



Grade 7 Science – Course 2 Unit # 1 Life Science

Grade 7

Unit # 1 Life Science

Topic 1 (23 days) – The Cell System

Topic 2 (20 days) – Human Body Systems

Topic 3 (17 days) – Reproduction and Growth

Topic 4 (15 days) – Ecosystems

Topic 5 (18 days) – Populations, Communities, and Ecosystems

Unit 1 Overview Students will understand and apply scientific concepts, principles, and theories pertaining to the living environment setting and recognize the historical development/multicultural involvement of the ideas in science. Main ideas include: living things are alike yet different, structures in living things are related to their function and living things interact with their environment. Students consider systems and how they interact as they investigate cell function and cellular processes as well as exploring the human body as a system model, driven by the flow of energy and the cycling of matter. This leads to the study of reproduction and the plant and animal structures that support it. Students consider stability and change as a core concept in the biosphere.

Unit 1 NYSSLS Performance Expectations (PE)

MS-LS1-1. Plan and conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]

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. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical details related to the functions of cells or cell parts.]

MS-LS1-3. Construct an explanation supported by evidence for how the body is composed of interacting systems consisting of cells, tissues, and organs working together to maintain homeostasis. [Clarification Statement: Emphasis should be on the function and interactions of the major body systems (e.g. circulatory, respiratory, nervous, musculoskeletal).] [Assessment Boundary: Assessment is focused on the interactions between systems not on the functions of individual systems.]

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. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include the genes responsible for size differences in different breeds of dogs. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, biochemical processes, or natural selection.]

MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]

MS-LS1-7. Develop a model to describe how food molecules are rearranged through chemical reactions to release energy during cellular respiration and/or form new molecules that support growth as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for respiration or synthesis.]

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli, resulting in immediate behavior and/or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms in a variety of ecosystems. [Clarification Statement: Emphasis is on predicting patterns of interactions such as competition, predation, mutualism, and parasitism in different ecosystems in terms of the relationships among and between organisms.]

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy associated with ecosystem, and on defining the boundaries of the ecosystem.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about shifts in populations due to changes in the ecosystem.]

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and protecting ecosystem stability. [Clarification Statement: Examples of ecosystem protections could include water purification, waste management, nutrient recycling, prevention of soil erosion, and eradication of invasive species. Examples of design solution constraints could include scientific, economic, and social considerations.]

MS-LS3-2. Develop and use a model to describe how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. [Clarification Statement: Emphasis is on using models such as diagrams and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring.]

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.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Unit 1 NYSSL Science and Engineering Practices (SEP)

- Developing and Using Models
- Obtaining, Evaluating, and Communicating Information
- Analyzing and Interpreting Data
- Asking Questions and Defining Problems
- Engaging in Argument from Evidence
- Constructing Explanations and Designing Solutions
- Planning and Carrying Out Investigations

Unit 1 NYSSLS Disciplinary Core Ideas (DCI)

LS1.A: Structure and Function

- 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)
- 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)
- 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. (MS-LS1-3)

LS1.B: Growth and Development of Organisms

- Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2)
- Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)
- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)
- Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)

LS1.C: Organization for Matter and Energy Flow in Organisms

- 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)
- Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7)

LS1.D: Information Processing

- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. (MS-LS1-8)
- (NYSED) Plants respond to stimuli such as gravity (geotropism) and light (phototropism). (MS-LS1-8)

LS2.A: Interdependent Relationships in Ecosystems

- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

LS2.B: Cycle of Matter and Energy Transfer in Ecosystems

- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- (NYSED) Biodiversity describes the variety of species found in Earth's ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5)

LS3.A: Inheritance of Traits

- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2)

LS3.B: Variation of Traits

- 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)

PS3.D: Energy in Chemical Processes and Everyday Life

- 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)

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· Cellular respiration in plants and animals involves chemical 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)

LS4.D: Biodiversity and Humans

· Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

· (NYSED) Humans impact biodiversity both positively and negatively. (secondary to MS-LS2-5)

ETS1.A: Defining and Delimiting Engineering Problems

· The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1- 1)

ETS1.B: Developing Possible Solutions

· A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)

· Models of all kinds are important for testing solutions. (MSETS1-4)

Unit 1 NYSSLS Cross Cutting Concepts (CCC)

- Patterns
- Scale, Proportion, and Quantity
- Cause and Effect
- Systems and Systems Model
- Stability and Change
- Energy and Matter
- Scale, Proportion, and Quantity

Resources

- Savvas Elevate Science Book NY Edition Course 2 Topics 1-5
- Savvas Easybridge (access via BPS Staff Resources or Clever)
- Savvas Lab materials
- <http://ngss.nsta.org/Classroom-Resources.aspx>

Measurement of Student Learning

- Lesson Quiz
- Topic Assessment and Remediation
- Evidence-Based Assessment
- Quest Rubrics
- Exam view Assessments

Savvas Elevate Science Supports

- Topic Differentiated Instruction in TE
- Topic Remediation Summary in TE
- ELL Support in TE
- ELL Vocabulary Support in TE

<p>English Language Learners (ELL) Enhancements</p> <p>To access hyperlinked material, you must be logged into your BPS Google Drive</p>	<p>Listening</p> <ul style="list-style-type: none"> ● Cross- Linguistic Practices: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates). ● Activating Prior Knowledge Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content. ● Visuals - GIFs, pictures- will assist students in understanding what they are listening to. Use visual thinking strategies to set the lens for learning. ● Video to review or introduce a topic – use closed captioning to help students see the words and pronunciations while they listen to the content. ● Word stretching / Vowel stretching when instructing allows student to listen closely to the pronunciation of the word. ● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening.
	<p>Speaking</p> <ul style="list-style-type: none"> ● Sentence Stems/Frames - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i> ● Academic Conversation Starters: Have a visual of a list of academic sentence starters that students can refer to in a discussion. ● Choral Reading - To build fluency, self-confidence and motivation with reading/speaking. ● Create movement to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning. ● Performance Level Descriptors This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking.
	<p>Reading</p> <ul style="list-style-type: none"> ● Supplementary Text to help reinforce concepts. ● Visual Aids - Pictures or models to support vocabulary words and concepts ● Video to review or introduce a topic - use closed captioning to help students read along while they listen to the content. ● 4 Square / Frayer models to help students gain a deeper understanding of vocabulary. ● Highlighting important text to assist students in answering questions after the reading. ● Chunking-Break reading of text into chunks or paragraphs ● Vocabulary Morphology- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary. ● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading.
	<p>Instructional Accommodations (depending on the student’s needs)</p> <ul style="list-style-type: none"> ● Extended time for tests in class, projects and assignments ● Directions read. Broken down as necessary ● Model how to complete the activity in the lesson ● Oral simplification of directions or questions ● Translated version of test when available. Student may have both version English and native language version ● Use of approved bilingual glossaries from NYS in each subject

<p>Special Education Modifications Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p><u>Instructional</u></p> <ul style="list-style-type: none"> ● Pre-teach vocabulary ● Use picture vocabulary ● Scaffold Depth of Knowledge questions ● Provide copy of notes/notes in “cloze” form ● Use of Think, Pair, and Share strategy to help process information ● Scaffold written assignments with the use of graphic organizers ● Allow for multiple ways to respond (verbal, written, response board) ● Provide model of performance task ● Modify informational text to fit the needs of the students ● Provide a digital or paper interactive notebook ● Present complex tasks in multiple ways ● Provide mnemonic strategies for scientific concepts <hr/> <p><u>Technology:</u></p> <ul style="list-style-type: none"> ● Audio reading of text ● Text to type functions ● Videos to clarify/visualize science concepts ● Record class lecture/discussions and make accessible to student ● Nearpod- interactive presentations of notes <hr/> <p><u>In Class Assessments</u></p> <ul style="list-style-type: none"> ● Provide multiple options for projects ● Use of timer in class ● Break all complex tasks into chunks
<p>Step Up to Writing Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder Grade 5 Resources Grade 5 SUTW materials</p>	<ul style="list-style-type: none"> ● Easy Two-Column Notes ● Breaking Down Definitions ● Paragraph Frame- What I Learned ● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing.
<p>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</p>	<ul style="list-style-type: none"> ● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications ● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population ● All students are given an opportunity to engage in science discourse ● Teacher demonstrates high expectations for all students