Name	School	Grade	Course/Subject	Number of Students	Interval of Instruction
	Orange High School	9-12	Physics Content		September 2017 to March 2018

Standards, Rationale, and Assessment Method

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS – SCIENCE K-12

Rationale

Most systems or processes depend at some level on physical sub-processes that occur within it, whether the system in question is a star, Earth's atmosphere, a river, or a bicycle. Understanding a process at any scale requires awareness of the interactions occurring—in terms of the forces between objects, the related energy transfers, and their consequences. In this way, physics underlie natural and human created phenomena. An overarching goal for learning in physics, therefore, is to help students see that there are mechanisms of cause and effect in all systems and processes that can be understood through a common set of physical and principles. A lab-based/inquiry physics course is structured so that students actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas. The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. Students should have the opportunity to carry out scientific investigations and engineering design projects related to the disciplinary core ideas in physics (pp. 8-9, NRC, 2012).

Standards

UNIT I: Forces

HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-4 Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

UNIT 2: Energy

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

HS-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

HS-PS2-4 Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

UNIT III: Energy

HS-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

HS-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*

HS-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

UNIT 4: Heat and Thermodynamics

HS-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

Assessment Method
Authentic Assessments throughout the year will be used to measure students' growth (including Discovery Education Assessments and other NGSS-aligned assessments). The assessments will consist of selected content understanding tasks and performance tasks that reflect higher levels of cognitive complexity.

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
2015-2016 Final Grade; weight (. 35)
Science Pre-Assessment; weight (.35)
Labs; 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 2018, 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 Command Level on SGO Assessment Portfolio
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				

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.

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

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 _____