

## Curriculum Guide

**Course 513:** Honors Earth Science

**Level:** Grades 9-12

### 1. Course Structure

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

### 2. Intended Audience

Honors Earth Science is an elective course intended for freshman/sophomore students who are presently taking CPI Algebra or Honors Geometry with a minimum grade of B- (Honors) or A- (CPI) and have been recommended for the program by their eighth or ninth year science teacher. In addition, upper class students who have not previously taken earth science may take this course

### 3. Course Goals

Students in this course will develop a solid, introductory college-level foundation in Earth Science principles, library research, and in developing critical thinking skills. One of the major goals of the course is to give students the ability to read and comprehend a college-level textbook with little or no support from the teacher. They will also strengthen their abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic.

Upon successful completion of this course, most students will enroll in Honors Biology as sophomores or Honors Chemistry as juniors. For those students that are not successful in the course (C or below), they will likely enroll in CP Biology or Enriched Chemistry.

### 4. Course Objectives

Content:

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

Skills:

- Students will demonstrate habits of mind characteristic of earth science professionals, including the constant questioning of earth science principles.
- Students will demonstrate an ability to solve mathematical problems in an orderly and succinct fashion.
- 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 college level material, 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?

## 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

III. 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

IV. 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:

- Tarbuck, Edward, Lutgens, Frederick **EARTH SCIENCE, Ed. 11,**  
MacMillan Publishing Company

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