

# WDHS Curriculum Map: created by Barbara Haulenbeek

Course: Genetics

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//////	Unit I Classical Genetics	Unit II Molecular Genetics	Unit III Population Genetics
<b>Length of Time</b>	8 weeks Mendel's Laws, Punnett Squares	5 weeks DNA, RNA , Amino acids	7 weeks Hardy-Weinberg, Evolution
<b>Standards</b>	<p><b>5.1 Science Practices:</b> Science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p><b>A. Understand Scientific Explanations:</b> Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.</p> <p>1. Refine interrelationships among concepts and patterns of evidence found in different central scientific explanations.</p> <p><b>5.3 Life Science:</b> Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p><b>A. Organization and Development:</b> Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of</p>	<p>5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.3A, 5.3Db</p>	<p><b>5.3 Life Science:</b> Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p><b>C. Interdependence:</b> All animals and most plants depend on both other organisms and their environment to meet their basic needs.</p> <p>1. Model how natural and human-made changes in the environment will affect individual organisms and the dynamics of populations.</p> <p><b>D. Heredity and Reproduction:</b> Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.</p> <p>1. Predict the potential impact on an organism (no impact, significant impact) given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.</p>

	<p>molecules, which also carry out biological functions.</p> <p>4. Distinguish between the processes of cellular growth (cell division) and development (differentiation).</p>		<p><b>E. Evolution and Diversity:</b> Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.</p> <p>1. Account for the appearance of a novel trait that arose in a given population.</p> <p>3. Provide a scientific explanation for the history of life on Earth using scientific evidence (e.g., fossil record, DNA, protein structures, etc.).</p> <p>4. Account for the evolution of a species by citing specific evidence of biological mechanisms.</p>
<b>Essential Questions</b>	<p>1. Why does sexual reproduction result in variations?</p> <p>2. How can the cell in my toe be the same as my mother's?</p> <p>3. How is the continuity of life sustained through reproduction and development?</p>	How is cellular information stored and transmitted throughout the cell?	<p>1. How could life on Earth change to become increasingly complex?</p> <p>2. Do people in a particular area have similar characteristics?</p> <p>3. How can the United States being a "melting pot" be an advantage for survival?</p> <p>4. What affects our outcomes in life, "Nature vs. Nurture?"</p>
<b>Knowledge</b>	<p>1. Difference between dominant/ recessive, homozygous/heterozygous, genotype/phenotype.</p> <p>2. The events in mitosis and meiosis.</p> <p>3. That the stages of mitosis are easily distinguished when seen in images.</p> <p>4. Mendel's Laws of Independent Assortment and Law of Segregation.</p> <p>5. Sexual reproduction produces offspring with a combination of genes from mother and father.</p> <p>6. Homolog separation and recombining is the method of diversifying genes.</p>	<p>1. Function and structure of DNA, RNA, and proteins.</p> <p>2. The central dogma of biology.</p> <p>3. Effect of mutations on organism's DNA, RNA and protein</p>	<p>1. That genes in populations change when subject to certain natural conditions.</p> <p>2. Selection, mutation, migration, random genetic drift, and meiotic drive are mechanisms to alter gene frequencies.</p> <p>3. There are many examples describing each of the above mechanisms for allelic change.</p> <p>4. Darwin's journey and finches that lead him to his theory explained in his book, "The Evolution of Species by Natural Selection."</p> <p>5. That human populations have particular, distinguishing blood types that can be traced in migration patterns.</p> <p>6. Evolution occurs as a result of a</p>

			<p>combination of the following factors:</p> <ul style="list-style-type: none"> <li>• Ability of a species to reproduce</li> <li>• Genetic variability of offspring due to mutation and recombination of genes</li> <li>• Finite supply of the resources required for life</li> </ul> <p>7. Humans have purposefully (gene manipulation) and inadvertently (clear-cut forests) changed gene frequencies.</p> <p>8. How to solve problems for gene frequency using algebra.</p>
<b>Skills</b>	<p><b>SWBAT...</b></p> <ol style="list-style-type: none"> <li>1. Recognize images of the stages of mitosis in an onion cell.</li> <li>2. Diagram and identify the stages of mitosis in pictures.</li> <li>3. Summarize the stages of mitosis.</li> <li>4. Compare and contrast the stages of meiosis and mitosis.</li> <li>5. Diagram the complex stages of meiosis.</li> <li>6. Manipulate models of chromosomes as they go through meiosis.</li> </ol>	<p><b>SWBAT...</b></p> <ol style="list-style-type: none"> <li>1. Compare and contrast both the structure and function of DNA and RNA</li> <li>2. Replicate DNA using Chargaff's base pairing rules</li> <li>3. Create RNA strands through transcription</li> <li>4. Create amino acid sequences (protein molecules) using the universal genetic code</li> </ol>	<p><b>SWBAT...</b></p> <ol style="list-style-type: none"> <li>1. Brainstorm and discuss</li> <li>2. Analyze 5 stories to determine which scenario of evolution.</li> <li>3. Track Darwin's famous voyage and examine his data on finches.</li> <li>4. Use a map of the world, a chart on blood type data, and infer migratory paths.</li> <li>5. View satellite pictures of devastated areas (tsunami, volcanic eruption) to see how species disappear.</li> <li>6. Use algebra to solve problems involving gene frequencies.</li> </ol>
<b>Assessment</b>	<p>Students create chromosomes that match their parents. Then in 2 groups then toss all of their chromosomes in a pile. I will call out a phase and the students will organize all of the chromosomes into their orientation at each phase of meiosis. Once we practice that a few times, going through all the phases, the entire class will form a group and put their chromosomes into a pile. I will then again call out a phase name and ALL of the chromosomes are put in</p>	<p>Daily warm-ups  Make diagrams and models of DNA and RNA  Open-ended questions from text  Web research - illnesses  Exam</p>	<ol style="list-style-type: none"> <li>1. Graphic organizer on 5 dynamic assumptions</li> <li>2. Amish article and graphic organizer with character analysis</li> <li>3. Amish article and questions</li> <li>4. Evaluate Darwin's finches document changes to show adaption</li> <li>5. Solve algebraic equations</li> <li>6. Test</li> <li>7. Students will use a map of the world (Google Earth), data on Native people's blood types, and propose a hypothesis with explanation on where your group of people migrated and who they mixed with.</li> </ol>

	orientation. 1. Quiz 2. Pictures and diagram evaluation. 3. Test		
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