



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Curriculum Development Timeline

School: Ocean Township High School

Course: Earth and Our Environment

Department: Science

Board Approval	Supervisor	Notes
August 2010	Patrick Sullivan	Update Standards
August 2013	Patrick Sullivan	Update Standards & Name Change from Earth Systems
December 2017	Patrick Sullivan	Update Standards
March 2019	Patrick Sullivan	Review
August 2022	Patrick Sullivan	Alignment to Standards
August 2024	Patrick Sullivan	Updated to include New State Mandates

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Township of Ocean Pacing Guide			
Week	Marking Period 1	Week	Marking Period 3
1	Introduction To Earth & Our Environment	11	Weather & Climate
2	Geological Time & Dating The Earth	12	Weather & Climate
3	Geological Time & Dating The Earth	13	Weather & Climate
4	Dynamic Earth	14	Human Impact On The Environment
5	Dynamic Earth	15	Human Impact On The Environment
Week	Marking Period 2	Week	Marking Period 4
6	Dynamic Earth	16	Human Impact On The Environment
7	Water Resources	17	Energy, Resources & The Future
8	Water Resources	18	Energy, Resources & The Future
9	Water Resources	19	Energy, Resources & The Future
10	Weather & Climate	20	Sustainable Development Project

Climate Change: Weather & Climate (NJSLS-S: HS-ESS3-5)

Core Instructional & Supplemental Materials including various levels of Texts

Textbook: Arms, Karen. Environmental Science. Austin: Holt Rinehart Winston, 2008. Print.
Online Textbook: CK-12. Earth Science Concepts for High School.

<https://www.ck12.org/book/CK-12-Earth-Science-Concepts-For-High-School/>

Lab activities: Health & Science Pipeline Initiative (HASPI). Earth Science Curriculum.

<http://www.haspi.org/haspi-curriculum.html>

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Digital Resources Across All Levels: (D=differentiated)

Edpuzzle (D)
Gizmo (D)
YouTube Videos
NOAA: <https://www.noaa.gov/>
New York Times Articles
PBS video clips
PhET Interactive Simulations (D)
Science News Articles
Ted Talks
Spartan Learning Library

Time Frame	1 Week
Topic	
Introduction To Earth & Our Environment	
<u>Alignment to Standards</u>	
HS-ESS2-2: Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes 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. HS-ESS2-6: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. HS-ESS2-7: Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	
Learning Objectives and Activities	
Learning Objectives: • Why should we study Earth and environmental sciences? • What are the major systems on Earth? • How are systems on Earth connected? • Human life is dependent on many of Earth's systems and understanding these interactions can lead to better societies • Some of the major natural systems of Earth are the atmosphere, geosphere, hydrosphere, cryosphere and biosphere	

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

- Earth consists of many interconnected systems, both natural and man-made, that all affect each other in ways that can be understood

Learning Activities:

- Lab safety bingo - learn where important safety equipment and other supplies are
- How carbonless copy paper works - use the scientific method to answer a seemingly simple question
- Scientific sketching - practice observation skills and recording visual information like a scientist
- Spheres of the environment research - read about the 5 major natural systems and how they interact
- How landfills work - set up a model of a landfill and make predictions about which materials will decompose, to be investigated again at the end of the semester

Assessments

Formative:

- Discussion during carbonless copy paper activity
- Scientific sketches
- Comprehension questions in spheres research
- Predictions during landfill set up

Summative:

- End of unit test - open ended
- Scenarios/examples of Earth's interconnected systems

Benchmark:

- Opening benchmark - skills

Alternative:

- Lab portfolio

Interdisciplinary Connections

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

Math

S.IC.B.5 (+) Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Technology Integration

Career Education

CRP-2: Students use knowledge and skills through their lab work.

CRP-12: Students work productively in collaborative groups using culturally global competence.

Time Frame

2 Weeks

Topic

Geological Time & Dating The Earth

[Alignment to Standards](#)

HS-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.

HS-ESS1-6: Apply scientific reasoning and evidence from ancient Earth materials, meteorites and other planetary surfaces to construct an account of Earth's formation and early history.

HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards and climate change have influenced human activity.

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Learning Objectives and Activities

Learning Objectives:

- How can we find the age of the Earth and other objects?
- Why do we study the Earth's history?
- What can we find out from studying rocks and fossils?
- Use various absolute and relative dating methods to find the age and study the history of Earth
- Studying the Earth's history can tell us about changes in the past and help predict future changes
- Scientists can use rocks and fossils to learn about evolution, extinction and climate change impacts

Learning Activities:

- Dendrochronology - discuss methods of dating, including relative dating; use model tree cores to find the age of a cabin
- Stratigraphic layers & the fossil record - use model drill cores to discover the laws of stratigraphy and superposition
- Radiometric dating with popcorn - discuss the difference between relative and absolute dating; model radioactive atoms in rocks using bags of popcorn, graph their results and calculate the "half-life" of popcorn
- Modeling the geological timescale - research major events in the history of Earth and work in small groups to create a timeline highlighting important changes in an assigned time period; group projects are combined and students do a poster walk to get info on the entire history of the Earth
- Human health in the fossil record - read articles and answer questions about evidence of human health problems, such as cancer, Lyme and childbirth in the fossil record; making the study of fossils feel more immediate and personal
- Newsela fossils jigsaw - read a current event about human fossils, then share that information with other groups

Assessments

Formative:

- Lab analysis questions (open ended)
- Geological timeline event card
- Fossil discussion
- Explain possible fossil locations/examples/scenarios

Summative:

- Unit test - open ended

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

- Placing geologic events in chronological order

Benchmark: N/A

Alternative:

- Lab portfolio

Interdisciplinary Connections

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

Math

S.IC.B.5 (+) Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

Career Readiness, Life Literacies, and Key Skills

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Technology Integration

Career Education

CRP-2: Students use knowledge and skills through their lab work.

CRP-12: Students work productively in collaborative groups using culturally global competence.

Time Frame

3 Weeks

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Topic

Dynamic Earth

Alignment to Standards

HS-ESS2-3: Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.

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 (i.e., climate change).

Learning Objectives and Activities

Learning Objectives:

- What is the structure of the Earth?
- How do changes in the Earth affect humans?
- How can we predict and minimize the effects of the changing Earth?
- The Earth is constantly changing due to its molten core and the tectonic plates that float on it
- Changes in Earth's crust can have effects on human society, including structural damage, health risks and social disruptions
- Use of science and engineering to anticipate and protect from those impacts

Learning Activities:

- Far-flung fossils - study model continents and the fossils found on various layers of them; use information gathered to support the theory of continental drift
- Tectonic plate movement WebQuest - gather data on tectonic plate movement on various interactive websites
- Building Pangea Gizmo - use an online simulation to recreate Pangea using multiple forms of evidence (fossils, glacial scars, rock types)
- Cosmos: Lost Worlds of Planet Earth - answer comprehension questions while watching the episode of the popular science mini-series; then reflect by answering an open ended question (episode connects fossils, mass extinctions and plate tectonics)
- Plate tectonics Gizmo - use an online simulation to research what happens at different types of plate boundaries; record findings in a handout
- Modeling convection currents - construct a model of the Earth's mantle with a hot spot and explain the movement of model "crust" above
- Seafloor spreading model - use paper strips with colored "magnetic stripes" to model how seafloor spreading happens and causes tectonic plate movement
- Earthquake epicenter Gizmos - use an online simulation to model how scientists use

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

the different speeds of P and S waves to find the epicenter of an earthquake; discuss reasons why it would be useful to know the epicenter

- Earthquake safe buildings - discuss the problems faced when building in an earthquake zone; work as a team to design, build and test an earthquake-safe building using only limited materials then reflect on the engineering process

Assessments

Formative:

- Lab analysis questions
- Gizmo screenshots and handouts - plate tectonics and earthquake epicenters
- Cosmos video questions
- Convection currents model
- Seafloor spreading model

Summative:

- Unit test - open ended
- Compare/contrast earthquakes from around the Earth

Benchmark: N/A

Alternative:

- Lab portfolio
- Design and construct an earthquake safe structure

Interdisciplinary Connections

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

Math

S.IC.B.5 (+) Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant..

Career Readiness, Life Literacies, and Key Skills

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Technology Integration
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
Career Education
CRP3: Analyze how economic conditions and societal changes influence employment trends and future education. (Engineering/Design)

Time Frame	3 Weeks
Topic	
Water Resources	
Alignment to Standards	
HS-LS4-6: Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. HS-ESS3-2: Evaluate competing design solutions for developing, managing and utilizing energy and mineral resources based on cost-benefit ratios. HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.	
Learning Objectives and Activities	
<u>Learning Objectives:</u> • Why is water considered a natural resource? • How do our everyday choices affect water resources? • Water is a finite resource that all human societies depend on • Our choices about how we use and pollute water today will impact how we are able to use water resources in the future • Shortages of clean freshwater can lead to problems with human health, politics and economics <u>Learning Activities:</u> • Water pollution - add various types of pollution to pond water samples and see how each one may contribute to changes in the biotic and abiotic factors in the pond	

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

(eutrophication)

- Modeling the water cycle using food coloring to represent pollution; discuss how the water cycle works and how pollution may or may not be included in it
- Blue Gold documentary - view film about the coming freshwater crisis; answer discussion questions about each part then participate in a class discussion about why there is a crisis and how we can work to avert it
- Make a groundwater model - read information about ground water then design and build a model aquifer; use model to study how pollution moves through an aquifer and how groundwater pumping affects the water table
- Water quality & human health - read about common water pollutants and their human health effects; test local surface water for some of these contaminants and make brochures warning the public about possible health problems in our area
- Design and build the most effective water filter using limited materials
- Ocean acidification - examine what happens to the pH of ocean water when CO₂ is absorbed; examine what happens to shelled organisms when they are exposed to more acidic environments
- Bio-magnification activity - model an aquatic ecosystem with "DDT" in the water; tag each other to represent predation then analyze how the toxin moves up the food chain and is magnified on the way

Assessments

Formative:

- Lab analysis questions
- Links between water quality and health of organisms
- Groundwater models
- Water filters

Summative:

- Unit test - open ended

Benchmark: N/A

Alternative:

- Lab portfolio
- Water Purification Project

Interdisciplinary Connections

ELA





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

W.IW.11-12.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

9.4.12.IML.8: Evaluate media sources for point of view, bias and motivations (e.g., NJSLA.R6, 7.1.AL.IPRET.6).

Career Education

CRP3: Analyze how economic conditions and societal changes influence employment trends and future education. (Discuss future economies, societies and jobs based on using up resources)

Time Frame

4 Weeks

Topic

Weather & Climate

[Alignment to Standards](#)

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-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations and biodiversity.

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.

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Learning Objectives and Activities

Learning Objectives:

- What is the difference between weather and climate?
- How are human actions affecting climate?
- What can we do about our changing climate?
- Weather is the result of complex systems interacting, while climate is the long term average of weather interactions.
- Human activities such as manufacturing, transportation, agriculture and generating electricity release carbon dioxide and may change our climate.
- We can use science and engineering to study, reduce and deal with the effects of climate change.

Learning Activities:

- Graphing weather and climate - practice using graphing software (Google Sheets) while making graphs comparing local average temperatures (climate) and observed temps (weather); discuss the difference between climate and weather and how they are connected
- Unequal heating & regional climate - design experiment comparing the rate of heating of different types of material found on earth's surface (SW, FW, sand, soil, blacktop, etc); discuss how different rates may affect local weather and climate; reflect on the process of designing an experiment
- Greenhouse Gases Model - model the greenhouse effect with different gases and draw correlations between the amount of CO₂ in the atmosphere and our changing climate
- Greenhouse Effect Gizmo - manipulate a model atmosphere and monitor the heat in, heat out and temperature of the system
- Climate & health - read articles and answer questions about the connection between climate change and human health
- Twister Dashboard - use an interactive map to research the occurrence of tornadoes in the US then examine the data to determine the ideal conditions that produce tornadoes
- Hurricane research - examine hurricane, sea surface and climate data then draw conclusions about the relationship between a warming climate and number and severity of hurricanes
- Hurricane Sandy Activity - examine the conditions that led to the formation of Hurricane Sandy and discuss the factors that contributed to the huge amount of damage caused by it; research and build a working model of one proposed solution to protect the NYC area before the next "Superstorm"; explain and demonstrate the model to the class

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Assessments

Formative:

- Lab analysis questions
- Weather & climate graphs
- Hurricane data maps & graphs
- Hurricane protection models
- Climate change scenarios

Summative:

- Unit test - open ended

Benchmark: N/A

Alternative:

- Lab portfolio
- Present Climate Change Mitigation Strategies

Interdisciplinary Connections

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

Math

S.IC.B.5 (+) Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

ELA Climate Change

RI.CT.11–12.8. Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements.

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

ELA Math

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

Career Readiness, Life Literacies, and Key Skills

9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political, economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).

Technology Integration

Career Education

CRP-2: Students use knowledge and skills through their lab work.

CRP-12: Students work productively in collaborative groups using culturally global competence.

Time Frame

3 Weeks

Topic

Human Impact On The Environment

[Alignment to Standards](#)

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 (i.e., climate change).

Learning Objectives and Activities

Learning Objectives:

- How do human activities impact the environment?

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

- How are human systems like society and economics connected to the natural system?
- How can we reduce the impact of human activities?
- Our everyday activities and use of resources impact the environment in many ways, both negative and positive
- Cultural and political values as well as economic choices can influence the way people treat the environment on a large scale
- We can make choices that will reduce society's impact on the environment

Learning Activities:

- 11th Hour Documentary Project - view the documentary then work in small groups to explain how various seemingly unrelated topics actually have a huge effect on the environment and each other
- Calculating your ecological footprint - students use an interactive website to calculate their impact on earth's resources then discuss ways they individually and we, as a culture, can reduce our impact
- Plastic website review - visit various websites that discuss the pros and cons of plastics and write reviews of each (they are reminded to be aware of bias on each page)
- Addicted To Plastic documentary - view and answer discussion questions
- Plastic discussion (student directed) - pros and cons of plastics based on both their research and the film

Assessments

Formative:

- Lab analysis questions
- Notes from videos (11th Hour and Addicted To Plastic)
- Plastic website review write-up
- Plastic discussion participation
- Examples of positive/negative actions on the environment

Summative:

- Quiz (open ended)

Benchmark: N/A

Alternative:

- Presentation on human-natural systems connection
- Debate on pros and cons of plastic

Interdisciplinary Connections

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

W.AW.11-12.1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

ELA Climate Change

RI.CT.11–12.8. Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements.

ELA Math

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source and relevance of information, in media, data, or other resources (e.g., NJSLA.W8, Social Studies Practice: Gathering and Evaluating Sources).

Career Education

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

CRP-2: Students use knowledge and skills through their lab work.

CRP-12: Students work productively in collaborative groups using culturally global competence.

Time Frame	3 Weeks
Topic	
Energy Resources & The Future	
Alignment to Standards	
HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations and biodiversity.	
Learning Objectives and Activities	
<u>Learning Objectives:</u> • What are natural resources and why are they important? • What are the differences between renewable and nonrenewable resources? • How can we build a sustainable society for the future? • Society depends on natural resources such as plants and animals for food, clean air, clean water and fossil fuels for energy • We are using fossil fuels and other limited resources at an unsustainable rate • Science, economics and society can come together and plan ways to make our society more sustainable	
<u>Learning Activities:</u> • Distribution of Natural Resources Map - analyze data from a set of interactive maps; identify correlations between the distribution and use of various natural resources and overall well being of the human population • Green Energy Sales Pitch - work in small groups to choose and research a type of renewable energy; pair with another group and make a presentation about why their energy source is the best for our future (rest of class votes on which group was more convincing) • Hydroelectric Power Challenge - construct a model water wheel and use it to explain how kinetic energy can be converted into mechanical energy/electricity; design an experiment to determine how different variables affect the energy output (height/speed of water, etc.) • Overfishing and sustainability - students act as fishers whose living depends on	

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

"fishing" for popcorn and discover what is currently happening to many fisheries around the world, in a modern "tragedy of the commons"; discuss ways to make fisheries more sustainable and extrapolate to other common resources (e.g., water, air)

Assessments

Formative:

- List and describe various examples of "green energy"
- Explain how "sustainable" actions can protect the Earth
- Class discussions
- Exit tickets

Summative:

- Open-ended assessment on renewable energy

Benchmark:

-

Alternative:

- Playing It Cool Energy Marketplace - model an energy marketplace and discover how production costs and profit margins are related to the amount of renewable energy sold/used; examine how things like government subsidies and civil unrest can affect energy prices

Interdisciplinary Connections

ELA

W.IW.11-12.2. Write informative/explanatory texts (**including the narration of historical events, scientific procedures/ experiments, or technical processes**) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

L.VL.11-12.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, including technical meanings, choosing flexibly from a range of strategies.

W.AW.11-12.1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Career Readiness, Life Literacies, and Key Skills

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Technology Integration

Career Education

CRP-2: Students use knowledge and skills through their lab work.

CRP-12: Students work productively in collaborative groups using culturally global competence.

Time Frame

1 Week

Topic

Sustainable Development Project

Alignment to Standards

Reinforces all standards covered in previous units

Learning Objectives and Activities

Learning Objectives:

- How can we apply the concepts of sustainability to future design and development?
- All of the topics covered this semester are interconnected
- By applying these course topics on both large and small scale, we can make a sustainable future

Learning Activities:

- Sustainable Development Project - Students work independently to design the best development for a local plot of land. Topics that must be addressed include:
 - economic and social benefits
 - effect on local water/air pollution
 - effect on the groundwater
 - type(s) of energy that will be used

Assessments

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

Formative:

- Graphic organizer with daily progress (brainstorming, researching, writing and designing model)

Summative:

- Digital work
- Presentation of visual model

Benchmark:

- Final benchmark - skills
- Digital work is final benchmark - content

Alternative:

- Project - digital, model and presentation

Interdisciplinary Connections

See previous units

Career Readiness, Life Literacies, and Key Skills

See previous units

Technology Integration

See previous units

Career Education

See previous units

Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: **Science**

COURSE: **Earth and Our Environment**

- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns

Home of the Spartans!
#spartanlegacy

