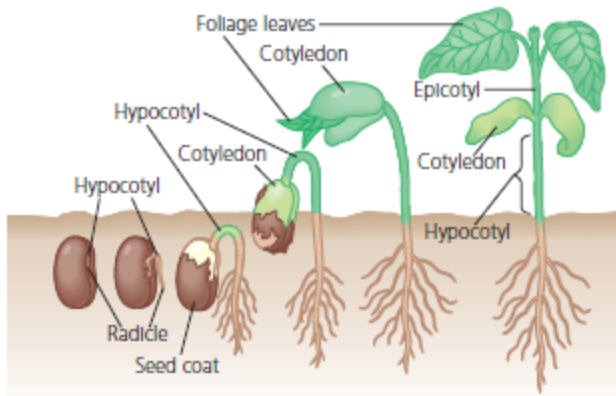
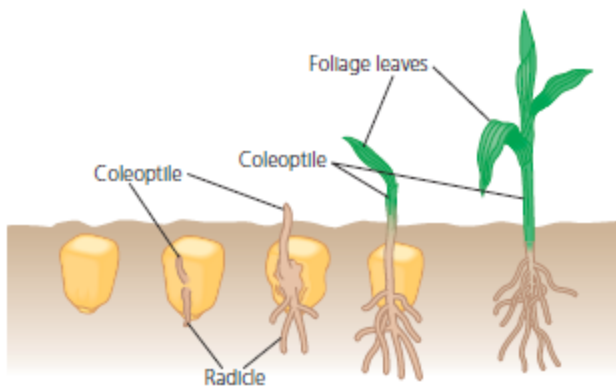


Cheat Sheet



(a) Common garden bean. In common garden beans, straightening of a hook in the hypocotyl pulls the cotyledons from the soil.



(b) Maize. In maize and other grasses, the shoot grows straight up through the tube of the coleoptile.

Chapter 38 Questions

1. What is a flower?
2. What is the receptacle?
3. Describe a carpel.
4. What is a pistil?
5. Describe a stamen.
6. What are complete flowers?
7. What are incomplete flowers?
8. What are inflorescences?
9. How are plants pollinated (percentages)?
10. Describe the characteristics of flowers that are pollinated by wind.
11. To what colors are bees attracted to?
12. What are the differences between moth and butterfly-pollinated flowers?
13. Describe fly-pollinated flowers.
14. Describe bird-pollinated flowers.
15. What is pollination?
16. What is coevolution?
17. What is an embryo sac?
18. What are integuments?
19. What are synergids?
20. What are polar nuclei?
21. What effect does the arrival of the pollen tube have on the synergids?
22. What is double fertilization?
23. What is a seed?
24. How does a zygote divide?
25. What is dormancy?
26. What is a seed coat?
27. What is the hypocotyl?
28. What is the radicle?
29. What is the epicotyl?
30. What is the plumule?
31. What purpose do cotyledons serve?
32. What is a scutellum?
33. What is a coleoptile?
34. What is a coleorhiza?
35. What is imbibition?
36. What happens to the endosperm and cotyledons?
37. What is the first organ to emerge from the germinating seed?
38. How do garden beans and maize emerge from the ground?
39. What is vegetative growth?
40. What is a fruit?

41. What is the pericarp?
42. What are simple fruits?
43. What is an aggregate fruit?
44. What is a multiple fruit?
45. What are accessory fruits?
46. What is fragmentation?
47. What is apomixis?
48. What is vegetative reproduction?
49. What are dioecious plants?
50. What is self-incompatibility?
51. What are *S-genes*?
52. What are the two types of self-incompatibility?
53. What is totipotency?
54. What is vegetative propagation?
55. What is a callus?
56. What is grafting?
57. What causes the controversy around sweet potato (*Ipomoea batatas*)?
58. What does transgenic mean?
59. What is the *Bt* toxin?
60. What is Golden Rice?
61. How has papaya been modified to save the Hawaiian papaya industry?
62. How has cassava been modified to fight world hunger?
63. What is glyphosate?
64. What are biofuels?
65. What is biomass?
66. What is fumonisin?
67. What are two crops that hybridize readily with weeds?

Chapter 38 Answers

1. Sporophytic structure of angiosperms specialized for sexual reproduction.
2. Part of the stem to which carpels, stamens, petals, and sepals are attached
3. Has ovary at base, long, slender neck called style, at top of style is sticky stigma that captures pollen, ovary has ovules (become seeds if fertilized).
4. Single carpel or two/more fused carpels
5. Stalk (filament) with terminal structure called anther, anther has chambers called microsporangia (pollen sacs, produce pollen)
6. Have all four basic floral organs
7. Lack sepals, petals, stamens, or carpels, some are sterile, others are unisexual (imperfect, lacking either stamens or carpels)
8. Showy clusters of flowers
9. 80% biotic, of abiotic 98% wind, 2% water
10. Green, small, inconspicuous flowers, produce neither scent nor nectar, flowers often appear in early spring when there are no leaves to interfere, a lot of pollen grains produced
11. Bright colors, primarily yellow and blue, bees can see UV radiation
12. Butterflies perceive bright colors, moth flowers usually white or yellow (stand out at night when moths are active)
13. Reddish, fleshy, odor like rotten meat
14. Large, bright red or yellow, little odor (birds do not have well-developed smell), have nectar
15. Transfer of pollen to ovules (anther to stigma)
16. Joint evolution of interacting species in response to selection imposed by the other
17. Female gametophyte, develops in each ovule, forms in megasporangium
18. Layers of protective sporophytic tissue that will develop into seed coat
19. Two cells near micropyle of embryo, flank egg and help attract/guide pollen tube to sac
20. Middle two nuclei, not partitioned into separate cells, share cytoplasm of large central cell of embryo sac.
21. One of the two dies, providing passageway into embryo sac
22. One sperm fertilizes egg (forms zygote), other combines with polar nuclei (forms triploid endosperm, acts as food-storing tissue of seed), causes tube nucleus, other synergid, and antipodal cells (3 nonpolar, non synergid, non egg cells) to degenerate
23. Dormant embryo surrounded by stored food and protective layers
24. First divides asymmetrically into basal (biggest) and terminal cell (terminal cell gives rise to most of embryo, basal cell divides to produce thread of cells called suspensor (anchors embryo to parent plant, helps in transferring nutrients to embryo from parent plant). Terminal cell divides several times to form spherical proembryo, cotyledons form as bumps on proembryo. Embryo elongates, shoot apex between cotyledons, at opposite end root apex forms

25. Growth stops and metabolism nearly stops, seeds dehydrate until water content = 5-15% of weight to enter dormancy
26. Hard protective layer formed from integuments of ovule
27. Embryonic axis below where the cotyledons are attached
28. Embryonic root
29. Embryonic axis above cotyledons and below first pair of miniature leaves
30. epicotyl, young leaves, and shoot apical meristem
31. Often packed with starch before seed germinates (absorbed carbs from endosperm, transfer nutrients to rest of embryo when seed germinates)
32. Specialized cotyledon, has large surface area, pressed against endosperm, absorbs nutrients from endosperm during germination
33. Protective sheath that covers young shoot
34. Covers young root
35. Uptake of water due to low water potential of dry seed. Seed expands and ruptures its coat, triggers changes in embryo that enable it to resume growth
36. Digested by enzymes, nutrients transferred to growing regions of embryo.
37. the radicle, anchors seedling in soil/ supplies it with water for cell expansion
38. See picture
39. Growth of stems, leaves, and roots
40. Mature ovary of a flower, protects seeds and aids in their dispersal
41. Thickened wall of fruit, formed from ovary wall
42. Fruits derived from single carpel or several fused carpels (e.g. peas)
43. Results from single flower that has more than one separate carpel (e.g. raspberries)
44. Develops from inflorescence (group of flowers clustered together), thickening of ovary walls causes them to fuse (e.g. pineapple)
45. Fruits where other floral parts contribute to the fruit (in apples, ovary is embedded in receptacle and fleshy part is mainly the enlarged receptacle). Another example is the strawberry (enlarged receptacle)
46. Separation of parent plant into parts that develop into whole plants, asexual reproduction
47. Seeds produced without pollination or fertilization, diploid cell in ovule gives rise to embryo, ovules mature into seeds
48. Plant reproduction based on the vegetative growth of stems, leaves, or roots. Offspring generally stronger than seedlings of sexual reproduction
49. Cannot self-fertilize because different individuals have either staminate or carpellate flowers
50. Ability of plant to reject its own pollen/pollen of close relatives, most common anti-selfing
51. Genes that recognition of self pollen is based on.
52. gametophytic - S-allele in pollen genome governs blocking of fertilization, involves enzymatic destruction of RNA within pollen tube
sporophytic - fertilization blocked by S-allele products in tissues of parental sporophyte, involves STP in epidermal cells of stigma that prevents germination of pollen grain
53. Ability of a cell to divide and asexually generate a clone of the original organism
54. vegetative reproduction induced by humans

55. Mass of dividing, totipotent cells that forms at end of shoot of cutting, adventitious roots develop from callus
56. Severed shoot from one plant is permanently joined to the truncated stem of another, plant that provides roots is stock, twig grafted onto stock is scion
57. Ancestor came in contact with *Agrobacterium* and horizontal gene transfer occurred, so sweet potatoes are genetically modified (naturally)
58. Organism that has been engineered to contain DNA from another organism
59. Toxic to many insect pests, derived from soil bacterium *Bacillus thuringiensis*, used in crops, produced in plant as harmless protoxin that becomes toxic if activated by alkaline conditions (i.e. the guts of insects). In humans, acidic stomachs denature the protoxin
60. Transgenic variety that produces grain with increased levels of beta-carotene (precursor of vitamin A)
61. Became resistant to ring spot virus
62. Normal cassava does not provide balanced diet and has cyanide. Transgenic cassava has more iron/beta-carotene/mass and almost no cyanide
63. Herbicide that is lethal to wide variety of plants, inhibits key enzyme in biochemical pathway in plants and bacteria but not in animals. May cause cancer and harm friendly gut bacteria
64. Fuels derived from living biomass, scientists focus on switchgrass (*Panicum virgatum*) and poplar (*Populus trichocarpa*) as biofuel crops
65. Total mass of organic matter in a group of organisms in a particular habitat
66. fungal toxin that causes cancer and birth defects, highly resistant to degradation, 90% less present in *Bt* maize, produced by *Fusarium* fungus that infects insect-damaged maize
67. Canola, sorghum