Unit 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 NYSSLS Science and Engineering Practices (SEP)

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

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

Resources

- Pearson Elevate Science Book Chapters Topics 1-5
- PearsonRealize.com
- Pearson Lab materials
- http://ngss.nsta.org/Classroom-Resources.aspx
- http://newyorkscienceteacher.com/sci/

Measurement of Student Learning

- Topic Readiness Test
- Lesson Checks
- Lesson Quiz
- Topic Review and Assessment
- Quest Rubrics
- Exam view Assessments

Step Up to Writing

SUTW Strategy
Connect, Case Studies
Easy 2-Column Notes
  SUTW 4th Edition p. 31
  SUTW Tools S1-17a-c

Content Vocabulary

Breaking Down Definitions
  SUTW 4th Edition p. 212
  SUTW Tools S3-2a-b, S3-1a

Investigate/Synthesize/Quest

IVF Summary Sentences
  SUTW 4th Edition p. 43
  SUTW Tools S1-23b

Investigate/Synthesize/Quest

Four Step Summary Paragraph
  SUTW 4th Edition p. 44
  SUTW Tools S1-24a-b

Investigate/Synthesize/Quest

Color-Coding the Elements of Informative
  SUTW 4th Edition p. 2688
  SUTW Tools S4-1a-b
### Investigate/Synthesize/Quest

Explanatory Writing Informal Outlines  
SUTW 4th Edition p. 272  
SUTW Tools S4-3a-b, S4-4a,b

### ELL Enhancements

**Pearson Elevate Science Supports**
- Topic Differentiated Instruction in TE
- Topic Remediation Summary in TE
- ELL Support in TE
- ELL Vocabulary Support in TE

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<td>Build Background Knowledge Audio</td>
<td>Sentence Frames Academic conversation Starters</td>
<td>Supplementary Texts Visual Aids Video Standards-based questions</td>
<td>Sentence Frames Graphic Organizers Standards-based sentence stems</td>
<td>Extended time Directions read 3x Oral interpretation Translated version of test (may have both English and other) Responses in home language</td>
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### Special Education Modifications

**Pearson Elevate Science Supports**
- Topic Differentiated Instruction in TE
- Topic Remediation Summary in TE

<table>
<thead>
<tr>
<th>Instructional</th>
<th>Assistive technology</th>
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<td>Pre-teach vocabulary Use picture vocabulary Picture examples of safety measures posted Pictures for each category of science Scaffold Depth of Knowledge questions Provide copy of notes/notes in &quot;cloze&quot; form Peer partner Extended time for written tasks/verbal response Break long tasks over multiple days Allow for multiple ways to respond (verbal, written, response board, scribe) Provide mock/model of performance task Model use of graphic organizers (fade until mastery) Modify informational text to shorter passages Provide model of exemplar lab write-up</td>
<td>Computer for lengthy writing tasks Audio textbook Videos to clarify concepts Recording device to record class lecture/discussions</td>
<td>Scaffold written assignments Individual criteria for success Provide with review packet Modify the number of questions Provide model of the task Provide multiple options for project Practice calculating density with sample problem before assessing student.</td>
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<th>Other</th>
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<td>Arrange seating for maximum engagement and minimum distraction Accessible lab space (counter level)</td>
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### Accommodations
- Extended time
- Directions read 3x
- Oral interpretation
- Translated version of test (may have both English and other)
- Responses in home language
| Provide interactive notebook  
Present complex tasks in multiple ways  
Model steps to read, interpret, and construct graphs  
Multiple opportunities to perform to repeat labs  
Provide advance organizer of class tasks |   |   |

**Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom**

**Pearson Elevate Science Supports**

- [Pearson Elevate Science Resources](#)

- 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