Next Generation Science Standards (Grades 9-12)

Performance Expectations www.seaperch.org

Legend

●	Standard addressed in **SeaPerch Build Guide**
○	Standard could be addressed by **additional activities during the SeaPerch build**
△	Standard could be met at a **SeaPerch competition**

Note: Only standards groups where at least one standard is met are included in the mapping below.

Matter & Its Interactions

Indicator	Indicator Statement	Addressed
HS - PS1-1	Use the periodic table as a model to prediect the relative properties of elmeents based on the patterns of electrons in th outermost level of atoms	
HS - PS1-2	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the period table, and knowledge of of patterns of chemical properites	
HS - PS1-3	Plan and construct an investigation to gather evidence to compare the structure of of substances at the bulk sale to infer the strength of electrical forces between particles	● ○
HS - PS1-4	Develop a model to illustrate the relase or absoration of energy from a chemical reaction system depends upon the changes in total bond energy.	○
HS - PS1-5	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on rate at which a reaction occurs	○
HS - PS1-6	Refine the design of a chemical system by specifing a change in conditions that would produce increased amounts of products at equilibrium.	
HS - PS1-7	Use matehmatical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction	○
HS - PS1-8	Develop models to illustrate the changes in the composition of the nuclues of the atom and ther energy released during the process of fission, fusion, and radioactive decay.	

Motion & Stability: Forces & Interactions

Indicator	Indicator Statement	Addressed
HS- PS2-1	Analyze the data to support the claim that Newton's second law of motion describes the mathmatical relationship amojng the net force of a macroscopic object, its mass, and its acceleration	
HS- PS2-2	Use matehmatical representations to support the claim that the total momentum of a system of objects is observed when there is no net force on the system.	○
HS- PS2-3	Apply scientific and engeenering 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 Coulombs Law to describe and predict the gravitational and electrostatic forces between objects	
HS- PS2-5	Plan and conduct in investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current	
HS- PS2-6	Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials.	

Waves

Indicator	Indicator Statement	Addressed
HS - PS4-1	Use mathematical representations to support a claim regarding relationships amoung the frequency, wavelength, and speed of waves traveling in various media.	○
HS - PS4-2	Evaluate questions about the advantages of using digital transmission and storage of information	○
HS - PS4-3	Evalaute the claims, evidence, and reasoning behind the idea that electromagentic radiation can be described either by a wave model or a particle model, and that for some situations on model is more useful than the other	○
HS - PS4-4	Evalaute the validity and reliabaility of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	○
HS - PS4-5	Communicate technical information about how some technological devices use the principle of way behavior and wave interactions with matter to transmit and capture information and energy.	○

Earth & Human Activity

Indicator	Indicator Statement	Addressed
HS- ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity	○
HS- ESS3-2	Evaluate competiting design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios	○
HS- ESS3-3	Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.	
HS- ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activites on natural systems	
HS- ESS3-5	Analayze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of golbal or regional climate change and associated future impacts to Earth's systems	
HS- ESS3-6	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	

Engineering Design

Indicator	Indicator Statement	Addressed
HS- ETS1-1	Analyze a major global challenge to specify qualitative and quantitatative criteria and constraints for solutions that account for societal needs and wants.	●○△
HS- ETS1-2	Design a solution to a complex real world problem by breaking it down in smaller, more managable probles that can be sovled through engineering.	●○△
HS- ETS1-3	Evaluate a solution to a complex real world probelm based on proritiezed criteria and trade-offs that account for a range of constraints, including cost, saftey, relatiability, and aesthetics, as well as possible social, cultural and enviormental impacts	●○△
HS- ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	●○△