LIFE SCIENCES 11

Learning Guide 2 – Cell Biology

Biology is the science of life. The word itself comes from the Greek terms *bios* meaning "life" and *logos* meaning "study," so biology can be understood as the study of living organisms. An organism is any living thing, whether made up of a single cell, such as bacteria, or many cells, like plants, animals, and fungi. In this course, you will explore both the structure and function of living things, as well as the processes—such as DNA and evolution—that explain how life develops and changes over time. We'll continue in Learning Guide 2 with an investigation of the most fundamental unit of life: the cell. You'll have an ex-cell-ent time throughout this LG!

What to do for this Learning Guide:

- **Cell Structure and function**

This section introduces you to one of the most important foundations of biology: the cell. You'll learn about the similarities and differences between types of cells, how organelles work together, and the history of how scientists developed our understanding of cell theory. Read pages 26-39 & 86-98 in your textbook

Instructions:

1. **Watch and Take Notes**
   Watch the three videos in the order listed below. While watching, take detailed notes that include the names of the organelles (cell parts) and their functions.
   a) https://www.youtube.com/watch?v=cj8dDTHGJBY – Animal cells
   b) https://www.youtube.com/watch?v=Pxujitlv8wc – Prokaryotic vs Eukaryotic cells
   c) https://www.youtube.com/watch?v=9UvlqAVCoqY – Plant cells

2. **Compare Plant and Animal Cells**
   Create clear, labeled diagrams of both an animal cell and a plant cell. Underneath your drawings, write a short summary that highlights the main differences between the two, noting which organelles are unique to each cell type.

3. **Explore Prokaryotic Cells**
   Draw and label a prokaryotic cell. Then, compare it with plant and animal cells, explaining the key structural differences.

4. **Prokaryotic vs. Eukaryotic Cells**
   Write a clear explanation of the differences between prokaryotic and eukaryotic cells, including examples of organisms that fall into each category.

5. **The Cell Theory**
   State the three main principles of the Cell Theory.

6. **Historical Contributions**
   Write one paragraph for each of the following scientists, describing their contributions to cell biology:
   a) Anton van Leeuwenhoek
   b) Robert Hooke
   c) Matthias Schleiden
   d) Theodor Schwann
   e) Rudolf Virchow

7. **Endosymbiont Hypothesis**
   Research and summarize the endosymbiont hypothesis, which explains the origin of mitochondria and chloroplasts in eukaryotic cells.

8. **Organelle Interrelationships**
   Describe how the major eukaryotic organelles work together in the life of a cell. For example, explain how the endoplasmic reticulum, Golgi apparatus, and vesicles interact in protein synthesis and transport.

9. **Microscope Skills and Lab Report**
   Learn the parts of the microscope and book a time in the science lab (during one of your Great Hall blocks) to complete the microscope lab activity
   *****this lab is to be written as a formal lab report and is DUE: !!**