

Spring Lake School District Science Curriculum

Unit: Structure of Living Things

Grade: 8

NJCCCS – 2009

5.1 Life Science- 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 can be modeled and predicted through the use of mathematics.

5.1 Science Practices – 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.

9.1 – 21st Century Life Skills – Demonstrate creative, critical thinking, collaboration, and problem-solving skills to function successfully as global citizens and workers in diverse ethnic and organizational cultures.

8.1 – Educational Technology – All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively to create and communicate knowledge.

Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> • Living things are composed of structures which carry out functions required for life. These structures work together as systems. • Productive scientific and 21st century practices enable us to improve, revise, expand, and make predictions about our understanding of physical, life, earth, and space systems. 	<ol style="list-style-type: none"> 1. What do we know about the structure of living things? 2. How do we know what we know about the structure of living things? 3. How do we know that what we know about the structure of living things is correct? 4. What do we do to improve and/or revise what we know about the structure of living things? 5. How does our understanding of the structure of living things help us understand the natural world?

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Overarching CPIs	Overarching Strategies
<p>5.1.8. D. 1 – Engage in multiple forms of discussions in order to process, make sense of, and learn from others’ ideas, observations, and experiences. Science involves practicing productive social interactions with peers such as partner talk, whole group discussions, and small group work. WALT...Engage in productive and focused discussions in order to learn from others’.</p> <p>5.1.8.D. 2 – Engage in productive scientific discussion practices during conversations with peers both face-to-face and virtually in the context of scientific investigations and model building. In order to determine which arguments and explanations are most persuasive, communities of learners work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories. WALT...Use discussions to examine, refine, and/or revise explanations and understandings.</p> <p>9.1.8. D.3 -Use effective communication skills in face-to-face and online interrelations with peers and adults from home and diverse cultures. Effective communication skills convey intended meaning to others and assist in preventing misunderstandings. WALT... Actively listen and appropriately respond during discussions both in person and online.</p>	<p>Group Discussion</p> <ul style="list-style-type: none"> • Active Listening • Learning from Others • Responding to Others
<p>9.1.8.A.1 – Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem solving skills. WALT...Recognize when behaviors are helping/interfering with critical thinking and problem solving.</p> <p>9.1.8. C.1 – Determine an individual’s responsibility for personal actions and contributions to group activities. Collaboration and teamwork enable an individual or group to achieve a common goal(s) with greater efficiency. WALT...Examine our own personal actions in terms of how they are helping/interfering with group tasks.</p> <p>9.1.8. F.1 – Demonstrate how productivity and accountability contribute to realizing individual or group work goals within or outside the classroom. The nature of the 21st century workplace has shifted, demanding greater individual accountability, productivity, and collaboration. WALT... Appropriately hold each other accountable for being productive members of a group.</p> <p>9.1.8. C.2 - Demonstrate the use of compromise, consensus, and community-building strategies for carrying out different tasks, assignments, and projects. Collaboration and teamwork enable an individual or group to achieve a common goal(s) with greater efficiency. WALT...Use compromise and consensus appropriately when carrying out tasks.</p> <p>9.1.8.C.3 – Model leadership skills during classroom and extra-curricular activities. WALT...Use leadership skills to complete a task.</p> <p>9.1.8. D. 1 - Employ appropriate conflict resolution strategies. Effective communication skills convey intended meaning to others and assist in preventing misunderstandings. WALT...Use conflict resolution strategies appropriately.</p>	<p>Team-Building</p> <ul style="list-style-type: none"> • Compromise • Consensus • Conflict Resolution • Leadership • Self-Monitoring

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<p>9.1.8.A.2 - Implement problem solving strategies to solve a problem in school or the community. WALT...Choose and use problem solving strategies to solve a problem.</p> <p>9.1.8.A. 4 – Design and implement a project management plan using a problem solving strategy. The ability to recognize a problem and apply critical thinking and problem solving skills to solve the problem is a lifelong skill that develops over time. WALT...Design and use a plan for solving a problem or completing a task.</p> <p>9.1.8.B.1 - Incorporate multiple points of view to create alternative solutions. WALT...Gather and include multiple points of view in a solution to a problem.</p> <p>9.1.8.B.2 - Assess data gathered to solve a problem that reflects varying perspectives (cross-cultural, gender specific, generational) and determine how the data can best be used to design solutions. WALT...Determine if enough and the correct data was collected to solve a problem. Determine how to best use data to solve a problem.</p>	<p>Problem Solving</p> <ul style="list-style-type: none"> • Develop a Plan • Follow a Plan • Choosing Strategies • Using Strategies • Multiple Points of View • Collecting and Assessing Data
<p>9.1.8.D.2 - Demonstrate the ability to understand inferences. WALT... Use inferences to explain.</p>	<p>Inferences</p> <ul style="list-style-type: none"> • Inferring • Using Inferences
<p>5.1.8. D. 3 – Demonstrate how to safely use tools, instruments, and supplies. Instruments of measurement can be used to safely gather accurate information for making scientific comparisons of objects and events. WALT...Use tools and supplies safely.</p> <p>5.1.8.D.4 – Handle and treat organisms humanely, responsibly, and ethically. Organisms are treated humanely, responsibly, and ethically. WALT...Handle and treat organisms humanely, responsible, and ethically.</p>	<p>Science Safety</p> <ul style="list-style-type: none"> • Care for self • Care for others • Care for tools • Care for classroom • Care for living things
<p>5.1.8. A. 2 – Use mathematical, physical, and computational tools to build conceptual-based models and to pose theories. Scientists build conceptual-based models and search for core explanations based on the results of observation and measurement. WALT...Use tools to collect data/observations.</p> <p>5.1.8.B.4 – Use quality controls to examine data sets and evidence to generate and review explanations. Reasoning is used to evaluate and interpret data patterns and scientific conclusions. WALT... Use quality controls collect valid and accurate data/observations.</p>	<p>Using Tools</p> <ul style="list-style-type: none"> • “Measure twice, cut once.” • Plan ahead. • Know how to use tools appropriately. • Conduct multiple trials. • Collect data from groups to compare. • Determine accuracy of data. • Determine validity of data. • Identify human and instrument error

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<p>5.1.8.B.4 – Use quality controls to examine data sets and evidence to generate and review explanations. Reasoning is used to evaluate and interpret data patterns and scientific conclusions. WALT...Use quality controls to examine data/observations to draw reliable conclusions</p>	<ul style="list-style-type: none"> • Know when data is misleading- redo if necessary
<p>5.1.8.A.1 – Demonstrate understanding and use interrelationships among central scientific concepts to revise explanations and to consider alternative explanations. Core scientific concepts and principles represent the conceptual basis for model building and facilitate the generation of new and productive questions. WALT...Relate scientific concepts to revise our own or consider other explanations.</p> <p>5.1.8.A.3 – Use scientific principles and models to frame and synthesize scientific arguments and pose theories. Predictions and explanations are revised based on systematic observations, accurate measurements, and structured data/evidence. WALT...Use data/observations to revise our or consider other explanations.</p> <p>5.1.8.B.3 – Use quantitative and qualitative evidence to develop evidence-based arguments. Carefully collected evidence is used to construct and defend arguments. WALT...Use quantitative and qualitative data to develop explanations.</p> <p>5.1.8. C.1 - Monitor one’s own thinking as understandings of scientific concepts are refined. Scientific models and understandings of fundamental concepts and principles are refined as new evidence is considered. WALT...Refine ideas based on the collection of data/observations/understandings.</p> <p>5.1.8.C.2 – Revise predictions or explanations on the basis of discovering new evidence, learning new information, or using models. Predictions and explanations are revised to account more completely for available evidence. WALT...Revise ideas based on the collection of data/observations/understandings.</p> <p>5.1.8.C.3 – Generate new and productive questions to evaluate and refine core explanations. Science is a practice where an established body of knowledge is continually revised, refined, and extended. WALT...Generate new questions to evaluate and refine explanations.</p>	<p>Revising/Refining Ideas</p> <ul style="list-style-type: none"> • Relate science concepts • Use data/observations for support • Use quantitative data • Use qualitative data • Know when data is misleading- redo if necessary • Know when data is leading- revise or refine ideas • Ask and test new questions to revise or refine ideas
<p>5.1.8.B.1 – Design investigations and use scientific instrumentation to collect, analyze, and evaluate evidence as part of building and revising models and explanations. Evidence is generated and evaluated as part of building and refining models and explanations. WALT...Design investigations to collect data.</p> <p>5.1.8. B. 2 - Gather, evaluate, and represent evidence using scientific tools, technologies, and computational strategies. Mathematics and technology are used to gather, analyze, and communicate results. WALT...Use tools to represent data.</p>	<p>Experimental Design</p> <ul style="list-style-type: none"> • Know the purpose • Develop a hypothesis • Plan a way to investigate it (materials and procedure) • Choose appropriate tools, experimental techniques, record-keeping methods • Analyze data for patterns/errors using mathematical/technological tools • Redo if necessary • Draw conclusions to answer purpose and revise/refine hypothesis • Ask refining/revising questions • Investigate those questions

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Unit Plan- Part 1					
CPI	We are learning to/that...	Formative Assessment(s)	Lesson Specific Strategies	Activities and Resources	Differentiation
Pre-Assessment					
Cells Pre-Assessment- SW answer multiple choice questions on pre-requisite knowledge and skills using the Senteo Remotes. <ul style="list-style-type: none"> ○ Cell Organelles ○ Cells as basic structure of life ○ Connections between organelles 					Revisit: Ready:
5.3.8.A.1 Compare the benefits and limitations of existing as a single-celled organism and as a multicellular organism. All organisms are composed of cell(s). In multicellular organisms, specialized cells perform specialized functions. Tissues, organs, and organ systems are composed of cells and function to serve the needs of cells for food, air, and waste removal.	Identify objects where cells are found.	a. Microscope Drawings of Cells b. WALT Exit Card <ul style="list-style-type: none"> • List ten things that contain cells. • What do they all have in common? 	Using Microscope Microscopic Drawings	a. SW conduct a tutorial lab to learn strategies for using a microscope. b. SW observe living and non-living things under the microscope to observe that living things or once-living things contain cells. (Self)	Reteach: Reinforce: Reach: Ready:
	Identify examples of multicellular and single-celled organisms.	a. Final Digital Collage b. Scavenger Hunt Answers		a. SW create a digital collage showing examples of multicellular organisms and single-celled organisms. (Self) b. SW conduct a scavenger hunt on the internet to identify given organisms as multicellular or single-celled. (Self)	Reteach: Reinforce: Reach: Ready:
	Use a microscope to view unicellular and multicellular organisms.	a. Single-Celled Microscope Drawings b. Multicellular Microscope Drawings	Making Wet Mount Slide	a. SW conduct an investigation to observe common single-celled organisms. (STC/MS- Organisms: Macro to Micro – Lesson 11) b. SW conduct an investigation to observe multicellular organisms. (Self)	Reteach: Reinforce: Reach: Ready:
	Compare the benefits and limitations of being multicellular or single-celled.	a. RAFT Assignment		a. SW will participate in role plays to understand the benefits and limitations of being single or multi-celled.(Self)	Reteach: Reinforce: Reach: Ready:
Summative Assessment(s)					
Cells Assessment – <ul style="list-style-type: none"> a. SW answer a series of open ended questions. b. SW use microscopic strategies to locate and draw single and multicellular organisms. 					

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Unit Plan- Part 2					
CPI	We are learning to...	Formative Assessment(s)	Lesson Specific Strategies	Activities and Resources	Differentiation
Pre-Assessment Needs of Cells Pre-Assessment - SW answer multiple choice questions on pre-requisite knowledge and skill using the Senteo Remotes. o Function of body systems					Revisit: Ready:
<p>5.3.8.A.1 Compare the benefits and limitations of existing as a single-celled organism and as a multicellular organism. All organisms are composed of cell(s). In multicellular organisms, specialized cells perform specialized functions. Tissues, organs, and organ systems are composed of cells and function to serve the needs of cells for food, air, and waste removal.</p> <p>5.3.8.A.2 Relate the structures of cells, tissues, organs, and systems to their functions in supporting life. During early development of an organism, cells differentiate and multiply to form many specialized cells, tissues, and organs that compose the final organism. Tissues grow through cell division.</p>	Describe the relationship between cell function and structure	<p>a. Human Body Diagram</p> <p>b. Cell Model</p> <p>c. WALT Exit Card</p> <ul style="list-style-type: none"> • Why do cells look the way they do? • Why are there so many different cell types and forms? 		<p>a. SW research cell structure and function and fill in a diagram of the human body. http://www.teachersdomain.org/resource/tdc02.sci.life.stru.lp_cell/ - Part 2, # 7-8 and http://player.discoveryeducation.com/index.cfm?guidAssetId=06B81218-CD77-4214-88D7-1506A9C566FE&blnFromSearch=1&productcode=DSCE</p>	Reteach: Reinforce: Meet with individual students to give them a chance to clarify their Exit Cards. If they need further clarification monitor them during Microscope Activity. Reach: Ready:
		a. Microscope Drawings WS	Using Microscope Microscope Drawings	a. SW conduct an investigation to observe different types of cells through a microscope. (self) Cell Types Drawings WS.docx	Reteach: Reinforce: Meet with individual students to give them a chance to clarify their answers to the microscope drawing questions. Reach: Ready:
	Identify the needs of cells (nutrients, oxygen, waste and carbon dioxide removal).	a. WALT Exit Card		a. SW identify the needs of cells while viewing a video. http://www.teachersdomain.org/resource/tdc02.sci.life.cell.organelles/	Reteach: Reinforce: Reach: Ready:
	Describe how cells get their needs met. Identify the role tissues, organs, and systems play in helping cells get their needs met.	<p>a. Website Worksheet</p> <p>b. Tissue Drawings</p> <p>c. Chicken Wing Dissection Checklist and Summary Questions</p> <p>d. Needs of Cells Graphic Organizer</p> <p>e. Bodies Exhibit questionnaire</p>	Dissection Methods	<p>a. SW use a website to explore the different types of tissues. http://www.smm.org/tissues/</p> <p>b. SW complete an investigation to observe tissues under a microscope. (Self)</p> <p>c. SW complete a dissection of the chicken wing to observe different tissues and how they work together. (Self)</p> <p>d. SW examine a variety of organs at stations and identify the cell and</p>	Reteach: Reinforce: Reach:

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				<p>tissue types they contain. (Self)</p> <p>e. SW complete a graphic organizer to show how the different cell types, tissues, organs, and systems enable the cells to get those needs. (self)</p> <p>f. SW attend the Bodies Exhibit to explore the relationship between cells, tissues, organs, and systems. (Bodies Exhibit-NYC)</p>	
<p>Summative Assessment(s)</p> <p>The Body as a System Assessment –</p> <p style="padding-left: 40px;">a. SW answer a series of open-ended questions.</p> <p>The Body as a System Performance Assessment-</p> <p>Purpose: You are expected to be able to accurately model how tissues, organs, and organ systems provide cells with what they need to survive.</p> <p>Process: You and your partner are curators for The Bodies Exhibit in NYC.</p> <p>You are preparing an interactive presentation to be displayed at The Bodies Exhibit for visitors to view.</p> <p>You have been hired by The Bodies Exhibit in NYC to prepare an interactive digital exhibit showing how the tissues, organs, and organ systems on display provide cells with what they need to survive.</p> <p>Product: You must create a multimedia digital display visitors can interact with. You will post the final product to the wiki as a test run.</p> <p>Proof:</p> <p>Evidence that you can meet the goal must include:</p> <ul style="list-style-type: none"> • Content: <ul style="list-style-type: none"> ○ Accurately describe how cells get nutrients and oxygen. ○ Accurately describe how cells get rid of wastes and carbon dioxide. ○ Accurately identify the tissues, organs, and organ systems involved in these processes. ○ Realistically describe what might happen to the body to prevent cells from getting/getting rid of at least one of these things. • Product <ul style="list-style-type: none"> ○ Multimedia digital display using Power Point Producer that includes audio, video, graphics, sound effects/music and text. ○ Successful posting to the wiki. • Process <ul style="list-style-type: none"> ○ Using Discussion Strategies. ○ Using Teamwork Strategies. ○ Using Explanation Strategies. ○ Using Reflection Strategies. <p>Digital Tools: Power Point Producer, Wiki</p> <p>IDC: Technology, Language Arts</p> <p>Essential Question Essay</p> <p style="padding-left: 40px;">a. SW choose from a menu of products to answer the overarching unit questions.</p>					

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Unit Plan- Part 3					
CPI	We are learning to/that...	Formative Assessment(s)	Lesson Specific Strategies	Activities and Resources	Differentiation
Pre-Assessment					Revisit:
Cell Division Pre-Assessment: There are no pre-requisite skills or knowledge. SW be asked to explain how cells become tissues, organs, etc. through a K-W-L Chart.					
5.3.8.A.2 Relate the structures of cells, tissues, organs, and systems to their functions in supporting life. During early development of an organism, cells differentiate and multiply to form many specialized cells, tissues, and organs that compose the final organism. Tissues grow through cell division.	Explain how cells become the various tissues, organs, and systems in the body.	a. Video Four Squares WS b. WALT Exit Card c. Observations and Conclusion from experiment.		a. SW view a series of videos and answer questions to understand how one cell differentiates and divides to become the many we have in our body. http://www.teachersdomain.org/resource/tdc02.sci.life.stru.lp_cell/ # 1-6 b. SW complete an activity to model cell division and exponential growth. http://artsedge.kennedy-center.org/content/2291/ c. SW conduct an experiment to observe cell division in yeast cells. http://artsedge.kennedy-center.org/content/2290/	Reteach: Reinforce: Reach:
Summative Assessment(s)					
Cell Division and Differentiation Assessment – SW answer a series of open-ended questions.					
Essential Question Assessment – SW choose from a menu of product options to answer the over-arching unit questions.					