Name	School	Grade	Course/Subject	Number of Students	Interval of Instruction
		7	Science Content		September 2018 to March 2019

Standards, Rationale, and Assessment Method

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS – SCIENCE K-12

Rationale

The goal of science education curriculum is to produce students who have gained sufficient knowledge of the practices, crosscutting concepts, and core ideas of science and engineering to engage in public discussions on science-related issues, to be critical consumers of scientific information related to their everyday lives, and to continue to learn about science throughout their lives. They should come to appreciate that science and the current scientific understanding of the world are the result of many hundreds of years of creative human endeavor. It is especially important to note that the above goals are for all students, not just those who pursue careers in science, engineering, or technology or those who continue on to higher education (p. 9, NRC, 2012).

Given this goal, an integrated science curriculum model should drive the formation of middle school science curriculum because:

- The nature of science is complex and multidisciplinary.
- Learning theory research in science shows expert knowledge base develops better through interdisciplinary connections and not through isolated content.
- Effective research-based practices for curriculum and instruction in science and engineering are supported through this approach.

Nature of Science

The nature of science is complex and multidisciplinary. From research about how scientists work, we know that scientists do not work in isolation in their own house of physics, or biology or chemistry but they reach out and create networks of scientists within and across disciplines who can contribute understanding, share ideas, and critique evidence and explanations.
Important practices like engaging in argument from evidence, modeling, and communicating information do not occur in isolation but rely on feedback from within and across scientific communities and disciplines.

Standards

Unit 1: Evidence of Common Ancestry

MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy

Unit 2: Selection and Adaptation

MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Unit 3: Stability and Change on Earth

MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

Unit 4: Human Impacts on Earth Systems and Global Climate Change

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

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-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

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.

Unit 5: Relationships Among Forms of Energy

MS-PS3-1, MS-PS3-2, and MS-PS3-5

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

Assessment Method

a. Authentic Assessments throughout the year will be used to measure students' growth. The assessments will consist of selected content understanding tasks and performance tasks that reflect higher levels of cognitive complexity and important practices like engaging in argument from evidence, modeling, and communicating information.
b. Writing Tasks will be used, one for each unit for a total of five (5). The unit 1 task appears below, and those for units 2-5 will follow the same format.

Performance Expectation

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.

Q: How does photosynthesis play a role in the flow of energy and matter in plants and animals?

The response will include evidence from text addressing the following lesson objectives:

- Sun's energy in Food
  - o https://app.discoveryeducation.com/learn/techbook/units/3391ad2d-bceb-45dc-a68b-8fd21ab33671/concepts/c975df4b-055c-4fad-bfaf-d60967ae3b70/tabs/759da9a7-2edf-4cde-9515-7081ca990764

- Relationship between Photosynthesis and Cell Respiration
  - o https://app.discoveryeducation.com/learn/techbook/units/3391ad2d-bceb-45dc-a68b-8fd21ab33671/concepts/c975df4b-055c-4fad-bfaf-d60967ae3b70/tabs/759da9a7-2edf-4cde-9515-7081ca990764/pages/a52504cc-cdb2-48b4-b967-686722a81cec

Standards addressed: English Language Arts/Literacy

• Cite specific textual evidence to support the analysis of patterns found in the fossil record to document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth.
• Use scientific, precise details in the explanations.
• Integrate quantitative or technical information about the fossil record that is expressed in words into a version of that information expressed visually in the form of a flowchart, diagram, model, graph, or table.
• Write informative/explanatory text examining anatomical similarities and differences among modern organisms and between modern and fossil organisms and their fossil relationships. The text should convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
• Draw evidence from informational texts to support an analysis of, reflection on, and research about anatomical similarities and differences among modern organisms and between modern and fossil organisms used to infer evolutionary relationships.

Starting Points and Preparedness Groupings

Students will be tiered as determined by a data point systems the uses 3 points of data. Each tier group will be assigned a target level.

Data Measures used to Establish Baselines

2017-2018 Final Grade; weight (. 35)
Science Pre-Assessment; weight (.35)
Unit 1 Lab: weight (.30)

Preparedness Group	Baseline Score
Tier 1	< 0.35
Tier 2	0.35 – 0.55
Tier 3	0.55 – 0.75
Tier 4	>0.75

Student Growth Objective

By March 2019, 70% of students in each preparedness group will meet their assigned target command level for full attainment of the objective as shown in the scoring plan.

Preparedness Group (e.g. 1,2,3)	Number of Students in Each Group	Target Level of SGO Combined Assessments
Tier 1		2
Tier 2		3
Tier 3		4

Tier 4		4 or 5[1]

Scoring Plan
State the projected scores for each group and what percentage/number of students will meet this target at each attainment level. Modify the table as needed.

Preparedness Group	Student Target Command Level	Teacher SGO Score Based on Percent of Students Achieving Target Score			
		Exceptional (4) >80%	Full (3) 70-80%	Partial (2) 50-69%	Insufficient (1) <50%
Tier 1	2				
Tier 2	3				
Tier 3	4				
Tier 4	4 or 5[1]				

[1] **It is expected that students in Tier 4 maintain a level of strong command or grow to distinguished command.**

Approval of Student Growth Objective
Administrator approves scoring plan and assessment used to measure student learning.

Teacher _____ Signature_____	Date Submitted_____
Evaluator _____ Signature _____	Date Approved _____

Results of Student Growth Objective
Summarize results using weighted average as appropriate. Delete and add columns and rows as needed.

Preparedness Group	Students at Target Score	Teacher SGO Score	Weight (based on students per group)	Weighted Score	**Total Teacher SGO Score**
Tier 1					
Tier 2					
Tier 3					
Tier 4					

Notes
Describe any changes made to SGO after initial approval, e.g. because of changes in student population, other unforeseen circumstances, etc.

Review SGO at Annual Conference
Describe successes and challenges, lessons learned from SGO about teaching and student learning, and steps to improve SGOs for next year.

Teacher _____ Signature _____ Date _____

Evaluator _____ Signature _____ Date _____