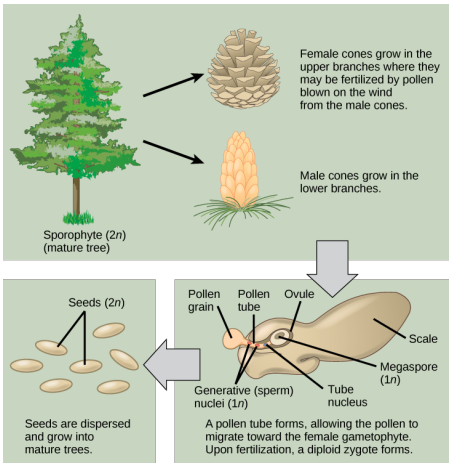
Biology 2e
Unit 5: Biological Diversity
Chapter 26: Seed Plants

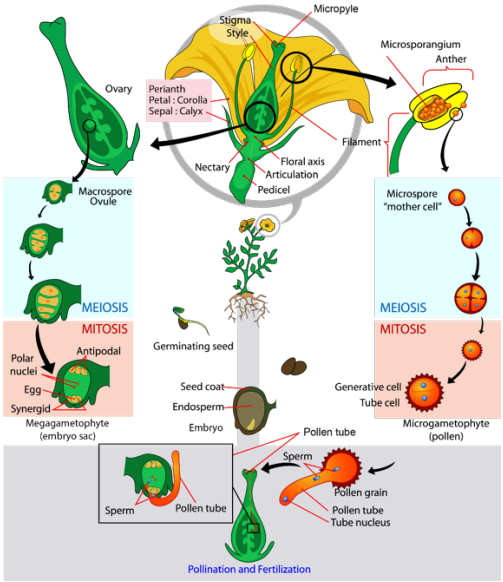
Visual Connection Questions

1. At what stage does the diploid zygote form?



b. At fertilization. The diploid zygote forms after the pollen tube has finished forming, so that the male generative nuclei can fuse with the female gametophyte.

2. If a flower lacked a megasporangium, what type of gamete would not form? If the flower lacked a microsporangium, what type of gamete would not form?



Without a megasporangium, an egg would not form; without a microsporangium, pollen would not form.

Review Questions

3. Seed plants are _____.
d. all heterosporous.

4. Besides the seed, what other major structure diminishes a plant's reliance on water for reproduction?
a. flower

5. In which of the following geological periods would gymnosperms dominate the landscape?
c. Triassic

6. Which of the following structures widens the geographic range of a species and is an agent of dispersal?
a. seed

7. Which of the following traits characterizes gymnosperms?
a. The plants carry exposed seeds on modified leaves.

8. Megasporocytes will eventually produce which of the following?
d. female gametophytes

9. What is the ploidy of the following structures: gametophyte, seed, spore, sporophyte?
b. 1*n*, 2*n*, 1*n*, 2*n*

10. In the northern forests of Siberia, a tall tree is most likely a:
a. conifer

11. Which of the following structures in a flower is not directly involved in reproduction?
c. the sepal

12. Pollen grains develop in which structure?
a. the anther

13. In the course of double fertilization, one sperm cell fuses with the egg and the second one fuses with _____.
b. the polar nuclei of the center cell

14. Corn develops from a seedling with a single cotyledon, displays parallel veins on its leaves, and produces monosulcate pollen. It is most likely:
b. a monocot

15. Which of the following plant structures is not a defense against herbivory?
c. nectar

16. White and sweet-smelling flowers with abundant nectar are probably pollinated by
a. bees and butterflies

17. Abundant and powdery pollen produced by small, indistinct flowers is probably transported by:
d. wind

18. Plants are a source of _____.
d. all of the above (food, fuel, medicine)

Critical Thinking Questions

19. The Cretaceous Period was marked by the increase in number and variety of angiosperms. Insects also diversified enormously during the same period. Can you propose the reason or reasons that could foster coevolution?
Both pollination and herbivory contributed to diversity, with plants needing to attract some insects and repel others.

20. What role did the adaptations of seed and pollen play in the development and expansion of seed plants?
Seeds and pollen allowed plants to reproduce in absence of water. This allowed them to expand their range onto dry land and to survive drought conditions.

21. The Mediterranean landscape along the sea shore is dotted with pines and cypresses. The weather is not cold, and the trees grow at sea level. What evolutionary adaptation of conifers makes them suitable to the Mediterranean climate?
The trees are adapted to arid weather, and do not lose as much water due to transpiration as non-conifers.

22. What are the four modern-day phyla of gymnosperms?
The four modern-day phyla of gymnosperms are Coniferophyta, Cycadophyta, Gingkophyta, and Gnetophyta.

23. Some cycads are considered endangered species and their trade is severely restricted. Customs officials stop suspected smugglers who claim that the plants in their possession are palm trees, not cycads. How would a botanist distinguish between the two types of plants?
The resemblance between cycads and palm trees is only superficial. Cycads are gymnosperms and do not bear flowers or fruit. Cycads produce cones: large, female cones that produce naked seeds, and smaller male cones on separate plants. Palms do not.

24. What are the two structures that allow angiosperms to be the dominant form of plant life in most terrestrial ecosystems?
Angiosperms are successful because of flowers and fruit. These structures protect reproduction from variability in the environment.

25. Biosynthesis of nectar and nutrient-rich pollen is energetically very expensive for a plant. Yet, plants funnel large amounts of energy into animal pollination. What are the evolutionary advantages that offset the cost of attracting animal pollinators?

Using animal pollinators promotes cross-pollination and increases genetic diversity. The odds that the pollen will reach another flower are greatly increased compared with the randomness of wind pollination.

26. What is biodiversity and why is it important to an ecosystem?

Biodiversity is the variation in all forms of life. It can refer to variation within a species, within an ecosystem, or on an entire planet. It is important because it ensures a resource for new food crops and medicines. Plant life balances the ecosystems, protects watersheds, mitigates erosion, moderates climate, and provides shelter for many animal species.