**Section 3.1**

Read the **Section 3.1** of the book to answer the questions in the space provided or fill in the blank.

1. What type of technology allowed early scientists to develop The Cell Theory?
2. What 3 improvements in the microscope “led (allowed) scientists to examine even more organisms”?
3. What 2 important questions did scientists begin to ask?
4. Why (do you believe) it took scientists almost 200 years to develop The Cell Theory?
5. What are the 3 major principles of The Cell Theory?
6. “In general, cells tend to be \_\_\_\_\_\_\_\_\_\_ in size, and have similar build building blocks. They are also enclosed by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that controls the \_\_\_\_\_\_\_\_\_\_of materials into and out of the cell.”
7. “Within the membrane, a cell is filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”
8. “\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the jelly-like substance that contains dissolved molecular building blocks such as \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_.
9. “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells do not have a \_\_\_\_\_\_\_\_\_\_\_\_, or other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organelles. Instead the \_\_\_\_\_\_\_\_\_ is suspended (“hanging out”) in the cytoplasm. All prokaryotes are \_\_\_\_\_\_\_\_\_\_\_\_ single-celled organisms.”
10. “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and other \_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_ organelles. The \_\_\_\_\_\_\_\_\_\_\_\_, the largest organelle, encloses the genetic information (DNA). Eukaryotes may be multi-cellular or \_\_\_\_\_\_\_\_\_\_\_- celled organisms.”
11. Create a VENN diagram in the space below to compare the prokaryote and the eukaryote. Use the following: has a nucleus, does not have a nucleus, does not have membrane-bound organelles, has membrane-bound organelles, DNA suspended (“hanging out”) in cytoplasm, DNA inside the nucleus, may be microscopic single-celled, may be either microscopic single-celled or multi-cellular. Indicate that BOTH cells have a plasma (cell) membrane, ribosomes and cytoplasm.

**Section 3.2**

Read **Section 3.2** of the book to answer the questions in the space provided or fill in the blank.

1. What is the function (job) of the **cytoskeleton**?
2. What 3 types of fibers comprise (make up) the cytoskeleton?
3. Which cell part is made mostly of water and “fills the space between the nucleus and the cell membrane”?
4. What is the role (job) of the **nucleus**?
5. How does the nucleus protect the DNA?
6. Why are their holes in the **nuclear envelope**?
7. What is the function of the **endoplasmic reticulum**?
8. Why is there such a large amount of ER within a cell?
9. Read the sleeping bag analogy (p.76) then complete the sentence to explain why the ER “crease(s) and fold(s)” inside the cell? “Likewise the ER’s many folds allow it to \_\_\_\_\_\_\_\_\_\_ within the cell.
10. Which organelle attaches itself to the surface of the **rough endoplasmic reticulum (RER)** and allows it to make proteins?
11. Sketch the picture of the rough ER and smooth ER underneath Figure 3.8. Label the RER, SER and the ribosomes attached to the surface of the RER. Sketch the picture with the 2 brackets on the right side. These are brackets: ] ].
12. Amino acids are the building blocks of proteins. Which organelle links the amino acids together? It is NOT the ER! Hint: It is found in both prokaryotes and eukaryotes.
13. What is the function of **smooth endoplasmic reticulum** (SER)? Hint: Think about the job of the liver. Remember that liver cells contain a larger amount of SER than many other cells in the body.
14. Sketch the **Golgi apparatus** shown (Figure 3.9) above the transmission electron microscope (TEM) picture on p.76. Label the “budding” vesicles. Hint: There are about 6 budding off of the Golgi.
15. What are 3 functions of the Golgi apparatus? Hint: post office, UPS, etc.
16. Describe the structure of the Golgi apparatus by filling in the blanks. “….Golgi apparatus consists of closely \_\_\_\_\_\_\_\_\_ stacks of membrane-enclosed \_\_\_\_\_\_\_.
17. Describe the structure of a **vesicle**.
18. What is the function of a vesicle?
19. Think about the job of a vesicle. In a school what might you compare to a vesicle? Give an analogy. Example: The nucleus is analogous the office in a school, the cell membrane is analogous the gates surrounding the school, etc. **Explain your answer.**
20. Vesicles tend to be “short-lived”. Why do you think they “live” such a short period of time inside the cell? Hint: Think about their role (job).
21. Sketch the mitochondrion at Figure 3.11. Sketch the one that is labeled! Label the parts.
22. What is the function (job) of mitochondrion in a cell?
23. Which cell would have more mitochondria, a muscle cell or a skin cell? Explain.
24. Why does a mitochondrion have many folds and creases inside?
25. Because mitochnodria have their own \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_scientists believe that they were once free-living prokaryotic cells that were taken in by larger cells
26. What is located inside a **vacuole**?
27. Both plants and animal cells contain small **vacuoles.** However, the plant cell also has another vacuole that is called a \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ vacuole.
28. “When a plants wilts, its leaves shrivel because there is not enough \_\_\_\_\_\_\_\_ in the cell’s \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ to support the leaf’s normal structure.”
29. Name 3 substances that might be stored inside the plant’s vacuole.
30. Why are waste products “stored” inside the vacuoles?
31. What 2 roles (jobs) of a lysosome?
32. What type of substance is located inside of a lysosome that allows it to carry out its functions?
33. What might happen to a cell if lysosomes were not surrounded by membranes?
34. What is the role (job) of a **centriole**?
35. “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organize microtubules to form \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_look like little hairs; \_\_\_\_\_\_\_\_\_\_\_\_\_ look like a whip or a tail. Their motion forces liquids past a cell.”
36. Which structure, organized by centrioles, allows the sperm cell to swim towards the egg cell? Think!
37. What are 3 functions of the **cell wall** in plant cells?
38. Which polysaccharide (poly = many; saccharide = sugar) comprises (makes up) the cell wall in plants and algae?
39. Why are openings or “channels” between cell walls?
40. Why do scientists hypothesize that chloroplasts, like mitochondria, were originally free-living prokaryotes?
41. What is the role of a chloroplast in a plant cell?

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Organelle Practice:

List the names of 12 cell organelles then write the function and describe the structure. Begin with a VERB to indicate the job (function) they have in the cell). Under the function. Begin with cytoskeleton (already done for you) and end with chloroplast. Create a chart then number each organelle in a chart.

1. Cytoskeleton

* **Supports** and **shapes** the cell.
* Composed of microtubules (hollow tubes), intermediate filaments and microfilaments (tiny threads).

2. Nucleus