1. Explain why good soil structure is important to gardeners.
   - Permeability (p. 38-41)
   - Water-holding capacity (p. 40)
   - Drainage (p. 40)
   - Root penetration (p. 40)
   - Soil aeration (p. 40)

2. Mark each of the following statements as True (T) or False (F). *
   - F Clay loam soil is unable to hold enough water for good plant growth (p. 39).
   - T Clay loam soil remains cool and wet late into the spring (p. 39).
   - T Clay loam soil stays warm late into the fall.
   - T Clay loam soil needs drainage improvement (p. 39).
   - T Clay loam soil takes more lime to correct an acidity problem than would a sandy loam.

3. A client has cold, wet soil. List two problems that are likely to occur in his garden.
   - The soil temperature will be slow to warm up in the spring (p. 41).
   - The gardener will have to delay tilling and planting (p. 41).
   - Many plants don't grow well with "wet feet" (p. 41).
   - Some plants are susceptible to root diseases in wet soil (p. 41).

   What could you recommend to help alleviate these problems?
   - Divert runoff (p. 42).
   - Avoid plants that don't like wet conditions (p. 42).
   - Use raised beds (pp. 42, 145).
   - Install drainage (p. 42).

*You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.
4. A house was built on a parcel of land that previously was covered with brush. The land was cleared, and the debris and much of the topsoil were removed from the site. List two soil problems the homeowner is likely to have in this situation.*
   - Compaction of existing soil (p. 40)
   - Loss of topsoil
   - Poor soil structure (p. 40)
   - Fill material

What could you recommend to help with these problems?
   - Till deeply.
   - Select good fill material.
   - Incorporate fill material if possible.
   - Plant something to rebuild soil structure and encourage development of biological activity. Grass often works well for this purpose even in areas intended for landscaping and gardens. Use annual grass in these areas.

5. Soil abounds with life. Why is this life important in a practical way to gardeners?
   - Soil organisms break down the remains of plants and other organisms, thereby releasing nutrients and reducing the need for added fertilizer. This process also creates beneficial organic matter (p. 42).
   - Rhizobia bacteria infect legume roots and convert atmospheric nitrogen to a form plants can use (p. 43).
   - Earthworms mix soil and create macropore channels (p. 43).
   - Mycorrhizae infect plant roots and increase their ability to take up plant nutrients (p. 43).

6. Why should you add organic matter to your garden soil?
   - It improves drainage in fine-textured (Clayey) soils (pp. 41, 54-55).
   - It improves water-holding capacity in coarse-textured (sandy) soils (pp. 41, 54-55).
   - It reduces the amount of fertilizer needed (pp. 41, 54-55).

7. A gardener mulches her vegetable garden with straw just after planting some young transplants. A short time later, she observes that the leaves of the plants are turning yellow. What is one possible nutrient-related cause of the yellowing? How would you advise her to correct the problem?
   The straw has a high ratio of carbon to nitrogen (C:N). As soil organisms break down the straw, they remove nitrogen from the soil solution. The plant yellowing is a response to nitrogen deficiency. Adding a soluble source of nitrogen should help correct the problem. Removing the straw also might be a good idea to prevent slug damage (pp. 54-55).

*You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.
8. Mark each of the following statements as True (T) or False (F). For true statements, indicate whether the statement identifies an advantage or a disadvantage of using an organic fertilizer.
   - F Nutrients in most organic fertilizers are quickly available to plants.
   - T Most organic fertilizers improve the long-term nutrient-holding capacity of soils. *Advantage (p. 48)*
   - T Using organic fertilizers usually involves recycling materials that otherwise would be discarded. *Advantage (p. 47)*
   - F Using organic fertilizers increases the risk of nitrogen leaching into the groundwater. *Disadvantage (p. 47)*

9. A fertilizer label reads 18-46-0. What does this mean?
   The material in the package contains 18% nitrogen, 46% phosphate, and 0% potassium. This material is diammonium phosphate *(p. 48)*.

10. What are the best methods for determining how much fertilizer to use on a garden?
   - Soil tests *(p. 52)*
   - Extension publications *(pp. 52–53)*

11. If an Extension publication (e.g., EC 1503) recommends applying 2 pounds of 16-20-0 fertilizer per 100 square feet, how many pounds of fertilizer would you put on a 20' x 15' garden?
   6 pounds [The garden is 300 square feet (20' x 15'). 2 lb per 100 square feet x 3 = 6 lb] *(p. 53)*

12. How much fresh cow manure could you use as a substitute for the fertilizer in #11?
    Six 5-gallon buckets [one 5-gallon bucket of fresh cow manure per 50 square feet of garden] *(p. 49)*
    
    **What precautions would you take when using manure?**
    - Do not use manure around root crops or low-growing crops such as lettuce or strawberries *(p. 50).*
    - Never use dog, cat, or pig manure *(p. 50).*
    - Cook food grown in manured gardens. At the very least, wash and peel raw produce *(p. 50).*

13. List the three ways that soil pH affects plants.
    - It affects the availability of plant nutrients *(p. 57).*
    - It affects the availability of toxic metals *(p. 57).*
    - It affects the activity of soil microorganisms, which in turn affect nutrient cycling and disease risk *(p. 57).*

14. What is the "ideal" soil pH range for a vegetable garden?
    5.5 to 7.5 *(p. 57)*

15. What happens when soil pH is higher or lower than the ideal range?
    Plants may suffer from nutrient deficiency or metal toxicity *(p. 57).*
16. How can a gardener increase soil pH? How can he/she decrease it?
   - To increase soil pH, add lime or wood ashes (pp. 57-58).
   - To decrease soil pH, add elemental sulfur ammonium sulfate, or urea (p. 58).

17. What is the effect of rototilling garden soil when it is too wet? (Mark the one best answer)
   (a) It destroys soil structure(pp. 40, 131).

18. Which of the following would help a compost pile that is not heating? (Mark all correct answers.)
   (b) Add a material with a low C:N ratio (pp. 55, 108).
   (d) Turn the pile more frequently (pp.55,c,108).
   (e) Keep the pile moist (pp. 55,108).
1. **What factors should you consider when choosing a garden site?**
   - Soil (p. 125)
   - Exposure to sunlight (pp. 125-126)
   - Slope (p. 125)
   - Microclimates, e.g., low, cold spots (p. 125)
   - Exposure to wind (p. 125)
   - Presence of trees and shrubs (p. 125)
   - Convenience to the house and to a water supply (p. 125)
   - Previous cropping history (p. 126)
   - Presence of roads (p. 126)
   - Presence of soil pollutants (p. 126)

2. **Which factor is most important for seed germination in the spring—soil temperature or air temperature?**
   Soil temperature has a greater influence on seed germination, and generally rises more slowly than air temperature (p. 134).

3. **In cold situations (e.g., spring and fall), what can you do to extend the growing season?**
   - Start plants indoors (pp. 133-134).
   - Use cold frames or hotbeds (pp. 157-159).
   - Plant in raised beds (pp. 145-146).
   - Cover plants with cloches or row covers (pp. 159-160).
   - Cover the soil with plastic mulch.

4. **Suppose you plant the same crop in a sandy soil, a loam soil, and a clay soil, and apply the same amount of water at each irrigation. Which site would need to be watered more often?**
   The one on sandy soil because it has less water-holding capacity (pp. 38, 141).

5. **What is a good way to build soil fertility while protecting your soil from leaching and compaction during the winter rainy season?**
   Grow winter cover crops (pp. 162-163).
Your Yard and Water Quality

1. **Name two "point" sources of pollution.**
   Factories and municipal sewage plants (p. 115)

3. **What is "nonpoint" source pollution? What are some examples?**
   Pollution that originates from many relatively small, widespread sources. Examples include soil, pesticides, oil, manure, soap, and fertilizers (p. 115).

3. **Name at least two environmentally sound gardening techniques.**
   - Reduce the use of potentially dangerous materials around the yard (p. 117).
   - Minimize water runoff (p. 117).
   - Reduce soil erosion by using groundcovers, mulches, and cover crops (p. 119).
   - Choose and site plants properly so they require minimal inputs of chemicals and water (pp. 117, 462-463).
   - Reduce the use of chemical fertilizers (p. 118).
   - Time fertilizer applications correctly (p. 118).
   - Use garden wastes as a mulch or in compost (p. 119 and Chapter 5).
   - Water efficiently(p. 120).
   - Practice integrated pest management (IPM) (p. 121 and Chapter 20).

4. **Can herbicide-treated grass be used as a mulch on a garden within a year of cutting?**
   No (p. 119)

5. **For pest management, which of the following are considered least toxic materials? (Mark all correct answers.)**
   (a) *Bacillus thuringiensis* (Bt) (pp. 121,449-450)
   (c) Insecticidal soap (pp. 121, 451)
   (e) Horticultural oils (pp. 121, 451)
1. **What are some of the site selection factors that should be considered when growing grapes and berry crops?**
   - Avoid planting in shaded areas or near trees or large shrubs (p. 223).
   - Plant in a location protected from drying winds (p. 223).
   - Avoid planting where potatoes, tomatoes, peppers, eggplants, or other berries have grown within the past 3 years (p. 223).
   - Plant in well-drained soil (p. 223).

2. **Why should you not plant small fruits where tomatoes, peppers, or eggplants were planted before?**
   The area may harbor soil-borne diseases that will affect the new planting (p. 223).

3. **What is the most important soil factor in selecting a site for growing raspberries, blueberries, or strawberries?**
   Drainage. Raspberries, blueberries, and strawberries are sensitive to soils that remain wet for long periods (p. 223).

4. **When establishing a new planting of berries, how can you avoid bringing disease into your garden?**
   Purchase certified plants from a nursery (p. 225).

5. **In caneberrles, the crowns are perennial but the canes are not. Explain the seasonal growth stages of the canes.**
   Primocanes are first-year growth. They are vegetative only (non-fruiting) in all blackberries, but may fruit on the top on fall-bearing raspberries. Floricanes are the second year's growth. They produce fruit on branches or laterals (p. 225).

6. **When is the best time to fertilize caneberrles?**
   When new growth begins in the spring (pp. 226, 230)
7. **Explain the difference between the two types of raspberries.**
   - *Summer bearers* produce a crop in June/July (p. 227).
   - *Fall-bearers* produce a crop on the top portion of the current season's primocanes in late summer. If these canes are left, they become floricanes and bear fruit on the lower portions the next June/July (p. 227).

8. **When should summer-bearing raspberries be pruned?**
   Remove the dead floricanes in late summer/fall or from January through early March (p. 230).

9. **Name the three different types of blackberries and explain how they differ.**
   Trailing, erect, and semi-erect. They differ in cane growth, pruning and training requirements, and fruit characteristics (pp. 224-225).

10. **What are the three types of strawberries? Explain their difference.**
    - *June bearers* produce only one crop per year, in June/July (p. 231).
    - *Everbearers* produce two crops; one in June/July and another in the fall (p. 231).
      - *Day-neutrals* produce a crop almost continuously through the normal growing season (p. 231).

11. **When is the best time to fertilize June-bearing, everbearing, and day-neutral strawberries?**
    - Fertilize June-bearing strawberries in late summer, after harvest, to promote fall growth (p. 234).
    - Fertilize ever bearers and day-neutrals in small amounts throughout the growing season (p. 234).

12. **When is the best time to prune grapes, and how much growth should you remove?**
    Prune grapes when they are dormant. Remove 90 percent of the wood that grew the previous season (p. 245).

13. **What are the two methods of pruning grapes?**
    - Cane pruning (pp. 245-248)
    - Spur pruning (pp. 248-249)

14. **Name a late-season blueberry variety.**
    Elliott or Darrow (p. 236)

15. **Name a midseason blueberry that has a very large berry.**
    Toro (p. 236)

16. **Why are male plants needed for pollination of kiwifruit?**
    The kiwifruit is a *dioecious* plant; it has separate male and female plants, making it essential to have both kinds of vines for pollination and crop production (p. 252).

17. **What insect problems do lingonberries have?**
    There are no insect problems yet (p. 260).
18. **To what other berries is the lingonberry related and what are its other common names?**
   The lingonberry is related to the cranberry and blueberry. Other common names are cowberry, moss cranberry, mountain cranberry, and red whortleberry (p. 259).

19. **How are elderberries used?**
   In juice, sauces, jelly, and wine (p. 260)

20. **Why is high-bush cranberry fruit not used in whole-fruit products?**
   The fruit has large seeds (p. 260).

21. **Beside its fruit, what other uses are there for the saskatoon berry plant?**
   The plants are good ornamentals with attractive blossoms and good fall color (p. 261).

22. **What other berry should the chokeberry not be confused with?**
   The chokecherry (p. 261)