

# RCSS High School Science Unit Plans

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**Subject: Biology      Unit: Cells**

**# of Days \_\_\_\_\_**

Essential Standards 1.1; 1.2; 3.1; 3.4; 4.2; 3.2; 2.1

Clarifying Objective 1.1.1-1.1.3; 1.2.1-1.2.3; 3.1.1; 3.4.1; 4.2.1-4.2.2; 3.2.1; 2.1.2

<b>Big Ideas in NOUNS and ADJECTIVES (Vocabulary)</b>	<b>Real World Performance in VERBS</b>
Cell	Mitosis
Nucleus	G1
Plasma Membrane	S
Cell Wall	G2
Cytoplasm	G0
Mitochondria	Interphase
Vacuole	Prophase
Chloroplast	Metaphase
Ribosome	Anaphase
Cilia	Telophase
Flagella	Cytokinesis
Prokaryote	Cleavage Furrow
Eukaryote	Cell Plate
Electron Microscope	Daughter Cells
Differentiation	Diploid
Homeostasis	Haploid
Dynamic Equilibrium	Meiosis
Active Transport	Crossing Over
Passive Transport	
Osmosis	
Osmotic Pressure	
Diffusion	
Facilitated Diffusion	
Carrier Protein	
Concentration Gradient	
Contractile Vacuole	
Anaerobic	
Aerobic	
Cellular Respiration	
Photosynthesis	
Adenosine Triphosphate (ATP)	
Adenosine Diphosphate (ADP)	
Lactic Acid Fermentation	
Alcoholic Fermentation	
Endosymbiosis	
Asexual Reproduction	
Sexual Reproduction	

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<b>Understanding(s):</b>	<b>Essential Questions/I Can Statements:</b>
<p>Cell structure and function-Organelles Prokaryotic vs. Eukaryotic-Microscope Use Cell differentiation-Stem cells, neurons, RBC's Homeostasis-Transport, buffers, pH Cell Cycle-Cancer Unicellular Adaptations-microvilli, pseudopods, eyespots, cysts Cancer / Injury Repair Prokaryotic and Eukaryotic Evolution-Endosymbiosis Metabolism (PS and Resp) Using ATP Sexual Reproduction (Meiosis)-Nondisjunction, karyotype Reproduction, Growth, and Development Respiration and Nutrition</p>	<ol style="list-style-type: none"><li>1. I can identify the organelles of a plant and animal cell.</li><li>2. I can explain how the structure of an organelle determines its function.</li><li>3. I can summarize how organelles interact to carry out functions such as energy production and use, molecule transport, disposal of waste, and synthesis of new molecules.</li><li>4. I can correctly use a light microscope to observe a variety of cells.</li><li>5. I can distinguish between prokaryotic and eukaryotic cells.</li><li>6. I can distinguish between plant and animal cells.</li><li>7. I can compare a variety of specialized cells (nerve, RBC, sperm cell, muscle, xylem, phloem) and understand how their functions vary.</li><li>8. I can explain how stem cells have the ability to differentiate into different types of specialized cells.</li><li>9. I can explain how homeostasis is maintained in a cell/organism in various environments.</li><li>10. I can distinguish between active and passive transport.</li><li>11. I can explain how cells use buffers to regulate pH.</li><li>12. I can explain how cells respond to maintain temperature, glucose levels, and water balance.</li><li>13. I can compare the mechanisms of passive transport (diffusion, osmosis, fac. diffusion).</li><li>14. I can understand how the structure of the plasma membrane relates to its function.</li><li>15. I can analyze how cells grow and reproduce in terms of the cell cycle (Interphase, G1, S, G2, Mitosis, Cytokinesis).</li><li>16. I can recognize mitosis as a part of asexual reproduction.</li><li>17. I can organize diagrams of mitotic phases and describe what is occurring throughout the process.</li><li>18. I can explain how specific cell adaptations increase survival in different environments (contractile vacuole, cilia, flagella, pseudopods, eyespots)</li><li>19. I can summarize adaptive behaviors such as chemotaxis and phototaxis.</li><li>20. I can explain how cancer results from production of proteins at an incorrect time.</li></ol>

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	<p>21. I can explain how eukaryotic cells formed (endosymbiotic theory).</p> <p>22. I can analyze reactions (reactants and products) for photosynthesis and cellular respiration.</p> <p>23. I can list and describe factors that affect the rates of photosynthesis and respiration.</p> <p>24. I can distinguish between anaerobic and aerobic respiration.</p> <p>25. I can distinguish between alcoholic fermentation and lactic acid fermentation.</p> <p>26. I can compare and contrast the processes of mitosis and meiosis in terms of number of cells produced, changes in chromosome number, and whether it is sexual or asexual reproduction.</p> <p>27. Contrast mitosis and meiosis in respect to genetic diversity between parent and daughter cells.</p> <p>28. I can chronologically arrange the steps of meiosis.</p> <p>29. I can correctly identify processes occurring in a diagram of meiosis.</p> <p>30. I can explain the importance of genes being on separate chromosomes in relation to meiosis.</p> <p>31. I can explain the process of independent assortment in meiosis and how it leads to genetic diversity.</p> <p>32. I can identify various sources of genetic diversity such as crossing over, independent assortment, nondisjunction, and fertilization.</p> <p>33. I can interpret chromosomal abnormalities and gender in a karyotype.</p> <p>34. I can distinguish between the haploid number and diploid number of chromosomes in humans.</p> <p>35.</p>
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<p><b>Performance Task Ideas/Activities:</b></p> <p>Draw/Label diagrams of cell          Build model of cell          Cell Organelle Want-Ad          Cell Magazine Project          Cheek/Onion Lab (microscope)          Rubber Egg Lab          Carrot Osmosis Activity(Glencoe materials)          Dialysis Tubing Lab          Chromatography Lab (Photosynthesis)          Muscle Fatigue Activity (lactic acid ferm.)          Demo-alcoholic fermentation          Cell Respiration stations lab          Floating Disks lab (Photosynthesis)          Concept Maps          Mitosis Diagrams (label)          Biology Project –Onion Root Division          Meiosis Diagrams (label)          Foldables</p>	<p><b>Websites:</b></p> <p>The Biology Project-Onion Root Mitosis  <a href="http://www.biology.arizona.edu/">http://www.biology.arizona.edu/</a></p>
<p><b>Literacy Shift Ideas: (Reading/writing)</b></p>	<p><b>21<sup>st</sup> Century Themes</b></p> <ul style="list-style-type: none"> <li>○ Global Awareness</li> <li>○ Financial, Economic, Business &amp; Entrepreneurial Literacy</li> <li>○ Civic Literacy</li> <li>○ Health Literacy</li> <li>○ Environmental Literacy</li> </ul>
<p><b>Assessments</b></p> <p>Section Tests          Benchmark Exam</p>	<p><b>Additional Info:</b></p>