspore*~~, ~~*polar nuclei*~~, ~~*synergids*~~, and ~~*egg*~~.



8. Meiosis in the female part of the plant produces four megaspores. How many survive?

One survives

9. What occurs in *pollination*? Annotate the figure to the right to explain pollination.

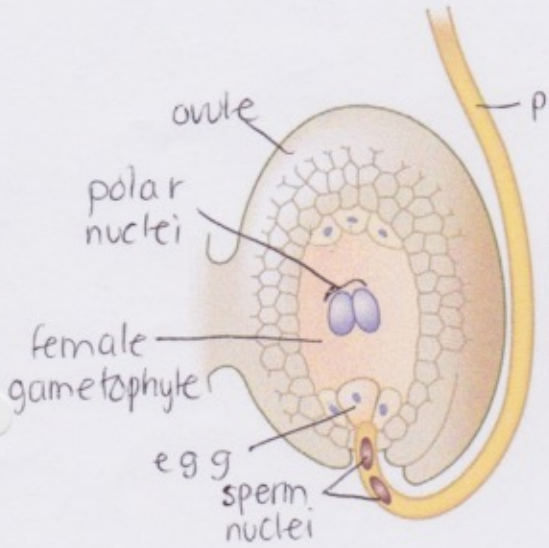


In pollination, the pollen grain attaches to the stigma, a pollen tube forms and leads the pollen/sperm down the style to the ovary. The tube discharges two spermies into the embryo sac within an ovule. one sperm fertilizes the egg, the other sperm combines with two polar nuclei, forming a triploid cell.

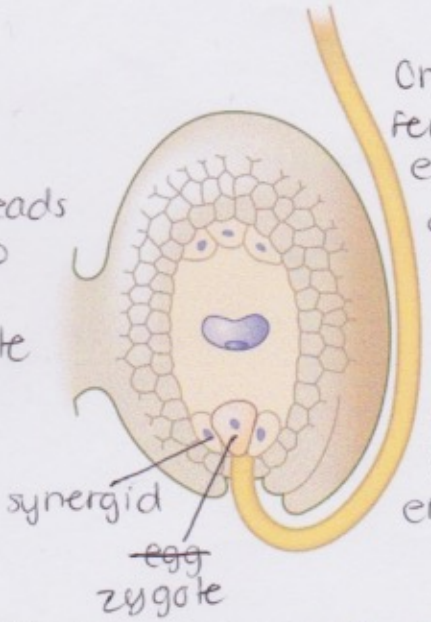
10. List five modes of pollination. For each mode, describe a feature of the flower that aids pollination.

Mode	Feature of Flower
Wind	production of copious amounts of pollen
Bees	sweet fragrance to attract bees
Flies	red/fleshy color w/ rotten odor
Bats	light color, aromatic
Birds	large and brightly colored

11. Study the section in this concept under the heading "Double Fertilization" very carefully. Label the figures below to show two ~~*sperm nuclei*~~, ~~*pollen tube*~~, ~~*female gametophyte*~~, ~~*ovule*~~, ~~*synergids*~~, ~~*polar nuclei*~~, ~~*egg*~~, and ~~*zygote*~~. Describe what is happening in each sketch.



Pollen tube leads sperm into female gametophyte



One sperm fertilizes the egg and the other sperm combines with polar nuclei, forming a 3n cell that will become the endosperm.

12. Study the figure on the left above. You should be able to count a total of 7 cells and 8 nuclei. Which of these are fertilized in *double fertilization*?

The egg and the polar nuclei are fertilized

13. When the *polar nuclei* are fertilized, what is formed? Endosperm!

14. The chromosome number of *endosperm* is (a) haploid, (b) diploid, or (c) triploid.

(c) Triploid

15. The chromosome number of the *zygote* is (a) haploid, (b) diploid, or (c) triploid.

(a) Haploid (wait, diploid?) gametophyte = n
sporophyte = 2n

16. What is the role of the *endosperm*?

To store nutrients for later use

17. After double fertilization, what does each ovule become?

Ovules become the ~~fruit part usually~~ seed and seed coat

18. After double fertilization, what does each ovary become?

Ovaries become the fruity part

19. Let's compare the seeds of *eudicots* and *monocots*. How many cotyledons does each type have?

Monocot: one cotyledon
Eudicot: two cotyledons

20. What is the function of a *seed coat*?

To protect the seed/embryo

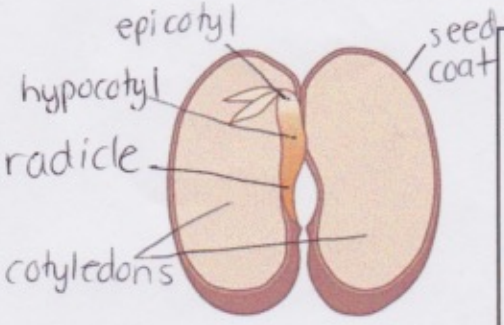
21. What part of the embryo plant emerges first?

The root emerges first

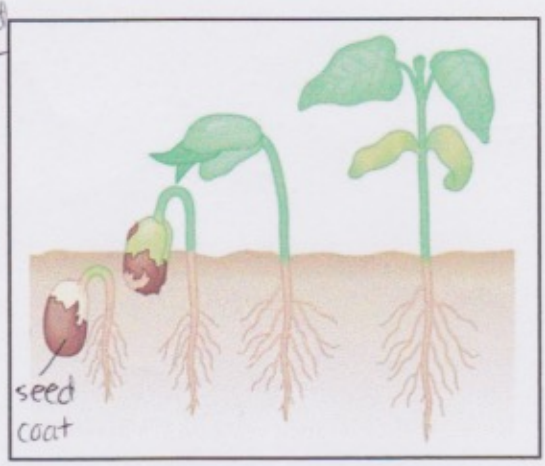
22. What are some mechanisms that maintain *seed dormancy*?

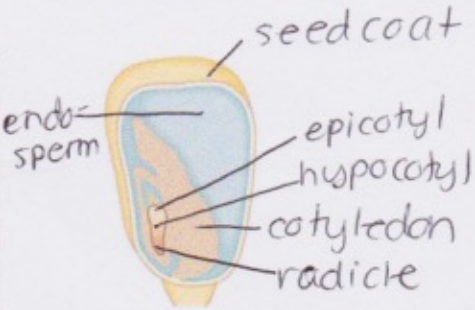
Temperature and other environmental factors maintain seed dormancy

23. Below are sketches of a bean seed and a corn seed. Label them to show: ~~*monocot, eudicot, cotyledons*~~, ~~*radicle, hypocotyl*~~, ~~*epicotyl, seed coat*~~, and ~~*endosperm*~~. You may use the same term several times.



Eudicot





Monocot

24. What is *imbibition*?

uptake of water because of low water potential of dry seed

25. To a botanist, a *fruit* is a ripe ovary. It does not have to be sweet! A pea pod is a fruit. A green pepper is a fruit.

26. An important function of the fruit is to aid in *dispersal*. What are three primary methods of dispersal?

wind, water, animals

Concept 38.2 Flowering plants reproduce sexually, asexually, or both

27. *Asexual reproduction* in plants is also known as *vegetative propagation*. Describe three different types of asexual reproduction in plants.

28. Why is it important for plants to have mechanisms to prevent self-fertilization?