Chapter 10 Nutrition I

OVERVIEW: All living creatures perform certain "basic life processes"– metabolism, reproduction, and coordination (responsiveness/ homeostasis) (Assignment #3). Metabolism is propelled by some mode of nutrition, the subject of this Assignment. Most autotrophs rely on photosynthesis for their nutrition; whereas, heterotrophs must absorb or ingest "food", process it, and distribute the products throughout the body. Thus, autotrophs and the various types of heterotrophs are distinguished by their modes of nutrition (See Assignment #5).

STRATEGY: Read Chapter 10, pages 193-195 which is an introduction to "Nutrition" in the major trophic classifications of life--autotrophs and various heterotrophs. Pages 195-202 addresses "Nutrition in Vascular Plants" which will relate to your upcoming lab experience. Read pages 202-207 which addresses nutrition in the microbes, protozoa, and invertebrates.

VOCABULARY: Define each of the following accurately in your own words:

Structures:

- oral groove
- food vacuole
- lysosome
- anal pore
- nematocyct
- nutritive cell
- gastrovascular cavity
- coelom
- pharynx
- gizzard
- stomach
- intestines
- digestive system
- circulatory system

Processes:

- phagocytosis
- intracellular digestion
- extracellular digestion
- secretion
- diffusion

LEARNING GOALS: You can measure your mastery of this assignment by completing the following:

1. List the three "basic life functions." Why are these three functions of life so named?

2. State briefly how the concept of "nutrition" may be applied to both autotrophs and heterotrophs.

3. What are the functions of xylem and phloem? Why do land plants, but not algae, need these tissues?

4. How do parasites gain nutrition? In how many of the five kingdoms can you identify parisites? [Don't forget mistletoe!]

5. Explain why bacteria and fungi are considered *decomposers*; whereas, Paramecium and many other protozoa are considered *consumers*.

6. List two purposes of digestion. List the four types of large molecules in food and the respective enzymes that break them down.

7. Use the VOCABULARY above to describe intake, processing, and excretion in our representative consumers – *Paramecium*, sponge, hydra, flatworms, and earthworms.

8. Why does earthworm require a circulatory system of vessels and blood; whereas, planaria does not?

STUDY SUGGESTION: See Question #5 at the end of Chapter 10.

NETWORK: See "BIO 100 Web Links" Page for Nutrition-related links under Assignment #16, 17.

I. **OVERVIEW**: Our study of "Organismic Biology" will center around three basic life processes:

N_____ , R _____, and C _____

A. Approach: Survey the major taxonomic groups (Monera, Protista, etc.) to see how *representative organisms* of each group perform each of the *basic life functions*.

B. NUTRITION: Definition: _____

_____

II. **KINGDOM PLANTAE** -- Plant Kingdom

A. ALGAE -- all or most cells are autotorophic; perform nutritional intake by P_____

Photosynthesis (Summary Reaction):

B. LAND PLANTS -- only certain cells are green and photosynthetic. Therefore, organic molecules formed by green cells (*e.g.* sugars, amino acids) must be transported to nongreen cells:

1. Transport from *source* leaves to *sinks* (roots, flowers, seeds) occurs via the _____

2. Water which is available to roots must be transported to leaves via _____

III. **Kingdoms MONERA and FUNGI**

A. These kingdoms contain species that are representatives of every nutritional classification.

B. Nutritional classification:

1. Autotrophic (photosynthetic): _____

2. Heterotrophic (digest organic compounds and incorporate into their growth)

a. Parasites: _____

b. Decomposers:_____

3. Symbiotic: _____

IV. **Kingdom PROTISTA:** Includes plant-like *autotrophs* (*e.g. Euglena*) and protozoa (*heterotrophic*)

A. Examples of Protists: _____

B. ***Paramecium*** – Our "representative protist": a unicellular consumer which *ingests* and *digests* food.

C. DIGESTION: Essential means by which heterotrophs gain nutrition.

1. Two purposes of DIGESTION:

   a. _____

   b. _____

2. Agents involved: _____

   _____

3. Molecules digested -- *i.e. SUBSTRATES:*

SUBSTRATE	ENZYME RESPONSIBLE	PRODUCTS
Carbohydrates		
Lipids		
Proteins		
Nucleic Acids		

D. Nutrition in ***Paramecium***:

1. Intake: _____

   _____

2. Processing: _____

   _____

3. Excretion: _____

   _____

E. Nutrition in **Sponges**: [**Note: Animal Kingdom begins here**]

1. Intake: _____

   _____

2. Processing: _____

   _____

3. Excretion: _____

F. Nutrition in ***Hydra***: See the "BIO 100 Web Links" for "Cnidaria Home Page"

1. INTAKE:

2. PROCESSING:

3. EXCRETION:

G. Nutrition in **Earthworm**:

1. Body design includes *coelom*: _____

2. Larger, muscular body requires _____
3. Habitat and nutrition: _____
4. Nutritional Process:
   a. INTAKE:

   b. PROCESSING:

   c. EXCRETION: