Cell Structure Worksheet

Objectives: After working through this worksheet, you should:
   a) Understand the basic structure of a typical eukaryotic cell.
   b) Know the structure and function of the plasma membrane, nucleus, nuclear envelope, endoplasmic reticulum, ribosomes, vesicles, Golgi apparatus, lysosomes, vacuoles, mitochondria and chloroplasts.
   c) Be able to label a diagram of a typical cell.

You will need your text book in order to complete this worksheet. If you do not have a text, there is one on reserve in the library.

Follow the steps one at a time and check off each one as you complete it. If you get stuck, the answers for this worksheet are available on the course web site.

1) Read page 144. What is a cell? *the basic unit of life*

2) Are all cells the same? How do you know this? *No, all cells are not the same. Some cells have to make hair, others mucus. Some are make up our muscles and others our nerves. Because they have different jobs, they must differ from each other. But, even so, they all have similar parts!*

3) Read pg 149-150. What is the boundary of all cells called? *Plasma membrane*

4) What is the function on the plasma membrane? *To separate the cell from its environment. To communicate with its environment. To regulate the movement of material into and out of the cell.*

5) What does selective permeability mean? *Some things can pass through the membrane and some things cannot.*

6) What structures within the plasma membrane are responsible for selective permeability? *proteins*

7) Read pages 150-153. We will concentrate on *eukaryotic* cells (those with compartments within them). What is the generic name for compartments within a cell? *organelles*

8) What surrounds each of these compartments? *membranes*

9) Explain how the membrane of organelles is like the plasma membrane. *All membranes are phospholipid bilayers with proteins embedded within them.*
10) What is the “most distinctive organelle” in a eukaryotic cell? the nucleus

11) How many membranes surround the nucleus? 2

12) What are the openings through the membranes and into the nucleus called? Nuclear pores

13) What is inside the nucleus? DNA

14) It’s important that you now that the DNA can never leave the nucleus! It has to send its instructions to the rest of the cell through the nuclear pores.

15) Read about the endoplasmic reticulum (also called the ER) on pages 153-154. How would you describe the structure of the ER? The ER is like 2 sheets folded up on themselves. The 2 sheets are always parallel to each other and create a space between them. This folded structure zigzags through the cell.

16) There are 2 kinds of ER. What are they? Rough ER and smooth ER

17) How do you tell the difference between the 2 kinds of ER? Rough ER has ribosomes attached to it. Smooth ER does not.

18) What is the function of a ribosome? They manufacture proteins.

19) Where else besides on the ER do you find ribosomes? Floating free in the cytosol (or cytoplasm)


21) What is the purpose of a vesicle? Vesicles are transport structures. They are like bubbles that form off the smooth ER. They can be filled with proteins from inside the ER.

22) One place a vesicle can travel to is the Golgi apparatus. Read about the Golgi on page 154.

23) What does the Golgi apparatus look like? A stack of pita breads!

24) What are the two functions of the Golgi? To modify proteins and to package and distribute proteins within the cell.

25) Now read about lysosomes and vacuoles on page 155. What is a lysosome? A lysosome is an organelle that contains digestive enzymes and, often, acids. These are dangerous to the cell and need to be “walled off” from the rest of the cell.
26) What is the function of a lysosome? *This functions like a “stomach” of the cell. Material brought into the cell that needs to be broken down or destroyed is brought to the lysosome.*

27) What is a vacuole? *A membrane bound storage sack.*

28) What is the purpose of vacuoles? *To store various materials. Some store water, starch, fats and oils, food, etc. There are lots of kinds of vacuoles*

29) Now read about mitochondria on pages 156-157. What is the function of the mitochondria? *To provide energy to the cell. Mitochondria specifically make the energy of glucose available to all the processes of the cell.*

30) How many membranes make up a mitochondrion? 2

31) Now read about chloroplasts on pages 157-158. What is the function of the chloroplast? *To perform photosynthesis. Chloroplasts take carbon dioxide from the air and transform it into glucose.*

32) How many membranes enclose a chloroplast? 2

33) Look back through this worksheet. Which organelles have a single membrane around them? *ER, Golgi apparatus, lysosomes, vacuoles*

34) Which organelles have 2 membranes around them? *Nucleus, mitochondria, chloroplasts*
35) On the diagram below, label the plasma membrane, nucleus, nuclear envelope, rough endoplasmic reticulum, smooth endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, vacuoles, and mitochondria.