BIOLOGY		
NJSLS-S-HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics		
HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity		
Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.		
Assessment Boundary: N/A		
Evidence Statements: HS-LS2-7		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. **LS4.D: Biodiversity and Humans** Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (secondary) Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary) (Note: This Disciplinary Core Idea is also addressed by NJSLS-S-HS-LS4-6.) **ETS1.B: Developing Possible Solutions** When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (secondary)	**Stability and Change** Much of science deals with constructing explanations of how things change and how they remain stable.
Connections to other DCIs in this grade-band: HS.ESS2.D ; HS.ESS2.E ; HS.ESS3.A ; HS.ESS3.C		
Articulation of DCIs across grade-bands: MS.LS2.C ; MS.ESS3.C ; MS.ESS3.D		
NJSLS- ELA: RST.9-10.8, RST.11-12.7, RST.11-12.8, WHST.9-12.7		
NJSLS- Math: MP.2, HSN.Q.A.1, HSN.Q.A.2, HSN.Q.A.3		
5E Model		
HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity		

Engage Anticipitory Set	A CNN news document that allows the students to understand the last standing of the Northern White Rhino. Showing the students how global interactions can affect population sizes in the environment. http://www.cnn.com/videos/world/2015/07/29/northern-white-rhino-dead-near-extinction-orig.cnn
	The below video can be used as a Hook. Have students list invasive species worldwide and see how many they actually know https://www.youtube.com/watch?v=U4157GuG2WA "The 25 Most Invasive Species"
Exploration Student Inquiry	**https://www.teachengineering.org/activities/view/van_biomimicry_activity6** Use the worksheet to access the video link to the decline of bee populations (CCD) in the U.S. Students will later be asked to develop a plan to aid in their conservation. Create a graphic organizer that separates the three terms: endangered species, threatened species, and extinct species. Students must define the difference between each and research organisms in the state of N.J. that fall into each category.
Explanation Concepts and Pratices	In these lessons Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS2.C: Ecosystem Dynamics, Functioning, and Resilience Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. LS4.D: Biodiversity and Humans Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (secondary) Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary) (Note: This Disciplinary Core Idea is also addressed by NJSLS-S-HS-LS4-6.) ETS1.B: Developing Possible Solutions When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (secondary)
Elaboration Extension Activity	Students determine which factors to consider in deciding the fate of endangered species and prepare a short presentation on why the species should be preserved. https://www.populationeducation.org/content/ngss-lesson-plan-high-school-bye-bye-birdie http://www.njisst.org/fact-sheets.htm http://www.nj.gov/dep/njisc/Factsheets/ The N.J. Department of Wildlife offers a variety of information on various invasive species, where they are found and projects to prevent their spread.
Evaluation Assessment Tasks	

BIOLOGY

NJSLS-S-HS-ETS1-1 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.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: HS-ETS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. Analyze complex real-world problems by specifying criteria and constraints for successful solutions.	**ETS1.A: Defining and Delimiting Engineering Problems** Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities.	**Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.
Connections to other DCIs in this grade-band: Physical Science: HS-PS2-3, HS-PS3-3		
Articulation of DCIs across grade-bands: MS.ETS1.A		
NJSLS- ELA: RST.11-12.7, RST.11-12.8, RST.11-12.9		
NJSLS- Math: MP.2, MP.4		

BIOLOGY		
NJSLS-S-HS-ETS1-2 Engineering Design		
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.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: HS-ETS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	**ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed.	

Connections to other DCIs in this grade-band: Physical Science: HS-PS1-6, HS-PS2-3		
Articulation of DCIs across grade-bands: MS.ETS1.A ; MS.ETS1.B ; MS.ETS1.C		
NJSLS- ELA: N/A		
NJSLS- Math: MP.4		

BIOLOGY		
NJSLS-S-HS-ETS1-3 Engineering Design		
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.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: HS-ETS1-3		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	**ETS1.B: Developing Possible Solutions** When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	**Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.
Connections to other DCIs in this grade-band: Earth and Space Science: NJSLS-S-HS-ESS3-2, NJSLS-S-HS-ESS3-4 Life Science: NJSLS-S-HS-LS2-7, NJSLS-S-HS-LS4-6		
Articulation of DCIs across grade-bands: MS.ETS1.A ; MS.ETS1.B		
NJSLS- ELA: RST.11-12.7, RST.11-12.8, RST.11-12.9		
NJSLS- Math: MP.2, MP.4		