

Unit # - 2 – Cell Physiology (4 weeks)

Standards Addressed	Student Learning Objectives for this Unit	Content Skills and Knowledge	Learning Activities and Instructional Strategies
<p>NSES Standards: Life Science Science as Inquiry Science & Technology History & Nature of Science</p> <p>PA STEE Standards: 3.2.10.A (sci. k) 3.2.10.B (app k) 3.2.10 C (meth) 3.3.10.A (liv frms) 3.3.10 B (str/fnc) 3.3.10.C (inherit) 3.3.10.D (evo) 3.6.10.A (biotech) 3.7.10.A (tools) 3.8.10 C (imp)</p> <p>1.2 read crit 1.4 writing 1.8 presentation</p> <p>2.2 comp/estimation 2.3 measurement/est 2.5 prob solving 2.6 data analysis</p>	<p>Students will understand:</p> <ul style="list-style-type: none"> ❑ Cell theory states that all living things are composed of cells, cells are the basic units of structure & function in living things, and new cells are produced from existing cells. ❑ Prokaryotic cells have genetic material, not contained in a nucleus. Eukaryotic cells contain a nucleus. ❑ Eukaryotic Cells include: nucleus, ribosomes, ER, Golgi apparatus, mitochondria, chloroplasts, and cytoskeleton. ❑ All cells have a membrane. The cell membrane regulates what enters and leaves the cell. It also provides protection and support. Some cells have cell walls. ❑ Diffusion causes many substances to move across a cell membrane, but does not require the cell to use energy. ❑ Osmosis is diffusion of water through a selectively permeable membrane. ❑ Cells in multicellular organisms develop in different ways to perform particular functions within the organism. ❑ The levels of organization in a multicellular organism are individual cells, tissues, organs, and organ systems. 	<p>Knowledge</p> <ul style="list-style-type: none"> ❑ Life is Cellular <ul style="list-style-type: none"> ○ Cell, cell theory, nucleus, eukaryote, prokaryote. ❑ Eukaryotic Cell Structure <ul style="list-style-type: none"> ○ Organelle, cytoplasm, nuclear envelope, chromatin, chromosome, nucleolus, ribosome, endoplasmic reticulum, golgi apparatus, lysosome, vacuole, mitochondrion, chloroplast, cytoskeleton, centriole. ❑ Cell Boundaries <ul style="list-style-type: none"> ○ Cell membrane, cell wall, lipid bilayer, concentration, diffusion, equilibrium, osmosis, facilitated diffusion, active transport. ❑ The Diversity of Cellular Life <ul style="list-style-type: none"> ○ Cell specialization, tissue, organ, organ system. <p>Skills</p> <ul style="list-style-type: none"> ○ To learn how to measure microscopic objects using a micrometer. (Microns/micrometers) ○ Use an analogy to describe the interdependence of organelles. 	<p>Labs or Demonstrations: Comparing Plant and Animal Cells Exploring the Role of Osmosis in Cystic Fibrosis Observing Mitosis in Plant Cells</p> <p>Readings: Cell Organelles and Features Unique Features of Plant Cells The History of Cell Biology</p> <p>Worksheets: Cell Structure: Interpreting Diagrams Cell Transport: Predicting Cell Cycle: Sequencing</p> <p>Technology Links</p> <p>Cell “learning tools” - http://www.learningscience.org/lsc3a/cell.htm</p>

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Unit Modifications

- ❑ Introduction to Cells (Active Reading)
- ❑ Active Transport (Active Reading)
- ❑ Cell Structure and Function (Vocabulary Review)

Unit Enrichments

- ❑ Comparing Plant and Animal Cells (Exploration Lab)
- ❑ Analyzing the Effects of Cell Size on Diffusion (Inquiry Lab)
- ❑ Comparing Surface Cells (Demonstration)

Suggested Assessment Techniques for Unit

Core 1: Protein Synthesis: Replication, Transcription, and Translation
Core 2: The Origin of Eukaryotic Cells
Core 3: Core Concepts Assessment: Final Exam

Materials/Technology for Unit

- ❑ [Cell Biology Animations](#) (Cell Overview)
- ❑ [The Cell: Web Interactives](#) from learningscience.org