Course Title – Environmental Science

Implement start year – 2018-2019

Revision Committee Members, email, extension –

Sarah Moretti- smoretti@lrhsd.org Ext. 8400
Diane Kelly- dkelly@lrhsd.org Ext. 8288
Dane Reed- dreed@lrhsd.org Ext. 8438

Unit #1 , topic –Ecology

Transfer Goal –

Students will be able to independently use their learning to identify the importance of various species' interactions in ecosystems and their role as humans preserving biodiversity.

Stage 1 – Desired Results

Established Goals

www.nextgenerationscience.org
Next Generation Science Standards
HS. Interdependent Relationships in Ecosystems

HS-LS2-6 Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions.

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS2-8 Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.

21st Century Themes
(www.21stcenturyskills.org)

X_ Global Awareness
X___Financial, Economic, Business and Entrepreneurial Literacy
X___Civic Literacy
X___Health Literacy
X___Environmental Literacy

21st Century Skills

Learning and Innovation Skills:
X___Creativity and Innovation
X___Critical Thinking and Problem Solving
X___Communication and Collaboration

Information, Media and Technology Skills:
X___Information Literacy
X___Media Literacy
X___ICT (Information, Communications and Technology) Literacy

	Life and Career Skills: X___Flexibility and Adaptability X___Initiative and Self-Direction X___Social and Cross-Cultural Skills X___Productivity and Accountability X___Leadership and Responsibility
Enduring Understandings: *Students will understand that . . .* *EU 1* species' interactions form the structure of communities and ecosystems. *EU 2* life on Earth depends on interactions among all organisms and between organisms and their environment. *EU 3* humans play an active role in determining public policies that ensure the protection of Earth's systems.	**Essential Questions:** *EU 1* • How do communities and ecosystems differ? • How do species interact in nature? • How do organisms help or harm each other? *EU 2* • How do factors such as climate and topography categorize Earth's biomes? • How does the environment affect where and how an organism lives? • How do organisms adapt to the conditions of their biome? *EU 3* • Why is it important to create and implement environmental laws? • How can we best balance our own interests and needs with the health of the environment? • Should communities take legal actions to protect biodiversity?
Knowledge: *Students will know . . .* *EU 1* • levels of ecological organization. • the difference between biotic and abiotic factors. • how an organism's habitat relates to its survival. • relationships among predators and prey in an ecosystem.	**Skills:** *Students will be able to . . .* *EU 1* • identify biotic and abiotic factors in a given ecosystem. • identify how population growth has changed over time and how population density varies greatly from one region to another. • identify predators and prey from a given food web.

EU 2 • how limiting factors and biotic potential affect population growth. • how biomes are characterized. • how organisms adapt to their biomes. • the major categories of aquatic ecosystems. • the impact of invasive species on an established ecosystem. EU 3 • the components of biodiversity. • major causes of biodiversity loss. • federal and local agencies that drive environmental policy. • consequences of environmental policies.	EU 2 • identify limiting factors that inhibit population growth. • describe what factors are used to characterize biomes. • determines where a species lives on Earth. • label various aquatic environments. • recognize examples of invasive species. • give examples of the impacts of invasive species on an ecosytem. EU 3 • recognize the distinct biodiversity of a specific environment. (ie: Pine Barrens, LBI, Florida Everglades) • predict how human actions lead to biodiversity loss. • summarize impacts of environmental policies on local and global communities.

Stage 2 – Assessment Evidence

Recommended Performance Tasks:.

The student will take on the role of a Boy Scout working towards earning your Environmental Science Merit Badge and have recently identified the potential overpopulation of deer in the Pine Barrens. The student will research whether or not it is putting a strain on the biodiversity of the ecosystem. The student will prepare a visual and informative presentation for the National Council outlining the following:
-impacts of deer on their own population as well as other organisms within the community
-food web
-limiting factors that will naturally affect deer population growth
-how biodiversity of the ecosystem may change with continued overpopulation
-positive impacts of population control
-any current laws that impact deer hunting and habitat destruction
-human impacts
- additional strategies for controlling the deer population
(EU 1, EU 2, EU 3)

Other Recommended Evidence: *Tests, Quizzes, Prompts, Self-assessment, Observations, Dialogues, etc.*

- Tests/quizzes
- Labs and lab reports
- Models, graphs, diagrams (atoms, molecules, physical and chemical changes)
- Student reflection in journal
- Teacher observation during class discussion

Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: *Consider the WHERETO elements. Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

- Diagram your classroom and school population and community (A)
- Identify the ecological organization of a species of choice (A)
- T-Chart biotic and abiotic factors in an ecosystem (A)
- Explore the 4 methods of determining population size (A)
- List and diagram 3 limiting factors for population (A)
- Make flashcards of components of biodiversity (A)
- Match local and global organizations to their name and role (A)
- Use index cards to order "who eats who" in a food web (A)
- List specific adaptations a species has acquired to survive in their biome (A, M)
- Analyze favorite Disney movies for examples of species' interactions, biomes and predator/prey relationships (M)
- Identify local aquatic ecosystems and compare and contrast species in each (M)
- Explore salt as an abiotic factor. (M)
- Color a global map of the Earth's biomes (A, M)
- Outline local and global efforts to save endangered species (A, M)
- Compare and contrast single species versus habitat approaches to protect organisms and ecosystems (A, M)
- Draw an energy pyramid for an aquatic environment that contains four levels (A, M)
- State positive and negative points of different strategies that deal with overpopulation (A, M)
- Study the interactions that take place between biotic and abiotic factors in a model ecosystems (ie: fish tank). (A, M)
- Investigate areas outside your school to determine which area contains the greatest biodiversity. (T)
- Pretend you are an animal living in a given biome, explain chart your living conditions and adaptations needed to survive. (M)
- Share viewpoints on governmental approved methods of population control ie: culling of elephants (T)