Chapter 31 Exercises

Review Questions

1. For an element to be regarded as essential, all of the following criteria must be met, except:
- **a.** No other element can perform the function.
- **b.** The element is directly involved in plant nutrition.
- **c.** The element is inorganic.
- **d.** The plant cannot complete its life cycle without the element.

2. The nutrient that is part of carbohydrates, proteins, and nucleic acids and that forms biomolecules is _____.
- **a.** nitrogen
- **b.** carbon
- **c.** magnesium
- **d.** iron

3. Most _____ are necessary for enzyme function.
- **a.** micronutrients
- **b.** macronutrients
- **c.** biomolecules
- **d.** essential nutrients

4. What is the main water source for land plants?
- **a.** rain
- **b.** soil
- **c.** biomolecules
- **d.** essential nutrients

5. Which factors affect soil quality?
- **a.** chemical composition
- **b.** history of the soil
- **c.** presence of living organisms and topography
- **d.** all of these

6. Soil particles that are 0.1 to 2 mm in diameter are called _____.
- **a.** sand
- **b.** silt
- **c.** clay
- **d.** loam

7. A soil consists of layers called _____ that, taken together, are called a _____.
- **a.** soil profiles; horizon
- **b.** horizons; soil profile
- **c.** horizons; humus
- **d.** humus; soil profile

8. What is the term used to describe the solid rock that lies beneath the soil?
- **a.** sand
- **b.** bedrock
- **c.** clay
- **d.** loam

9. Which process produces an inorganic compound that plants can easily use?
- **a.** photosynthesis
- **b.** nitrogen fixation
- **c.** mycorrhization
- **d.** Calvin cycle

10. Through mycorrhization, a plant obtains important nutrients, such as _____.
- **a.** phosphorus, zinc, and copper
- **b.** phosphorus, zinc, and calcium
- **c.** nickel, calcium, and zinc
- **d.** all of these

11. What term describes a plant that requires nutrition from a living host plant?
- **a.** parasite
- **b.** saprophyte
- **c.** epiphyte
- **d.** insectivorous

12. What is the term for a plant that grows on another plant without relying on it for nutrition?
- **a.** rhizobia
- **b.** mycorrhizae
- **c.** epiphyte
- **d.** nitrogen-fixing nodule

Critical Thinking Questions

13. What type of plant problems result from nitrogen and calcium deficiencies?

14. List two essential macronutrients and two essential micronutrients.

15. Describe the main differences between a mineral soil and an organic soil.

16. Name and briefly explain the factors that affect soil formation.

17. Describe how topography influences the characteristics and fertility of a soil.

18. Why is biological nitrogen fixation an environmentally friendly way of fertilizing plants?

19. What is the main difference, from an energy point of view, between photosynthesis and biological nitrogen fixation?

20. Why is a root nodule a nutritional adaptation of a plant?