EPSc 116A: Resources of the Earth
Self-Questions for Ch. 9: Fertilizer and Chemical Minerals

Be sure to read the introduction to Part 5 of the book (pp. 315-316) and Focal Points to Chapter 9 (pp. 317-318).

1. What are two main types of nonmetallic minerals?

2. What are the 3 most important elements needed for plant growth, i.e., fertilizer elements?

3. What kinds of organic/biological materials initially were used to supply fertilizer elements?

5. What were some of the reasons for switching from biological to geological sources of the fertilizer elements?

6. From what materials do we currently derive these 3 “fertilizer elements”?

7. Define the following terms:
   - guano
   - evaporites
   - caliche
   - Haber-Bosch process
   - superphosphate
   - Frasch process
   - soda ash

8. What else, besides fertilizer, are nitrates used for?

9. What is the importance of phosphorus to living organisms?

10. a. What are the typical geological sources of phosphate?
    b. How do they form? (Explain Fig. 9.8)

11. Why do we not just take raw phosphate rocks, crush them, and put that powder on the soil as a fertilizer?

12. What types of processing do phosphate rocks undergo in order to make fertilizer?

13. How do organisms use potassium?

14. What are the major geological sources of potassium?

15. a. What are the main geological sources of sulfur?
    b. What do we use sulfur for?

16. a. How do sulfur deposits form around salt domes?
    b. Why is there petroleum in many cases around those same salt domes?

17. How do we “mine” sulfur?

18. How do halite deposits form?
19. What other minerals and elements precipitate out under conditions similar to those under which “salt” deposits form?

20. What are the major uses of NaCl, salt?

21. For what do we use sodium carbonate and sodium sulfate?

22. For what do we use the element boron?

23.a. For what do we use the element fluorine?
   b. What is the mineral fluorite and how does it form?

24. What happened in Lake Peignuer?

25. What kinds of minerals and related inorganic compounds are contained in our foods, medicines, and cosmetics?

Focus on: Figs. 9.1, 9.4, 9.6, 9.7, 9.8, 9.11, 9.13, 9.16, 9.17
Tables 9.1, 9.2, 9.3
Boxes 9.1, 9.2, 9.3