1. **Plant identification is important for several reasons. List three of them.**
   - It helps in diagnosing a plant problem, such as a disease or insect, since different plants are susceptible to different problems (p. 475).
   - You can determine the plant's cultural requirements (p. 475).
   - You can determine the plant's mature size, which is useful when selecting plants for a landscape (p. 475).
   - You can determine the plant's flowering and fruiting habits (p. 475).

2. **Why is it important to learn the botanical names of plants when common names are easier to say and remember?**
   
   One of the most important reasons for learning the Latin names of plants is to be able to discuss the plant with other gardeners, nursery personnel, and pest control experts and be sure you're talking about the same plant. Consider the following: The European white waterlily has 245 common names, depending on which country you live in. Its scientific name, *Nymphaea alba* L., is recognized everywhere, however; (p. 475).

3. **The plant classification system is made up of several levels. Which are the two most important levels for the typical gardener?**
   
   Genus and species (p. 476)

4. **The term "cultivar" is an abbreviation for what? Why are cultivars important?**

   Cultivar means cultivated variety. Cultivars are plants that are propagated or selected for a specific desirable feature or trait (p. 477).

*You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.*
Soils and Fertilizers

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

"It's not just the volume,"
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.
T  Organic fertilizers usually have a low nutrient content. *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, 108).*
   (e) Keep the pile moist *(pp. 55, 108).*
1. **Air is necessary for a compost pile to work. Why?**
   To encourage aerobic organisms (p. 102, 106)

3. **What happens in a compost pile if there is no air present?**
   Without air, the compost pile kills aerobic organisms and encourages the growth of anaerobic ones. The compost pile becomes a smelly, slimy mess (pp. 106, 108).

3. **A good compost pile contains a variety of raw materials. Define each of the following and give examples:**
   - **Energy materials** contain a lot of energy for microorganisms. Examples include grass clippings, manure, garden trimmings, and fruit and vegetable waste (p. 105).
   - **Bulking agents** are low in nitrogen, energy, and moisture. Examples include wood chips, corn stalks, sawdust, grass hay, and straw (p. 105).
   - **Balanced raw materials** contain a balance of energy and bulk. Examples include leaves, high-quality hay (ground up), ground-up tree and shrub trimmings, horse manure with bedding, and mixtures of bulking and energy materials (p. 105).

4. **Why is particle size important in a compost pile?**
   Microorganisms act on the surface of the compost material; the smaller the size, the more surface area there is to act on (p. 105).

5. **Why does compost need to "cure" before being applied to a garden?**
   Curing affects the availability of nitrogen and the microbial activity of compost. Uncured compost can injure plants, especially when used with potting soil or to start new seeds (pp. 107-108).

6. **What are some problems with using manure in a compost pile?**
   Composting might not kill all pathogens found in manure. The greatest risk of contamination is to root crops, such as potatoes and carrots, and leafy vegetables such as lettuce (pp. 50, 109).

7. **What are some kinds of manure that never should be used in a compost pile?**
   Cat, dog, and pig manure (pp. 50, 109)