Annual Sustainable Design Challenge

Next Generation Science Standards (NGSS)

The following is a list of high school (grade 9-12) NGSS that align with participation in the Sustainable Design Challenge. This list is not exhaustive nor will every standard listed apply to each participant. However, in the course of researching and designing a model the below standards are relevant.

Disciplinary Core Ideas	Performance Expectations
Energy	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.
Matter and Energy in Organisms and Ecosystems	HS-LS2-4 - Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
Interdependent Relationships in Ecosystems	HS-LS2-1 - Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. HS-LS2-6 - Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. HS-LS2-7 - Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. HS-LS4-6 - Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
Earth's Systems	HS-ESS2-2 - Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. HS-ESS2-5 - Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

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Weather & Climate	HS-ESS2-4 - Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. HS-ESS3-5 - Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
Human Sustainability	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 competing 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 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 activities on natural 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	HS-ETS1-1 - Analyze a major global challenge to specify qualitative and quantitative 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 into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental 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.