

Grade 7
Module B Dimensions
Cells and Heredity

New Jersey Student Learning Standards

Established	2016-2017
Revised	2017-2018
Revised	2018-2019
Revised	2019-2020
Revised	2020-2021
Revised	2022-2023

Marking Period	Unit Title		Recommended Instructional Days
3	Cells and Heredity		55 Days
NJSL - Science: <i>Title</i>	NJSL - Science: <i>Performance Expectations</i>	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSL-S within Unit	
From Molecules to Organisms: Structures and Processes	<p>MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.</p> <p>MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.</p> <p>MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.</p>	<p><u>Essential Question/s:</u></p> <ol style="list-style-type: none"> 1. What are the building blocks of life? 2. How does each part of a cell function? 3. How is the body a system of interacting subsystems composed of groups of cells? 4. How do our sensory receptors send information to our brain? 5. What is the role of genes and chromosomes in the passing of traits from one generation to the next? 6. What are the advantages and disadvantages of sexual and asexual reproduction. 7. How do offspring inherit traits from their parents? 8. What is a Punnett Square and how does it help us predict the traits of offspring? 9. How do characteristic animal behaviors and 	

<p>Heredity: Inheritance and Variation of Traits</p>	<p>MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.</p> <p>MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p> <p>MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</p> <p>IMS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in</p>	<p>specialized plant structures affect the probability of successful reproduction of animals and plants respectively?</p> <p>Activity Description:</p> <ul style="list-style-type: none">❖ Hands-on Lab: Observe cells with a microscope❖ Hands-on Lab: Use cell models to investigate cell size❖ Hands-on Lab: Model tissue structure and function❖ Hands-on Lab: Observe transport❖ Hands-on Lab: Measure system response to exercise❖ Hands-on Lab: Measure reaction time❖ Hands-on Lab: Model genes and traits❖ Hands-on Lab: Model sexual and asexual reproduction❖ Hands-on Lab: Investigate flower structure❖ Take it Further: Biomimicry❖ Take it Further: People in Science❖ Virtual Lab: Analyzing cells <p>Lab and engineering activities will incorporate these skills:</p> <ul style="list-style-type: none">● Planning and Organization● Critical Thinking● Communication in a group● Decision Making
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<p>Engineering Design</p>	<p>offspring with genetic variation.</p> <p>MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>MS-ETS1-4. Develop a model to generate data for iterative testing</p>	<ul style="list-style-type: none">● Reflection on activity and participation <p>Spotlight on scientists and their accomplishments Ex. Sara Josephine Baker - Physician Michael Dillon - Ethics and Medicine Mary Daly- Food Scientist/ Nutritionist</p> <p>Human Impacts on Earth Climate change can impact unicellular and multicellular organisms. Refer to NASA Climate Kids website (plants and animals)</p> <p><u>Interdisciplinary Connection: Content: (NJSL#)</u></p> <p><u>Connections to Math:</u></p> <ul style="list-style-type: none">● Use variables to represent two quantities in a real-world problem that changes in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, though as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (6.EE.C.9)● Use order of magnitude thinking, write and solve equations, analyze data, and use concepts of probability.● Model with mathematics (MP.4)
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	and modification of a proposed object, tool, or process	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context. (6.SP.B.5) Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (6.SP.A.2) <p><u>Connections to Language Arts:</u></p> <ul style="list-style-type: none"> Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (WHST.6-8.7) Integrated multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (SL.8.5) Write arguments focused on content. (WHST.6-8.1) Cite specific text to support analysis of science and technical texts. (RST.6-8.1) Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources (WHST.6-8.8) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (RST.6-8.7) Write informative/ explanatory texts to examine a
FOUNDATION Disciplinary: <i>Core Idea</i>	FOUNDATION Disciplinary: <i>Statement</i>	
LS1.A: Structure and Function	<p>All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)</p> <p>Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)</p> <p>In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.</p>	

<p>LS1.B: Growth and Development of Organisms</p> <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p>	<p>(MS-LS1-3)</p> <p>Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)</p> <p>Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)</p> <p>Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)</p> <p>Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6)</p> <p>Within individual organisms, food moves through a series of</p>	<p>topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (WHST.6-8.2)</p> <ul style="list-style-type: none">● Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. (RST.6-8.4)● Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (RST.6-8.2)● Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (RI.6.8)● Draw evidence from informational texts to support analysis, reflection, and research. (WHST.6-8.9)
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<p>LS1.D: Information Processing</p> <p>PS3.D: Energy in Chemical Processes and Everyday Life</p>	<p>chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7)</p> <p>Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)</p> <p>The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to MS-LS1-6)</p> <p>Cellular respiration in plants and animals involve chemical</p>	
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<p>LS1.B: Growth and Development of Organisms</p> <p>LS3.A: Inheritance of Traits</p>	<p>reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to MS-LS1-7)</p> <p>Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2)</p> <p>Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1)</p> <p>Variations of inherited traits</p>	
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<p>LS3.B: Variation of Traits</p>	<p>between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2)</p> <p>In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2)</p> <p>In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)</p>	
<p>ETS1.B: Developing Possible Solutions</p>	<p>A solution needs to be tested, and then modified on the basis of</p>	

	<p>the test results, in order to improve it. (MS-ETS1-4)</p> <p>There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3)</p> <p>Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3)</p> <p>Models of all kinds are important for testing solutions. (MS-ETS1-4)</p>	
<p>FOUNDATION Science and Engineering Practices: <i>Core Idea</i></p>	<p>FOUNDATION Science and Engineering Practices: <i>Statement</i></p>	
<p>Developing and Using Models</p>	<p>Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p>	

Planning and Carrying Out Investigations	Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.	
Constructing Explanations and Designing Solutions	Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.	
Engaging in Argument from Evidence	Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).	
Obtaining, Evaluating, and	Obtaining, evaluating, and	

<p>Structure and Function</p> <p><i>Connections to Engineering, Technology and Applications of Science</i></p> <p>Interdependence of Science, Engineering, and Technology</p> <p><i>Connections to Nature of Science</i></p> <p>Science is a Human Endeavor</p>	<p>Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) (MS-LS3-1)</p> <p>Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)</p> <p>Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)</p>	
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<p>Influence of Science, Engineering, and Technology on Society and the Natural World</p>	<p>All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)</p> <p>The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)</p>	
<p>Social and Emotional Learning: <i>Competencies</i></p>	<p>Social and Emotional Learning: <i>Sub-Competencies</i></p>	
<p>Responsible Decision-Making</p> <p>Relationship Skills</p> <p>Self-Management</p>	<ul style="list-style-type: none"> ● Develop, implement, and model effective problem-solving and critical thinking skills ● Utilize positive communication and social skills to interact effectively with others 	

	<i>IEP/504/At-Risk/ESL</i>		
<ul style="list-style-type: none"> ● Interactive Worktext ● Equipment Kits ● Online Simulations ● Evidence Notebook ● Lab Safety Handbook ● CK 12 ● Virtual Labs ● Hands on Labs ● Online Science Tools (Scientific Calculator, Graphing) ● BrainPop Science ● IXL Science 	<ul style="list-style-type: none"> ● Multilingual Glossary ● Sciencosaur ● Online Science Tools (Scientific Calculator, Graphing) ● BrainPopEspanol 	<ul style="list-style-type: none"> ● Multilingual Glossary ● Sciencosaur ● Online Science Tools (Scientific Calculator, Graphing) ● Brain Pop ELL 	<ul style="list-style-type: none"> ● Online Simulations ● CK 12 ● Virtual Labs ● Webquests ● PHET ● Video-Based Projects ● Take It Further ● You Solve It! ● Unit Performance Tasks ● Unit Projects ● Online Science Tools (Scientific Calculator, Graphing) ● BrainPop Science ● IXL Science
Supplemental Resources			
<p>Technology:</p> <ul style="list-style-type: none"> ● 8.1.8.A.1, 8.1.8.A. 2, 8.1.8.A.3, 8.1.8.A. 4, 8.1.8.A. 5 <p>Other:</p> <ul style="list-style-type: none"> ● CRP4 Communicate clearly and effectively and with reason. ● CRP6 Demonstrate creativity and innovation ● CRP7 Employ valid and reliable research strategies 			

- CRP11 Use technology to enhance productivity

**Differentiated Student Access to Content:
Recommended Strategies & Techniques**

Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core Resources
<ul style="list-style-type: none"> ● Large group instruction ● Small group instruction ● Think Pair Share ● Peer editing ● Cooperative group work ● Multimedia presentations ● Manipulatives ● Choice Boards/Learning Menus 	<ul style="list-style-type: none"> ● Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks. 	<ul style="list-style-type: none"> ● Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric. 	<ul style="list-style-type: none"> ● Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

Disciplinary Concept: 1.Career Awareness and Planning, 2.Creativity and Innovation, 3.Critical

<p>NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS</p>	<p>Thinking and Problem Solving, 4.Global and Cultural Awareness 5. Digital Citizenship 6. Information and Media Literacy 7. Technology Literacy</p>	
	<p><i>Core Ideas:</i></p>	<ol style="list-style-type: none"> 1. There are a variety of resources available to help navigate the career planning process. 2. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking. 3. Multiple solutions often exist to solve a problem. 4. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction. 5. Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one’s own work. 6. Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated. 7. Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others
	<p><i>Performance Expectation/s:</i></p>	<ol style="list-style-type: none"> 1. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential. 2. 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4). 3. 9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2). 4. 9.4.8.GCA.2: Demonstrate openness to diverse ideas and

		<p>perspectives through active discussions to achieve a group goal.</p> <p>5. 9.4.8.DC.1: Analyze the resource citations in online materials for proper use.</p> <p>5. 9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).</p> <p>6. 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.</p> <p>7. 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).</p> <p>7. 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).</p>
	<p>Career Readiness, Life Literacies, & Key Skills Practices</p>	
	<ul style="list-style-type: none"> ● Act as a responsible and contributing community member and employee. ● Demonstrate creativity and innovation. ● Utilize critical thinking to make sense of problems and persevere in solving them. ● Consider the environmental, social and economic impacts of decisions. ● Use technology to enhance productivity, increase collaboration and communicate effectively. ● Work productively in teams while using cultural/global competence. 	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>	X	LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>	X	Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	X	Standards in Action: <i>Climate Change</i>