

Curriculum Guide

Course 511: College Preparatory Earth Science

Level: Grades 9-12

1. Course Structure

This full-year course meets four or five periods each week.

2. Intended Audience

College Preparatory Earth Science is an elective course open to all freshman/sophomore students. A student's placement is based upon the recommendation of his/her eighth or ninth year science teacher.

3. Course Goals

Students in this course will develop a solid foundation in Earth Science principles, library research, and critical thinking skills. One of the major goals of the course is to instill within students both an inquisitive nature about the world they live in and the skills necessary to research questions they may develop. They will also strengthen their abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic. Finally, students will be expected to learn how to properly research, format, write, and site a science style research paper.

Upon successful completion of this course, most students will enroll in College Preparatory Biology as sophomores. Some students may be moved into Honors Biology based upon their performance in College Preparatory Earth Science and the recommendation of the teacher.

4. Course Objectives

Content:

- I. The Solid Earth
- II. The Atmosphere
- III. Astronomy
- IV. The Oceans

Skills:

- Students will demonstrate habit of mind characteristic of earth science professionals, including the constant questioning of earth science principles.
- Students will demonstrate a functional understanding of earth science principles and concepts, and they will use these to solve new problems and master new concepts and skills.
- Students will become proficient in reading text, and they will be able to synthesize what they read.

- Students will be able to design and conduct library research.

5. Essential Questions

- I. Astronomy
 - What is the earth's place in the Universe?
 - What is the earth's place in the Solar System?
 - What lies beyond our solar system?
 - How do stars evolve?

- II. The Atmosphere
 - What is the composition, the structure, and the temperature of the atmosphere?
 - What is the relationship between the earth and the sun?
 - How is moisture measured in the atmosphere?
 - How do temperature and pressure affect weather?
 - What is the relationship between weather patterns and severe storms?
 - How have humans impacted weather?

- III. The Solid Earth
 - What are the rocks and minerals that comprise the crust of the earth?
 - How do the forces of weathering and erosion affect the earth?
 - What forces created the Ice Age?
 - What causes earthquakes?
 - How does plate tectonics account for the location of earthquake zones and volcanic activity around the earth?
 - What forces create mountains?
 - How do geologists determine geologic time?

- IV. The Oceans
 - What are the features of the ocean floor?
 - What is the composition of seawater?
 - What is the history of oceanography?
 - What is the importance of ocean currents?

- V. The Solid Earth
 - How were the earth, its oceans, and its atmosphere created?
 - What are the rocks and minerals that comprise the crust of the earth?
 - How did each of the major families of rocks form?
 - How do the forces of weathering and erosion affect the earth?
 - What forces created the Ice Age?
 - What causes earthquakes?
 - How does plate tectonics account for the location of earthquake zones and volcanic activity around the earth?
 - What forces create mountains?
 - How do geologists determine geologic time?

- VI. The Atmosphere
 - What is the composition, the structure, and the temperature of the atmosphere?
 - What is the relationship between the earth and the sun?
 - How is moisture measured in the atmosphere?
 - How do temperature and pressure affect weather?
 - What is the relationship between weather patterns and severe thunderstorms?
 - How have humans impacted weather?

- VII. Astronomy
 - What is the earth's place in the Universe?
 - What is the earth's place in the Solar System?
 - What lies beyond our solar system?
 - How do stars evolve?
 - What is the fate of the Universe?

- VIII. Oceans
 - What are the features of the ocean floor?
 - What is the composition of seawater?
 - What is the history of oceanography?
 - What is the importance of ocean currents?

6. Course Outline/ Curriculum Map

Quarter 1

- I. Astronomy
 - Ancient Astronomy and the Birth of Modern Astronomy
 - Motions of the Earth-Moon System
 - The Solar System and an Overview of the Planets
 - The Moon and Minor Members of the Solar System
 - The Study of Light
 - The Sun, Properties of Stars, and Interstellar Matter
 - Galaxies, Red Shifts, and the Big Bang

- II. Meteorology
 - Weather and Climate
 - Composition of the Atmosphere
 - The Ozone Problem
 - Earth-Sun Relationships
 - Mechanisms of Heat Transfer
 - Humidity and Adiabatic Temperature
 - Air Pressure Measurements
 - General Circulation of the Atmosphere
 - Air Masses, Fronts, Thunderstorms, Tornadoes, and Hurricane

- Air Pollution, the Climate of Cities, and Human Impact on Global Climate

Quarter 2

- III. The Solid Earth (Structure and Forces that Attack the Surface)
- Minerals
 - The Rock Cycle
 - Igneous, Sedimentary, and Metamorphic Rocks
 - Weathering, Soil, and Erosion
 - Mass Wasting
 - Hydrologic Cycle, Stream Valleys, and Artesian Springs
 - Geothermal Energy and Ground Water
 - Glaciers
 - Deserts

Quarter 3

- IV. The Solid Earth (Force that Raise the Surface and the Earth's History)
- Plate tectonics
 - Alfred Wegner, Continental Drift, and Pangaea
 - The Nature of Volcanic Activity
 - Volcanoes and Climate
 - Earthquakes and the Earth's Interior
 - Rock Deformation, Mountain Types, and Mountain Building
 - Historical Geology and relative Dating
 - Mass Extinctions
 - Correlation, Fossils, and Life of the Geologic Past

Quarter 4

- I. The Oceans
- Extent of the Oceans and Composition of Seawater
 - The Earth Beneath the Sea
 - Features of the Ocean Basin Floor
 - Surface Currents
 - Waves and Wave Erosion
 - Shoreline Erosion
 - Map Reading and Compass work

7. Course Text and Other Materials

The text for this course is:

- Spaulding, Nancy E., Namowitz, Samuel N. **Earth Science**. Heath/McDougal Littell, 2003.

Support materials include:

- Flip Charts and Powerpoint Presentations
- CD-ROM from Textbook
- Support Videos

8. Instructional Methods and Course Activities

Content will be conveyed through:

- Class dialogue and discussion
- Topic lectures and demonstrations
- Audio-visual presentations
- Library research
- Internet research
- Laboratory investigation
- Hands-on activities

9. Learning Strategies

- The primary instructional mode will include class dialogue, discussion, and interaction.
- Students will be encouraged to approach each learning experience with an objective, critical, and analytical attitude.
- The text will be used as a primary reference, but additional material will be presented in class and through work in the library and computer lab.
- Lecturing will be used.
- Students will be asked on a bi-weekly basis to find an article related to earth science written in a current publication or internet site. They will prepare a summary of the article and comment on the article in class.

10. Assessment

The assessment of students will occur through:

- Daily evaluation of class participation and preparation
- Normal testing (open ended, objective, and short answer essay exam questions)
- Quarter projects involving library research
- Ability to summarize current research in earth science through science articles
- In-class group project work

11. Course Evaluation

The assessment of this course will occur through:

- On-going feedback from current students and graduates
- A formal student questionnaire