SOLUTIONS TO THE STUDY GUIDE FOR MODULE #3

1. a. Pseudopod - A temporary, foot-like extension of a cell, used for locomotion or engulfing food

b. Nucleus – The region of a eukaryotic cell that contains the cell's main DNA

c. Vacuole – A membrane-bounded "sac" within a cell

d. Ectoplasm – The thin, watery cytoplasm near the plasma membrane of some cells

e. Endoplasm – The dense cytoplasm found in the interior of many cells

f. Flagellate – A protozoan that propels itself with a flagellum

g. Pellicle – A firm, flexible coating outside the plasma membrane

h. Chloroplast – An organelle containing chlorophyll for photosynthesis

i. Chlorophyll – A pigment necessary for photosynthesis

j. Eyespot – A light-sensitive region in certain protozoa

k. Symbiosis – A close relationship between two or more species where at least one benefits

l. Mutualism – A relationship between two or more organisms of different species where all benefit from the association

m. Commensalism – A relationship between two organisms of different species where one benefits and the other is neither harmed nor benefited

n. Parasitism – A relationship between two organisms of different species where one benefits and the other is harmed

o. Cilia – Hairlike projections that extend from the plasma membrane and are used for locomotion

p. Spore – A reproductive cell with a hard, protective coating

q. Plankton – Tiny organisms that float in the water

r. Zooplankton – Tiny floating organisms that are either small animals or protozoa

s. Phytoplankton – Tiny floating photosynthetic organisms, primarily algae

t. Thallus – The body of a plant-like organism that is not divided into leaves, roots, or stems

u. Cellulose – A substance (made of sugars) that is common in the cell walls of many organisms

v. Holdfast – A special structure used by an organism to anchor itself

w. Sessile Colony – A colony that uses holdfasts to anchor itself to an object

2. There is no real answer for this question. Just be sure that you can name the subkingdom and phylum of each organism in Figure 3.1 when you see its picture.

3. *Euglena* and *Spirogyra*. Each of these organisms use chlorophyll for photosynthesis and thus have chloroplasts. The other two genera contain exclusively heterotrophic organisms, which obviously do not use photosynthesis.

4. A contractile vacuole collects excess water in a cell and releases it into the surroundings to reduce the pressure inside the cell. This keeps the cell from exploding. The food vacuole, on the other hand, stores food while it is being digested and has nothing to do with excess water or pressure.

5. Endoplasm is thick, while ectoplasm is thin and watery. Endoplasm is found in the central region of the cell, while ectoplasm is found near the plasma membrane.

6. The amoeba uses pseudopods which it creates by deforming its body. The euglena, on the other hand uses a flagellum. There is one bit of similarity. When it wants to move quickly, the euglena deforms its body in an almost earthworm-type motion. This is used to enhance the motion supplied by the flagellum, and is something like the amoeba's motion.

7. There are more than three, but you only need to recall three. The ones we discussed in this module are *Entamoeba histolytica, Trypanosoma, Balantidium coli, Plasmodium,* and *Toxoplasma*.

8. Sarcodina: pseudopods, Mastigophora: flagella, Ciliophora: cilia.

9. These organisms form spores as a natural part of their life cycle and have no real means of locomotion.

10. *Trichonympha* is an example of mutualism, because both the *Trichonympha* and the termite benefit from the situation. The tapeworm is an example of parasitism, since only the tapeworm benefits. The host is hurt by the situation.

11. Ciliates require so much energy that they must have a nucleus (called the macronucleus) devoted solely to metabolism. The other, smaller nucleus (the micronucleus) controls reproduction.

12. In conjugation between paramecia, there is a mutual exchange of DNA so that each paramecium gets new DNA. We learned in Module #2 that when bacteria conjugate, only one bacterium (the recipient) gets new DNA.

13. Spores are formed as a natural part of an organism's lifestyle. Cysts, however, are only formed in the case of life-threatening conditions. If those conditions do not exist, cysts will not be formed. Thus, the first group produced cysts. The second group produced spores, making them a part of phylum Sporozoa.

14. A euglena can either live on the dead remains of other organisms or it can produce its own food by photosynthesis. This combination of autotrophic and heterotrophic behavior is rather unique in God's creation.

15. Phylum Chrysophyta contains the diatoms, which are responsible for most of the world's photosynthesis.

16. In the answers below, we list all of the phyla that apply. You only need to list one.

Food vacuole - purpose: store food, phyla: Sarcodina, Mastigophora, Ciliophora

Contractile vacuole - purpose: remove excess water, reducing pressure, phyla: Sarcodina, Mastigophora, Ciliophora

Flagellum - purpose: locomotion, phylum: Mastigophora, Pyrrophyta

Pellicle - purpose: retains cell shape, phyla: Mastigophora, Ciliophora

Chloroplast - purpose: stores chlorophyll, phylum: Chlorophyta or Mastigophora

Eyespot - purpose: detects light, phylum: Mastigophora

Cilia - purpose: locomotion, phylum: Ciliophora

Nucleus - purpose: contains DNA, phyla: all phyla in Protista

Oral groove - purpose: food intake and conjugation, phylum: Ciliophora

17. These deposits are called diatomaceous earth and are used as abrasives and filters.

18. A red tide is an algae bloom of dinoflagellates, which belong to phylum Pyrrophyta.

19. Phaeophyta and Rhodophyta

20. Members of phylum Phaeophyta have alginic acid (or just algin) in their cell walls. This is the thickening agent used in the foods listed.