

**EARTH SCIENCE CP, GRADE 9
2008**

COURSE DESCRIPTION:

This course will give students an understanding and appreciation of planet Earth and its relationships to the rest of the universe. Major topics covered will include, but will not be limited to, the composition of the Earth, forces that shape the Earth, Astronomy and Space Science, natural change to Earth's systems vs. changes created by activities of man.

CORE CURRICULUM CONTENT STANDARDS:

STANDARD 5.8 (Earth Science) All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth.

A. Earth's Properties and Materials

B. Atmosphere and Weather

C. Processes that Shape the Earth

D. How We Study the Earth

STANDARD 5.9 (Astronomy & Space Science) All students will gain an understanding of the origin, evolution, and structure of the universe.

A. Earth, Moon, Sun System

B. Solar System

C. Stars

D. Galaxies and Universe

STANDARD 5.10 (Environmental Studies) All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.

A. Natural Systems and Interactions

B. Human Interactions and Impact

STANDARD 8.1 (Computer and information literacy) All students will use computer applications to gather and organize information and to solve problems.

CUMULATIVE PROGRESS INDICATORS:

Standard 5.8

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 12**, students will:

A. Earth's Properties and Materials

1. Explain the interrelationship of the geosphere, hydrosphere, and the atmosphere.

B. Atmosphere and Water

1. Describe how weather (in the short term) and climate (in the long term) involve the transfer of energy in and out of the atmosphere.

C. Processes that Shape the Earth

1. Use the theory of plate tectonics to explain the relationship among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches.
2. Know that Earth is a system in which chemical elements exist in fixed amounts and move through the solid Earth, oceans, atmosphere, and living things as part of geochemical cycles.
3. Recognize that the evolution of life on Earth has changed the composition of Earth's atmosphere through time.

D. How We Study the Earth

1. Analyze the evidence produced by a variety of techniques that is used to understand changes in the Earth that have occurred over time.
 - topography
 - fossils
 - rock stratification
 - ice cores
 - radiometric data

Cumulative Progress Indicators:

Standard 5.9

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 12**, students will:

A. Earth, Moon, Sun System

Reinforce indicators from previous grade level.

B. Solar System

1. Explain that our solar system coalesced from a nebular cloud of gas and dust left from exploding stars.

C. Stars

1. Describe the physical characteristics, stages of development, and the apparent motions of stars.

D. Galaxies and Universe

1. Describe data gathering and observation technologies and explain how they are used to explore the solar system and beyond.
2. Cite evidence to describe the scientific theory of the origin of the universe and the current explanations of its evolution.

Cumulative Progress Indicators:

Standard 5.10

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 12**, students will:

A. Natural Systems and Interactions

1. Distinguish naturally occurring process from those believed to have been modified by human interaction or activity.

- ♣ climate change
- ♣ ozone production
- ♣ erosion and deposition
- ♣ threatened and endangered species

B. Human Interactions and Impact

1. Assess the impact of human activities on the cycling of matter and the flow of energy through ecosystems.
2. Use scientific, economic, and other data to assess environmental risks and benefits associated with societal activity.

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

5.8

A.

- 1.) - Independent Practice Vocab/reading assignment from text for Minerals, Rocks, Weathering, Erosion and Atmosphere chapters
- Activity 3-3 “Identification of Minerals”
- Book Assignment “1-10 p 81, and 1-10 p 82” – Chapter Review questions
- Activity 3-2 “Minerals”
- Activity 2-1 “Properties of Minerals”
- Cooperative Learning LAB “Mineral Identification techniques and Practices”
- Cooperative Learning Review Game for Minerals, Rocks, Weathering, Erosion and Atmosphere Chapters
- United Streaming Video Segments for Minerals
- United Streaming Video Segments for Rocks
- Activity “The Rock Cycle”
- Activity “Igneous Rocks”
- Activity “Igneous Rocks and the Rock Cycle”
- Book Assignment “1-10 p 111, 1-10 p 112” – Chapter Review Questions
- Activity “Sedimentary Rock Book Quest”
- United Streaming Video Clips for Weathering
- Activity “Weathering Under Various Climatic Conditions”
- Activity “Plotting and Interpreting Rate Graphs”
- Activity “Weathering – Reinforcement “
- Activity “Weathering – Study Guide”
- Activity “3-1 Weathering and Soil”
- Activity “7-1 Rocks and Weathering”
- LAB DEMO – “Surface Area and the Rate of Weathering”
- Book assignment “1-10 p 167 and 1-10 p 168” - Chapter Review Questions
- United Streaming Video Clips for Erosion and Deposition
- Activity “Water”
- Activity “Erosional Forces”
- Activity “Gravity”
- Activity “Erosion and Deposition Book and Internet Resource Find”
- Book Assignment 1-10 p 197 and 1-10 p 198 – Chapter Review Questions
- Book Assignment 1-10 p 227 and 1-10 p 228 – Chapter Review Questions
- Activity “Wind”
- Activity “Surface Water reinforcement”
- Activity “Surface Water Study Guide”
- Activity “Water Erosion and Deposition”
- Activity “Erosion and Deposition Review Sheet Book ad Internet Resource Find”
- (For Atmosphere Activities, Please see Below)

B.

- 1.) - United Streaming Video Clips for the Atmosphere
- Lab Demo “A Cloud in a Bottle”
- Activity “10-1 Properties of the Atmosphere”
- Activity “The Ozone Layer”
- Activity “Energy From the Sun”
- Activity “10-3 Air Pressure and Winds”

- Activity “Planetary Winds”
- Activity “What is Weather?”
- Activity “The Atmosphere Review”
- Activity “The Atmosphere Practice Test”
- Lab “Measuring Relative Humidity”
- Activity “Water in the Air – Evaporation and Condensation”
- Activity “Water in the Air – Clouds and Precipitation”
- Activity “11-1 Evaporation”
- Activity “Water in the Air – Review”
- Activity “Water in the Air – Practice Test”
- Coop Learn - “Water in the Air - Crossword”
- Activity “12-1 Weather”
- Activity “Severe Weather”
- Lab “Tracking Hurricanes”
- Activity “Frontal Weather”
- Activity “Air Masses and Fronts”
- Activity “Weather Systems Review”
- Activity “Weather Systems Practice Test”

- C.
- 1.) - Independent Practice Vocab/reading assignments from text for Plate Tectonics, Earthquakes and volcano chapters
 - United Streaming Video Clips for Plate Tectonics and Continental Drift
 - Activity “7-4 Plate Tectonics”
 - Activity “Continental Drift”
 - Map Exercise
 - Activity “Determining How Fast Some Crustal Plates Move”
 - Activity “Plate Tectonics and Volcanoes Crossword”
 - Activity “Seafloor Spreading”
 - Activity “Plate Tectonics”
 - Activity “Theory of Plate Tectonics”
 - Activity “Continental Drift”
 - United Streaming Video Clips for Volcanoes
 - Activity “2-3 Volcanoes”
 - Activity “Volcanoes and Earth’s Moving Plates - Reinforcement”
 - Activity “Volcanoes and Earth’s Moving Plates – Study Guide”
 - Activity “Volcanoes – Review”
 - Activity “Eruptions and Forms of Volcanoes – Study Guide”
 - Activity “Eruptions and Forms of Volcanoes – Reinforcement”
 - Cooperative Learning Review Game for Plate Tectonics, Volcanoes, and Earthquakes Chapters
 - United Streaming Video Clips for Earthquakes
 - Activity “Forces Inside Earth - Study Guide”
 - Activity “Forces Inside Earth – Reinforcement”
 - Lab “Illustrating Movement in Rock Layers”
 - Activity “2-2 Folding and Faulting”
 - Activity “How Does the Intensity of an Earthquake Change with Distance?”
 - Activity “Earthquake Information – Study Guide”
 - Activity “Earthquake Information – Reinforcement”
 - 2.) - Independent Practice vocab/reading assignment from text for basic chemistry

- Cooperative learning review game for basic chemistry
- Lab “Basic Measurements”
- Activity “Elements and Compounds”
- Activity “Atoms”
- Activity “The Nature of Science”
- For Atmosphere Activities, see above.

3.) - Video Notes and Quiz for “Earth is Born” video

- D.
- 1.)
- Activity “Geologic Time”
 - Activity “Ch 9 Questions”
 - Activity “Geologic Time and Dinosaur Extinction Internet/Resource Search”
 - Activity “Superposition Wkst”
 - Activity “The Rock Record – History in the Earth”
 - Activity “Fossils and Earth History”
 - Activity “Ch 8 Questions”
 - Activity “Fossils and Nonfossils”
 - For Weathering Activities, see above

5.9

- A.
- 1.)
- Demo on Earth’s Seasons on the Equinoxes and Winter Solstice (3x)
 - United Streaming Video Clips
 - Activity “Tides”
 - For additional activities, See below

- B.
- 1.)
- United Streaming Video Clips on the Solar System
 - Activity “The Solar System – Review”
 - Activity “The Inner Planets”
 - Activity “The Outer Planets”
 - Activity “Other Objects in the Solar System”

- C.
- 1.)
- United Streaming Video clips on the Sun and Stars
 - Activity “The Sun – Study Guide”
 - Activity “The Sun – Reinforcement”
 - Activity “Stars and Galaxies”
 - Activity “Stars and Galaxies – review”

- D.
- 1.)
- United Streaming Video Clips on Astronomy
- 2.)
- United Streaming Video Clips on The Big Bang Theory
 - Activity “Galaxies and the Expanding Universe – study guide”
 - Activity “Galaxies and the Expanding Universe – reinforcement”

5.10

- A.
- 1.)
- Cooperative Learning Large-Group Discussions

- Earth Science Picture of the Day Discussions and Write-ups
- “Current Events in Earth Science” Discussions

B.

- 1.)
 - Cooperative Learning Large-Group Discussions
 - Earth Science Picture of the Day Discussions and Write-ups
 - “Current Events in Earth Science” Discussions
- 2.)
 - Cooperative Learning Large-Group Discussions
 - Earth Science Picture of the Day Discussions and Write-ups
 - “Current Events in Earth Science” Discussions”

8.1

See Below

INSTRUCTIONAL STRATEGIES:

(Included in the presentation of each unit will be lecture/discussion and guided practice, independent practice, video presentations, cooperative learning activities and differentiated instruction)

5.8

Teacher will:

A.1)

- present unit on Minerals
- present unit on Rocks
- present unit on Weathering
- present unit on Erosion
- present unit Earth’s Atmosphere (structure and composition)
- present unit Earth’s Atmosphere (Water in the Atmosphere)
- present unit Earth’s Atmosphere (Weather)

B.1)

- present 3 units on the Earth’s Atmosphere (See Above)

C.1)

- present unit on Plate Tectonics
- present unit on Earthquakes
- present unit on Volcanoes (PowerPoint)

C.2)

- present unit on Basic Chemistry
- present unit on Earth’s Atmosphere (structure and composition)

C.3)

- present video “Earth is Born”

D.1)

- Explain how fossils can be used as indicators of age and ancient environments.
- Contrast absolute and relative dating, explain radioactive decay.
- explain superposition (rock stratification)
- explain ice cores
- present unit on Weathering

5.9

Teacher will:

A.1)

- Present physical data on Earth, including rotation, revolution, and seasons.
- present unit on our Solar System (PowerPoint) – includes info on Sun.
- Explain the phases of the moon via presentation of Moon Unit (PowerPoint)

B.1)

- present unit on Solar System (PowerPoint)

C.1)

- Compare and contrast relative brightness of stars and analyze other physical properties. (Solar System Unit)
- Discuss features and structure of the sun. (Solar System Unit)

D.1)

- Illustrate the different galaxies, and present theories on their formation. (Solar system Unit and Short PowerPoint on Galaxies)

D.2)

- Discuss most widely accepted theory of the origin of the universe and other theories and myths. (Solar System Unit)

5.10

Teacher will:

A.1)

- present 3 Atmosphere Units and
 - Illustrate the importance of the ozone layer to life on Earth, and how human interactions are destroying it.
 - Offer different theories as explanations for climate change.
 - Offer different species that are threatened and endangered as a result of climate change and erosion and deposition changes by actions of humans
- present unit on Erosion and Deposition and
 - illustrate how human activities can affect the rate of change

B.1&2)

- Analyze the advantages and disadvantages of tapping tides for energy.
- Describe the human population explosion, and the effects of an increasing number of people on the environment.
- Examine the cause of smog and acid rain (Weathering Unit).

8.1

Teacher will:

- present several lessons via PowerPoint

- present conversation jump-starters “Earth Science Picture of the Day” using several internet websites
- present lessons using “Google-Earth”
- present recent earthquake data using the USGS website
- present an assignment where students will need to use the internet to analyze topographic maps
- present an assignment where the students will create a PowerPoint presentation on a prescribed topic

EVALUATION/ASSESSMENT OF STUDENTS:

Homework Category:	20%	Labs/projects Category	15%
Quiz Category:	15%	Test Category	50%

EVALUATION/ASSESSMENT OF CURRICULUM:

This course of study will be evaluated/assessed by instructional staff during the first year of implementation for the purpose of necessary revision at the end of the first year. In addition, this course of study will be reviewed according to the Five-Year Curriculum Review schedule.

RESOURCES/BIBLIOGRAPHY:

<http://education.state.nj.us/cccs/>

Earth Science, Textbook, Glencoe/McGraw-Hill, 1999, Feather, Snyder

Teacher resources and knowledge