Name: _____

Study Guide for Science Semester Exam December 2017

Standards included in the Semester exam

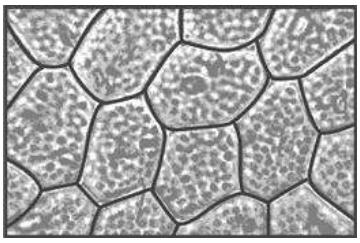
S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically.
a. Demonstrate the process for the development of a dichotomous key.
b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaebacteria, eubacteria, protists, fungi, plants, and animals).

S7L2. Students will describe the structure and function of cells, tissues, organs, and organ systems.
a. Explain that cells take in nutrients in order to grow and divide and to make needed materials.
b. Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, and mitochondria) to basic cell functions.
c. Explain that cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms.

Answer the following questions on separate sheets of paper:

1. Your muscle cells produce energy from sugar. Waste from this process builds up in the cytoplasm. When the concentration of waste is higher inside the cell than outside the cell, the waste diffuses across the cell membrane and moves into the bloodstream.
   a. Which cell function is described above?
   b. How is this process different from active transport? Give some examples.

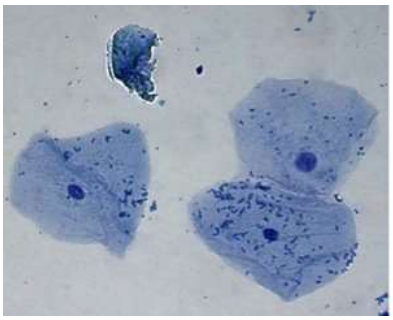
2. The drawing below shows what a student sees when looking through a microscope. The object is magnified many times so that they are easily seen.



   Explain what the compartments are and how they relate to life. Why are these compartments grouped together?

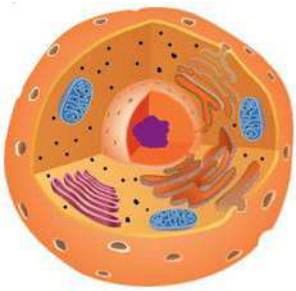
3. Cells have specific organelles with different structures and functions. Compare the mitochondria and chloroplast in terms of function.

4. Multicellular organisms have five levels of organization ranging from simplest to most complex. The simplest level is the cellular level. This is an image of one type of cell found in your body: a cheek cell.



You are the most complex level: you are an organism. List the five levels of organization, from simplest to most complex. Describe each level with one or two sentences. Give an example at each level.

5. Is the cell in the diagram eukaryotic or prokaryotic? Explain your answer using the defining characteristics of cells. Mention structural features of the diagram that support your answer.



6. Exploring the South American rain forest, a scientist discovers a mysterious organism and brings it back to the lab for further study. What cell characteristics should the scientist examine to tell whether the organism is an animal or plant? Why?

7. In the past, fungi were thought to be plants without chlorophyll. Now fungi are classified in their own kingdom. Compare and contrast fungi with plants, in terms of their means of getting nutrition.

8. John loves trout fishing so much that he goes trout fishing several times throughout the year. He began to notice that during the dry season the trout had significantly more lice on them than during the rainy season. John, being a curious science student, wanted to find out what was causing the increase of lice on the trout. Write a testable hypothesis to help John focus his research.

9. Some organisms and objects cannot be seen by human eyes without special tools. What tool would be used to observe such organisms that cannot be seen by human eyes? How would you determine the magnification of that tool?

10. Justin and Tara designed an experiment to see which fertilizer worked the best on tomato plants. They set up the experiment so that they had three tomato plants, and they designated them plant A, B, and C. They made sure that the only variable that differed between the plants was the type of fertilizer applied. Each tomato plant was the same type of plant and was planted at the same time. Each plant received the same amount of sunlight, was in the same room and therefore at the same temperature, was given the same amount of water at the same time, and was given the same amount of fertilizer at the same time. After three months of data collection, a conclusion was drawn.
    a. Although Justin and Tara took great care in carrying out the experiment, they made one major flaw. What is missing in this experiment?
    b. What would be the independent and the dependent variables in this experiment?

11. What are the six kingdoms of life? What are their identifying characters? Create a dichotomous key to identify these six kingdoms (Separate sheet of paper).

12. Compare and contrast photosynthesis and cellular respiration.

13. Define:

Nucleus
Cytoplasm
Cell membrane
Cell wall
Chloroplasts
Lysosome
Mitochondria
Osmosis
Diffusion
Active transport
Passive transport
Digestive System
Circulatory System
Skeletal System
Muscular System
Nervous System
Excretory System
Integumentary System
Respiratory System