EGG HARBOR TOWNSHIP PUBLIC SCHOOLS
CURRICULUM

COLLEGE PREP (CP) CORE SCIENCE
High School

Length of Course:	Full Year
Elective / Required:	Refer to Program of Studies
Schools:	High School
Student Eligibility:	Grades 10-12
Credit Value:	5 credits
Date Submitted:	September 2016
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DISTRICT MISSION STATEMENT

Our mission in the Egg Harbor Township School District is to partner with the student, family, school, and community to provide a safe learning environment that addresses rigorous and relevant 21st Century standards and best practices which will develop academic scholarship, integrity, leadership, citizenship, and the unique learning style of students, while encouraging them to develop a strong work ethic and to act responsibly in their school community and every day society.

SCIENCE – PHILOSOPHY

We believe that ALL students regardless of race, ethnicity, socio-economic status, religious background, and/or any other classification are deserving of a holistic science education. This holistic approach would include an education that will allow them to fully discover themselves, their strengths and weaknesses, and benefit from science instruction.

> Scientific literacy assumes an increasingly important role in the context of globalization. The rapid pace of technological advances, access to an unprecedented wealth of information, and the pervasive impact of science and technology on day-to-day living require a depth of understanding that can be enhanced through quality science education. In the 21st century, science education focuses on the practices of science that lead to a greater understanding of the growing body of scientific knowledge that is required of citizens in an ever-changing world (NJCCCS-Science).

Science curricula are designed to reinforce 21st Century Learning, to maximize rigor, relevance, and relationships, and to engage students individually through differentiated instruction.

SCIENCE - STATEMENT OF PURPOSE

Education exists for the purpose of enabling each individual to realize and maintain her/his full potential. Scientifically literate students possess the knowledge and understanding of scientific concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

> Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts,

learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering (NJSLS-Science)

All students engage in science experiences that promote the ability to ask, find, or determine answers to questions derived from natural curiosity about everyday things and occurrences. The underpinning of the revised standards lies in the premise that science is experienced as an active process in which inquiry is central to learning and in which students engage in observation, inference, and experimentation on an ongoing basis, rather than as an isolated a process. When engaging in inquiry, students describe objects and events, ask questions, construct explanations, test those explanations against current scientific knowledge, and communicate their ideas to others in their community and around the world. They actively develop their understanding of science by identifying their assumptions, using critical and logical thinking, and considering alternative explanations (NJCCCS-Science).

Our school district provides an extensive science program, which will enable students to succeed and compete in the global marketplace using the New Jersey Student Learning Standards in Science as well as the Next Generation Science Standards.

INTRODUCTION

The most precious resource teachers have is time. Regardless of how much time a course is scheduled for, it is never enough to accomplish all that one would like. Therefore, it is imperative that teachers utilize the time they have wisely in order to maximize the potential for all students to achieve the desired learning.

High quality educational programs are characterized by clearly stated goals for student learning, teachers who are well-informed and skilled in enabling students to reach those goals, program designs that allow for continuous growth over the span of years of instruction, and ways of measuring whether students are achieving program goals.

THE EGG HARBOR TOWNSHIP SCHOOL DISTRICT CURRICULUM TEMPLATE

The Egg Harbor Township School District has embraced the backward-design model as the foundation for all curriculum development for the educational program. When reviewing curriculum documents and the Egg Harbor Township curriculum template, aspects of the backward-design model will be found in the stated enduring *understandings/essential questions, unit assessments,* and *instructional activities*. Familiarization with backward-design is critical to working effectively with Egg Harbor Township's curriculum guides.

GUIDING PRINCIPLES: WHAT IS BACKWARD DESIGN?
WHAT IS UNDERSTANDING BY DESIGN?

"Backward design" is an increasingly common approach to planning curriculum and instruction. As its name implies, "backward design" is based on defining clear goals, providing acceptable evidence of having achieved those goals, and then working 'backward' to identify what actions need to be taken that will ensure that the gap between the current status and the desired status is closed.

Building on the concept of backward design, Grant Wiggins and Jay McTighe (2005) have developed a structured approach to planning programs, curriculum, and instructional units. Their model asks educators to state goals; identify deep understandings, pose essential questions, and specify clear evidence that goals, understandings, and core learning have been achieved.

Programs based on backward design use desired results to drive decisions. With this design, there are questions to consider, such as: What should students understand, know, and be able to do? What does it look like to meet those goals? What kind of program will result in the outcomes stated? How will we know students have achieved that result? What other kinds of evidence will tell us that we have a quality program? These questions apply regardless of whether they are goals in program planning or classroom instruction.

The backward design process involves three interrelated stages for developing an entire curriculum or a single unit of instruction. The relationship from planning to curriculum design, development, and implementation hinges upon the integration of the following three stages.

Stage I: Identifying Desired Results: Enduring understandings, essential questions, knowledge and skills need to be woven into curriculum publications, documents, standards, and scope and sequence materials. Enduring understandings identify the "big ideas" that students will grapple with during the course of the unit. Essential questions provide a unifying focus for the unit and students should be able to answer more deeply and fully these questions as they proceed through the unit. Knowledge and skills are the *"stuff"* upon which the understandings are built.

Stage II: Determining Acceptable Evidence: Varied types of evidence are specified to ensure that students demonstrate attainment of desired results. While discrete knowledge assessments (e.g.: multiple choice, fill-in-the-blank, short answer, etc…) will be utilized during an instructional unit, the overall unit assessment is performance-based and asks students to demonstrate that they have mastered the desired understandings. These culminating (summative) assessments are authentic tasks that students would likely encounter in the real-world after they leave school. They allow students to demonstrate all that they have learned and can do. To demonstrate their understandings students can explain, interpret, apply, provide critical and insightful points of view, show empathy and/or evidence self-knowledge. Models of student performance and clearly defined criteria (i.e.: rubrics) are provided to all students in advance of starting work on the unit task.

Stage III: Designing Learning Activities: Instructional tasks, activities, and experiences are aligned with stages one and two so that the desired results are obtained based on the identified

evidence or assessment tasks. Instructional activities and strategies are considered only once stages one and two have been clearly explicated. Therefore, congruence among all three stages can be ensured and teachers can make wise instructional choices.

At the curricular level, these three stages are best realized as a fusion of research, best practices, shared and sustained inquiry, consensus building, and initiative that involves all stakeholders. In this design, administrators are instructional leaders who enable the alignment between the curriculum and other key initiatives in their district or schools. These leaders demonstrate a clear purpose and direction for the curriculum within their school or district by providing support for implementation, opportunities for revision through sustained and consistent professional development, initiating action research activities, and collecting and evaluating materials to ensure alignment with the desired results. Intrinsic to the success of curriculum is to show how it aligns with the overarching goals of the district, how the document relates to district, state, or national standards, what a high quality educational program looks like, and what excellent teaching and learning looks like. Within education, success of the educational program is realized through this blend of commitment and organizational direction.

INTENT OF THE GUIDE

This guide is intended to provide teachers with course objectives and possible activities, as well as assist the teacher in planning and delivering instruction in accordance with the New Jersey Core Curriculum Content Standards. The guide is not intended to restrict or limit the teacher's resources or individual instruction techniques. It is expected that the teacher will reflectively adjust and modify instruction and units during the course of normal lessons depending on the varying needs of the class, provided such modified instruction attends to the objectives and essential questions outlined below.

N.J.A.C. 6A:8-3.1 Required Curriculum Components

Code Language	Evident in Curriculum YES/NO	Comments
Interdisciplinary Connections	**Yes**	**Via lab activities. STEM units in development 1 per marking period**
A pacing guide	**Yes**	**By Unit approximately 2-4 units per marking period**
A list of core instructional materials, including various levels of text at each grade level	**Yes**	**Suggested Activities Labs**
Benchmark assessments	**Yes**	**Teacher-developed and common via pre/post and benchmark assessments**
Modifications for special education students, for ELLs in accordance with N.J.A.C. 6A:15, and for gifted students. (As appropriate) – See Appendix A	**Yes**	**As directed by student's Individual Education Plan**

Unit Name: Anatomy **Time Frame: Seven Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to identify the structure and function of the human body as well as how the body maintains homeostasis. This unit will focus on the complex nature of the human body and how each system interacts with the other systems in the body.

UNIT RESOURCES- Biology Textbook- Ch 30 Digestive and Excretory Systems, Ch 31 Nervous System, Ch 32 Skeletal, Muscular and Integumentary Systems, Ch 33 Circulatory and Respiratory Systems, Ch 35 Immune System and Disease; Student Kept Binders, Laboratory Assignments, Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND STANDARDS-

HS-LS1-3 **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.**

The goal of this unit is for the students to understand that the human body is complex and has a specific structure and function and that the body needs to maintain homeostasis in order to function correctly.

ENDURING UNDERSTANDINGS

The big idea for this unit is that the human body is characterized by a specific organization and maintains homeostasis. The systems of the body that will be focused on in this unit are the digestive, excretory, nervous, skeletal, muscular, circulatory, and respiratory and immune systems. Each organ in each system will be discussed and the function will be analyzed. The students may not know each organ in the human body and where it is located.

ESSENTIAL QUESTIONS

1. What are the anatomical and physiological properties of the human body?
2. How do the body systems interact to maintain homeostasis?

KNOWLEDGE AND SKILLS

Content: Vocabulary- tissue, homeostasis, calorie, enzyme, senses, esophagus, mouth, stomach, small intestine, gallbladder, large intestine, liver, trachea, neurons, brain, spinal cord, axon, dendrite, muscle, bones, heart, vein, aorta, blood, antigens, antibodies, allergy

Skills:

Draw and label organs of the following systems: digestive, circulatory, respiratory, immune, skeletal, and nervous

Identify the four levels of organization in the human body

Identify the nutritional value of different types of food

Label a neuron and how information is transmitted through the body

Identify how our senses work

Explain how movement can occur in the human body

Identify how the human body protects itself from disease

Explain how oxygen is moved through the body

Identify the four major blood types and who can donate to whom

STAGE TWO

PERFORMANCE TASKS

- Use a food label to identify the nutritional value of a particular food

- Draw and label a foldable for the digestive system

- Use synthesized chemicals to show how food is digested in the body

- Complete a coloring of the different organs of the brain

- Draw and label all of the sense organs in the body

- Complete a lab on optical illusions

- Dissect an owl pellet and show comparisons between the human anatomy

- Label the bones in the human body

- Investigate a crime scene using evidence

- Identify which blood types cannot be mixed using a lab demonstration

- Watch and analyze the movie contagion and how the disease can be spread throughout the human population

- Complete case study on our immune system

OTHER EVIDENCE

- Quiz on digestive system
- Quiz on circulatory system
- Test on the nervous system
- Project on immune system
- Quiz on the skeletal system

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use real life examples and synthesized chemicals to help show how the human body maintains its homeostasis. There will also be a study guide provided for the test and a quiz. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. The students have in the past struggled with the amount of vocabulary in this unit so it will be broken down into smaller blocks so that it can be more easily retained.

Unit Name: Meteorology **Time Frame: Six Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to identify what causes climate locally and globally. The students will also look at the effect of storms. They will also identify the layers of the atmosphere and how the sun affects life on earth.

UNIT RESOURCES- Earth Science Textbook – Ch. 1 Nature of Science, Ch. 11 Atmosphere, Ch. 12 Meteorology, Ch. 13 Nature of Storms; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND 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-ESS3-5 **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.**

The goal of this unit is for the students to realize that our planet is a dynamic system that is consistently changing.

ENDURING UNDERSTANDINGS

The big idea for this unit is that climate is a result of the interaction of a number of factors. The atmosphere is one of the most influential factors. Energy in the atmosphere can result in damaging storms. The misunderstanding coming into class may be that weather is only a result of local factors and not of global factors.

ESSENTIAL QUESTIONS

1. How is weather studied and analyzed?
2. How do the layers of the atmosphere affect the Earth's surface?
3. How do storm systems form?
4. What causes climate?

KNOWLEDGE AND SKILLS

Content: Vocabulary- Troposphere, Stratosphere, Mesosphere, Thermosphere, exosphere, dew point, Air pressure, Humidity, Fronts, Radiation, Anemometer, Flood, Cumulus, Stratus, Cirrus, weather, climate, thermometer, barometer, Thunderstorm (4 types), Tornado, stepped leader, return stroke, downburst, supercell, Fujita tornado intensity scale, eye, eyewall, Saffir-Simpson hurricane scale. storm surge, tropical cyclone, cold wave, drought, heat wave, wind chill index, air mass, source region, Coriolis effect, jet stream, polar easterlies, prevailing westerlies, trade winds, Doppler effect,

hygrometer, radiosonde, analog forecast, digital forecast, isobar, isotherm, station model, conduction, convection, latent heat, saturation, temperature inversion, relative humidity, coalescence, condensation nucleus, precipitation, orographic lifting

Skills:

Name the six layers of the atmosphere and determine how the temperature varies in each layer

Identify greenhouses gases and how this could affect the climate of the Earth

Identify how solar energy is absorbed by the atmosphere

Compare and contrast cold and warm air characteristics

Name the properties of the four types of clouds and how clouds are formed

Name the properties of cold fronts and properties of warm fronts.

Identify how major storms affect an area and how they are formed

Identify how weather systems are analyzed and measured

STAGE TWO

PERFORMANCE TASKS

Design an experiment using the steps of the scientific method

Draw out layers of the atmosphere and complete lab on temperature change in the atmosphere

Read and analyze a weather map

Complete computer based weather predictions based off of current weather patterns

Build a model on a hurricane and identify the path of a tornado

Climates:

- biomes research project/ presentation

- Planet Earth Pole to Pole

OTHER EVIDENCE

-Test on Chapter 1, 11, 12 and 13

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use computer and paper based models to analyze weather patterns. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. Students may need more time on understanding global weather patterns.

Unit Name: Surface Processes on Earth Time Frame: Eight Cycles (4 days each)

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to identify what causes the Earth's surface to change. They will also explain how water moves on the Earth's surface and how groundwater moves and is stored under the Earth's surface.

UNIT RESOURCES- Earth Science Textbook – Ch. 7 Weathering, Erosion and Soil, Ch. 8 Mass Movements, Wind and Glaciers, Ch.9 Surface water, Ch. 10 Groundwater; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND STANDARDS-

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.**

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.**

The goal of this unit is for the students to realize that our planet is a dynamic system that is consistently changing. And to understand the impact humans are having on this system.

ENDURING UNDERSTANDINGS

The big idea for this unit is that the Earth's surface is changed by a variety of factors including gravity, wind, glaciers and water. Water moves not only on the Earth's surface but underneath the ground and can be stored underneath the ground. The misunderstanding coming into class may be that the earth has not changed in appearance since it was formed when in reality it is continually changing.

ESSENTIAL QUESTIONS

1. What are factors that change the Earth's surface?
2. How does groundwater form?

3. How is groundwater stored?

KNOWLEDGE AND SKILLS

Content: Vocabulary- chemical weathering, exfoliation, frost wedging, mechanical weathering, oxidation, weathering, deposition, erosion, gully erosion, rill erosion, residual soil, soil, soil horizon, soil profile, transported soil, avalanche, creep, landslide, mass movement, mudflow, slump, abrasion, deflation, dune, loess, ventifact, cirque, continental glacier, drumlin, esker, glacier, kame, kettle, moraine, outwash plain, valley glacier, bed load, discharge, divide, flood, floodplain, runoff, suspension, watershed, base level, delta, meander, rejuvenation, stream bank, stream channel, eutrophication, lake, wetland, aquiclude, aquifer, geyser, hot spring, infiltration, permeability, spring, water table, zone of aeration, zone of saturation, cave, karst topography, sinkhole, stalactite, stalagmite, artesian well, drawdown, recharge, well

Skills:

Define weathering and erosion and how it affects the Earth's surface

Name the soil layers found on Earth and how each layer is formed

Identify how mass movements, wind and glaciers affect the Earth's surface

Identify what surface water is, how it moves and what forms on the Earth's surface as a result of surface water movement

Name the stages of the water cycle and how water is stored in the ground.

Explain how water supply demands affect the human population on Earth

STAGE TWO

PERFORMANCE TASKS

Color me a watershed (project wet)

Common water (project wet)

Stream table

Draw out soil layers

Use a soil profile triangle

Identify composition of a soil sample

Draw a diagram of the water cycle

Model the water cycle

Debate a case study of water pollution

Watch a video on Emperor Penguins

OTHER EVIDENCE

-Test on Chapter 7, 8, 9 and 10

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use models to show how weathering and erosion affects the Earth's surface. Also the students will use actual soil samples to identify the soil layers. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. Students may need more time to focus on the Earth's movements.

Unit Name: Composition of Earth **Time Frame: Six Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to determine the differences among the different types of rocks on Earth as well as the uses for rocks and minerals.

UNIT RESOURCES- Earth Science Textbook – Ch. 4 Minerals Ch. 5 Igneous Rocks, Ch.6 Sedimentary and Metamorphic Rocks; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND STANDARDS-

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

The goal of this unit is for the students to realize that our planet is a dynamic system that is consistently changing.

ENDURING UNDERSTANDINGS

The big idea for this unit is that there are 4 types of rocks that are composed of different types of minerals and that our planet is dynamic. The students should be able to list and identify different types of rocks and at least ten types of minerals. The misunderstanding coming into class may be that the earth has not changed in appearance since it was formed when in reality it is continually changing.

ESSENTIAL QUESTIONS

1. How are minerals used in everyday life?
2. How are igneous rocks formed?
3. Do preexisting rocks change form?

KNOWLEDGE AND SKILLS

Content: Vocabulary- cleavage, crystal, fracture, hardness, luster, mineral, specific gravity, streak, gem, ore, silicate, tetrahedron, Bowen's reaction series, fractional crystallization, igneous rock, lava, partial melting, basaltic rock, extrusive rock, granitic rock, intrusive rock, kimberlite, pegmatite, porphyritic texture, texture, vesicular texture

Skills:

Define what a mineral is and how minerals form

Classify minerals passed on their properties

Identify different groups of minerals

Summarize igneous rock formations

Describe the composition of magma

Classify different types and textures of igneous rocks

Describe some uses of igneous rocks

Explain the process of lithification

Describe the types of clastic sedimentary rocks

Compare and contrast the different types and causes of metamorphism

Analyze the rock cycle

STAGE TWO

PERFORMANCE TASKS

Identifying rocks

Draw out the rock cycle

Model the rock cycle

OTHER EVIDENCE

-Test on Chapter 4,5,6

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use the rock cycle to identify what types of rocks are found on Earth. Also the students will use actual minerals to identify the properties of minerals. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. Students may need more time understand the process of igneous rock formation.

Unit Name: The Dynamic Earth **Time Frame: Eight Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to determine how geologic activity affects the formation of the Earth and structures found on the Earth.

UNIT RESOURCES- Earth Science Textbook – Ch. 17 Plate Tectonics, Ch.18 Volcanism, Ch.19 Earthquakes, Ch. 20 Mountain Building; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND 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.**

The goal of this unit is for the students to realize that our planet is a dynamic system that is consistently changing.

ENDURING UNDERSTANDINGS

The big idea for this unit is that geologic activity usually occurs at plate boundaries. This then causes volcanoes to form as well as earthquakes to occur. Mountains also form from movements of tectonic plates. The misunderstanding coming into class may be that mountains were formed when the Earth was formed and also that no new mountain chains can form.

ESSENTIAL QUESTIONS

1. What happens at plate boundaries?
2. How do volcanoes form?
3. How do earthquakes form?

4. What causes mountains to form?

KNOWLEDGE AND SKILLS

Content: Vocabulary- continental drift, Pangaea, isochron, magnetic reversal, magnetometer, paleomagnetism, sea floor spreading, convergent boundary, divergent boundary, rift valley, subduction, tectonic plate, transform boundary, ridge push, slab pull, caldera, cinder cone, composite volcano, conduit, crater, fissure, flood basalt, hot spot, shield volcano, vent, volcanism, pyroclastic flow, tephra, viscosity, batholith, dike, laccolith, pluton, sill, stock, elastic deformation, epicenter, fault, focus, plastic deformation, primary wave, secondary wave, seismic wave, strain, stress, seismogram, seismometer, amplitude, magnitude, modified Mercalli scale, Richter scale, seismic gap, tsunami, isostasy, isostatic rebound, root, topography, compressive force, orogeny, fault- block mountain, plateau, uplifted mountain

Skills:

Discuss what continental drift is and why it was not accepted at first as a theory

Summarize the evidence that the seafloor is spreading

Describe how Earth's tectonic plates result in many geologic features

Explain the process of convection

Describe how plate tectonics influences the formation of volcanism

Identify the major part of a volcano

Explain how magma type influences volcanic activity

Distinguish among the three types of movements of faults

Describe how a seismometer works

Compare and contrast earthquake magnitude and intensity and the scales to measure each

Describe how Earth's crust responds to the addition and removal of mass

STAGE TWO

PERFORMANCE TASKS

Making Straws Safe from the Shake- building structures that are earthquake ready

Case studies involving mountain ranges

Build a volcano

Modeling plate boundaries

Case study: Krakatoa

OTHER EVIDENCE

-Test on Chapter 17,18,19 and 20

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use models to show how tectonic plates affect formations on the Earth's surface. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. Students may need more time to understand how mountains are formed.

Unit Name: Geologic Time **Time Frame: Two Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to have the students understand that over time change has occurred in the continents, the oceans and life itself. The students will gain the knowledge of how the Earth is studied from the beginning of time and what scientists use to put together a geologic time scale.

UNIT RESOURCES- Earth Science Textbook – Ch.21 Fossils and the Rock Record, Ch 22 The Precambrian Earth, Ch 23 The Paleozoic, Mesozoic, and Cenozoic Eras; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND STANDARDS-

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.**

HSS-ESS2-7 **Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.**

The goal of this unit is for the students to realize that our planet is a dynamic system that is consistently changing.

ENDURING UNDERSTANDINGS

The big idea for this unit is that scientists sue several methods to learn about Earth's long history. The students will also then focus on the major time periods on the geologic time scale and what unique characteristics each era has that has led to present day life on earth. The students may have the misunderstanding that evolution of life over time has no evidence. They also may misunderstand that evolution is just a theory but a theory that withstood over time.

ESSENTIAL QUESTIONS

1. How do we study past and extinct life forms?
2. How old is Planet Earth and has it ever changed?

KNOWLEDGE AND SKILLS

Content: Vocabulary- eon, epoch, era, geologic time scale, mass extinction, period, Precambrian, correlation, cross- cutting relationship, key bed, principle of inclusions, original horizontality,

relative- age dating, superposition, unconformity, uniformitarianism, absolute age dating, dendrochronology, half- life, radioactive decay, radiocarbon dating, radiometric dating, varve, altered hard part, cast, evolution, index fossil, mineral replacement, mold, original preservation, trace fossil, asteroid, meteorite, zircon, Canadian shield, craton, differentiation, Laurentia, microcontinent, Precambrian shield, banded iron formation, cyanobacteria, red bed, stromatolite, amino acid, Ediacaran biota, eukaryote, prokaryote, Cambrian explosion, paleogeography, passive margin, regression, transgression, amniotic egg, iridium, phytoplankton, bipedal, Homo sapiens

Skills:

Explain why scientists need a geologic time scale

Compare and Contrast dating methods

Define fossil formations and how fossils are used to interpret earth's history

Describe evidence of the age of the Earth

Describe the formation of the atmosphere and the oceans

Describe experimental evidence of how life began on Earth

Summarize the changes in the Paleozoic life- forms

Identify possible causes of extinction of the dinosaurs

Explain how climate change affected life- forms during the Cenozoic

STAGE TWO

PERFORMANCE TASKS

Geologic timeline scale

Fossil identification

Precambrian story book

Proterozoic Era

Dinosaur dig

OTHER EVIDENCE

-Test on Chapter 21, 22 and 23

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The students will use fossil from the fossil record to supplement their knowledge. They will also use a dinosaur dig to get a clear idea of how paleontologists perform their jobs. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. The students will have a clear misunderstanding of the theory of evolution and will need time spent in class clearing up any misconceptions that they might have.

Unit Name: Beyond Earth **Time Frame: 10 Cycles (4 days each)**

Author: Egg Harbor Township High School Science Department

UNIT

Subject: **Science** Country: **USA**

Course/Grade: **College Prep Core Science/ 10-12** State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY- The purpose of this unit is to explore the dynamic system beyond Earth and the effects that celestial bodies have on the Earth. The topics that will be covered are the Sun-Moon-Earth system, the Solar System, Stars, Galaxies and how space is studied. At the end of this unit the students will identify that the Earth is one sole body in a complex and dynamic universe.

UNIT RESOURCES- Earth Science Textbook –Ch 27 The Sun-Earth-Moon System, Ch 28- Our Solar System, Ch 29 Stars, Ch 30 Galaxies and the Universe; Student Kept Binders; Laboratory Assignments; Media Center

Internet Resource Links: Glencoe.com, NBCLearn videos

STAGE ONE

GOALS AND STANDARDS-

HS-ESS1-1 **Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.**

HS-ESS1-2 **Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.**

HS-ESS1-3 **Communicate scientific ideas about the way stars, over their life cycle, produce elements.**

HS-ESS1-4 **Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.**

This unit will begin the students' knowledge of the earth and the universe and how it is all interconnected.

ENDURING UNDERSTANDINGS

The big idea for this unit is that using the laws of motion and gravitation, astronomers can understand the orbits and the properties of the planets and other objects in the solar system. The students should be able to explain how the solar system is formed, compare and contrast the characteristics of the inner and outer planets, and distinguish between planets and other objects in the universe. They will also develop an understanding of the ways in which space is studied. The students may come into class with a preconceived notion of the size of space and may believe that

the Milky Way Galaxy is the only galaxy in the universe. They may also not understand what a star is and how it is formed.

ESSENTIAL QUESTIONS

1. How does the interaction of the sun, moon and earth affect our planet?
2. What are the biggest differences between the inner planets and the outer planets?
3. How are other objects in our universe formed?
4. How do astronomers study space?

KNOWLEDGE AND SKILLS

Content: Vocabulary- electromagnetic spectrum, interferometry, reflecting telescope, refracting telescope, albedo, ejecta, highland, impact crater, mare, ray, regolith, rille, apogee, perigee, ecliptic plane, equinox, lunar eclipse, solar eclipse, solstice, astronomical unit, eccentricity, ellipse, retrograde motion, scarp, terrestrial planet, belt, gas giant planet, comet, dwarf planet, Kuiper belt, meteor, meteorite, meteoroid, meteor shower, corona, fission, fusion, chromosphere, photosphere, prominence, solar flare, solar wind, sunspot, constellation, black hole, nebula, supernova, Big Bang Theory, halo, dark matter, cosmology, variable star

Skills:

-Draw out a picture of a solar eclipse and a lunar eclipse. Include where the umbra and penumbra would be.

-Write the changes in dates for our seasons and what causes seasons on our planet.

-Name and describe all 8 planets. (ex. Which is the hottest, which one has rings etc.) and put the planets in order starting with the one closest to the sun.

-Name all of the famous astronomers learned about and their contribution to astronomy

-Name what ancient astronomers thought the universe revolved around and how they benefited from studying space.

-Name all of the phases of the moon

-Name the layers of the suns atmosphere and their characteristics.

-Name the life cycle of a star.

-Describe moon theory and the Big Bang Theory

-Identify the number of tides and on Earth and how they are affected by space

STAGE TWO

PERFORMANCE TASKS

First Men On the Moon

Scale model of the solar system

Solar system brochure

Calculating the energy output of the Sun

Researching the stars

Rockets

Sky high costs- are they worth it? Debate space funding

Completely draw the phases of the moon

Use the Star Lab to identify constellations and what the constellations represent

Complete a poem using vocabulary terms from this section

Make a cosmic timeline the length of the classroom

Determine the validity of astrological readings based on the zodiac sign

Use pictures to determine how we have made in improvements in studying space.

Make a foldable on the life cycle of a star and in the computer lab research a star

OTHER EVIDENCE

-Test on Chapter 27,28,29 and 30

STAGE THREE

LEARNING PLAN

The students will use their notes given from the PowerPoint's and the NBC Learn videos shown to first begin their knowledge of each topic in this unit. The unit will broken down into the four sub categories- sun, moon and earth interactions, inner and outer planets, stars and galaxies and the study of space. The subcategories will be presented in the order above. The students making their own drawings for the phases of the moon, layers of the suns atmosphere, life cycle of a star and the cosmic timeline will be hands on and will help the students on the tests. The research projects will ask the students to think outside the box in terms of developing new ideas of the scope of space and this will help the students on the assessments. Independently, the students will complete questions and vocabulary out of the book. The students will also use their weekly labs to add to their learning. The students will be monitored through the progression of this unit by daily "Do Now" questions as well as exit questions that will be graded, returned to the students and the correct answers explained. The end project of the rocket launch will further help students to understand the physics behind astronomy.

Curriculum Resources - Differentiated Instruction

Special Education Interventions in General Education

Visual Supports
Extended time to complete tests and assignments
Graphic Organizers
Mnemonic tricks to improve memory
Study guides
Use agenda book for assignments
Provide a posted daily schedule
Use of classroom behavior management system
Use prompts and model directions
Use task analysis to break down activities and lessons into each individual step needed to complete the task
Use concrete examples to teach concepts
Have student repeat/rephrase written directions
Heterogeneous grouping

Resources:

Do to Learn:
http://www.do2learn.com/

Sen Teacher:
http://www.senteacher.org/

Intervention Central:
http://www.interventioncentral.org/

Learning Ally:
https://www.learningally.org/

English Language Learners Interventions in Regular Education

Resources:

FABRIC - Learning Paradigm for ELLs (NJDOE)
www.nj.gov/education/bilingual/pd/**fabric**/**fabric**.pdf

Guide to Teaching ELL Students
http://www.colorincolorado.org/new-teaching-ells

Edutopia - Supporting English Language Learners
https://www.edutopia.org/blog/strategies-and-resources-supporting-ell-todd-finley

Reading Rockets
http://www.readingrockets.org/reading-topics/english-language-learners

Gifted and Talented Interventions in Regular Education

Resources:

Who are Gifted and Talented Students
http://www.npr.org/sections/ed/2015/09/28/443193523/who-are-the-gifted-and-talented-and-what-do-they-need

Hoagies Gifted Education Page
http://www.hoagiesgifted.org/programs.htm

21st Century Learning
Resources:

Partnership for 21st Century Learning
http://www.p21.org/

Career Ready Practices (NJDOE)
http://www.nj.gov/education/cte/hl/CRP.pdf