

Chapter 2

Overview of the Biological System Under Study – Descriptive Models

2.1 Thought exercises

This chapter is intended largely as a survey of the biological system in which our physical studies occur. The following exercises may be useful for students who are unfamiliar with much of the basic content in biological studies to help review the chapter content. Because the answers are essentially a recap and reorganization of the chapter content itself, answers are not given in this manual.

- Q.2.1 Use a graphical organizer (see Chapter 1) to write a systems analysis of
- (a) a prokaryotic cell,
 - (b) an eukaryotic cell.
- Q.2.2 Extend your systems analysis to various subsystems of the cell including (1) the cytosol, (2) the ribosome; (3) mitochondrion; (4) cell membrane; (5) nucleus.
- Q.2.3 Are the sub-systems described in Question 2.2 the same for the prokaryotic cells and for the eukaryotic cells?
- Q.2.4 Graphical organizers can be useful in describing changes that occur in complex systems. Use a “change” organizer to summarize the phenomenon of the “rusting of the earth” that occurred around 2 billion years ago.
- Q.2.5 Consider the lipid membranes in the cell. Which organellar membranes are equivalent?
- Q.2.6 Does the endosymbiotic theory support the view that compartmentalization is causally related to (a) the surface-volume problem or (b) the oxygenation-energy catastrophe?

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