BIO 100 Study Guide **Assignment #2**

Chapter 2 **BIOLOGY AND THE NATURE OF LIFE**

OVERVIEW: This assignment guides your study of the nature of *life* from the standpoint of the question "What are the basic characteristics of *life*?" No matter what species, what are the basic traits that make it *living*? In a nutshell, you will see from Chapter 2 that life can be viewed as a *hierarchical arrangement* of levels of organization. Life also has *specified complexity* and can perform four basic life functions – *metabolism, reproduction, responsiveness*, and *homeostasis.*

STRATEGY: Skim Chapter 2 beginning with only the section headings and marginal captions. Then read Chapter 2 in which you will "take a hike" and consider the nature of life.

VOCABULARY: The following list includes the major concepts; try to gain a "definition level" knowledge of each. We will be revisiting them again in later chapters:

levels of organization:
- atom
- molecule
- cell
- tissue
- organ
- organism
- population
- community
- ecosystem
- biosphere

What *life* has:
1. hierarchic arrangement
2. specified complexity

What *life* does – "basic life processes":
1. metabolism
2. reproduction
3. responsiveness
4. homeostasis

LEARNING GOALS: the following statements represent learning goals which, when attained will suggest mastery of the vocabulary and move you toward structural literacy:

Review from Assignment #1:

1. Suppose you enter a discussion with a friend who believes that life of Earth evolved from one or a few simple forms. How would you approach this discussion in order to make clear why the two of you disagree?

2. Some secular scientists suggest that *theology* and the *human sciences* (*e.g.* psychology, sociology) are only temporary and that the *natural sciences* will eventually explain all there is to know about human life. How would you respond to this claim? (See Assignment #1, Learning Goal #3)

Assignment #2 Goals:

1. List from memory the levels of biological organization and basic life processes (above).

2. Explain the requirements for *metabolism* using the model of a cell in the lecture slides linked to the BIO 100 home page at http://www.cedarville.edu/dept/sm/silvius/100/100main.htm

3. State a definition from memory of each of the VOCABULARY listed above.

4. Check your understanding (perhaps after lecture) using the Text Study Questions, Chapter 2.

STUDY OUTLINE : NATURE OF LIFE

I. WHAT IS *LIFE*?

A. LIFE HAS A HIERARCHICAL ARRANGEMENT – LEVELS OF ORGANIZATION

1. HIERARCHICAL means

2. DEFINITION of EACH LEVEL – if necessary, write definitions on facing page:
   a. Biosphere
   b. Ecosystem
   c. Community
   d. Population
   e. Multicellular Organism
   f. Organ
   g. Tissue
   h. Cell
   i. Organelle
   j. Molecule
   k. Atom

B. LIFE HAS SPECIFIED COMPLEXITY – complexity that suggests that life (or another system) is the result of I_____ and rather U_____ natural causes.

II. WHAT DOES LIFE DO? – BASIC LIFE FUNCTIONS:

A, METABOLISM

1. Definition =

2. Requirements:

   a. Source of _____ – e.g. _____

   b. Metabolic _____ – e.g. _____

   c. Metabolic _____ – i.e. _____

B. REPRODUCTION

C. RESPONSIVENESS

D. HOMEOSTASIS

III. IS LIFE MORE THAN A MACHINE?

PRINCIPLES OF BIOLOGY BIO-100 WINTER FIELD PROJECT: "Making It Through Winter"

Names (Contributing Cooperative Group Members): _____

_____

Laboratory Section (Indicate Day of Week and Time , e.g. T1): _____

INSTRUCTIONS: This assignment gives an opportunity for your cooperative learning group to schedule a hike into a winter setting. investigate processes of winter survival, and submit your findings in lecture on February 11. Unless you procrastinate, you will have plenty of good days to go outside. See below and Assign. 20W, Feb. 11, for specific instructions.

A. OBJECTIVE: To identify adaptations used by Ohio plants and wildlife to survive winter challenges.

B. OBSERVATIONS: Arrange to go on a winter hike anywhere that you can find signs of winter life. Ideally, you should work with your cooperative learning group or else agree to work individually or with another grouping. Hopefully, you can do this on a pleasant, winter day after a recent snow. A small spiral notebook and pencil (won't smudge) are the preferred items of field biology enthusiasts. Binoculars are great for birdwatching along forest edges and thickets. Walking quietly and pausing for a few minutes will reveal a surprising display of wildlife in places like the Cedarville Falls-Indian Mound Park, or along the Ohio-Erie Bikeway. **Warning:** Such activities (especially with binoculars) can become habit-forming.

Observations [List plants, songbirds, mammals, animal tracks, burrows, nests, etc. and any relevant behavior (*e.g.* feeding, burrowing in snow, etc.)]: **Afterwards list these "field notes" on back –>**

C. ORGANIZING YOUR DATA: When you return to the comfort of the indoors, relate what you have observed to the questions below, and respond by filling in the table:

1. In column #1, list some of the chief challenges presented to plants and animals in winter. Try to represent plant and animal, and make your entries thoughtfully. Share within your group.HINT: What are the basic needs of plants and animals that must be met even in winter, and how does fulfilling these needs make winter life challenging and at times stressful to these creatures?
2. In column #2, name one plant or animal species that relates to the challenges in column #1.
3. In column #3, make a brief note of how you believe the creature contends with the challenge.

Table 1. Winter Adaptations of Common Plant and Animal Species

Winter Challenges	Common Names	How the creature contends with the winter challenge:

D. DISCUSSION: Be prepared to give input from your group. One neatly completed "TAKE-HOME PROJECT" page, front and back, will be collected from each cooperative group on Feb 11.