**Essentials of Earth Systems Science**



Instructor: **Mr. Cooper**

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**Course Description**

In Earth Systems Science, students will explore how the Earth operates as a whole composed of its five major spheres: exosphere, lithosphere, hydrosphere, atmosphere, and biosphere. This course will provide an overview of all the principle physical, chemical, and biological systems having shaped the Earth throughout its history. It will also provide an explanation of the delicate balance among the five spheres and the cause-and-effect relationships resulting when this balance is disrupted. The major topics of study throughout this course include the role of science and technology in society, mapping techniques, astronomy, matter and energy, physical and historical geology, hydrology, oceanography, meteorology, and environmental science.

**Classroom Materials**

It is the students’ responsibility to come prepared to each class period with all required classroom materials. Those materials include the following:

1. One composition book for daily openers and warm-up activities (provided by instructor).
2. Three-ring notebook (preferably 2 inch) in order to store all classroom materials.
3. Writing utensils including pencils, pens, and highlighters. Be aware, certain labs may require you *ONLY* use a pencil!
4. Colored pencils for various lab activities and projects (provided by instructor).
5. Scientific calculator (does not need to be a graphing one).

**Classroom Rules**

When in the classroom, it is important students act as young, responsible adults. This can be achieved by following some basic classroom rules including the following:

* **RESPECT** – One of the most important rules in the classroom is respect. You are to respect your fellow classmates and the instructor at *ALL* times.
* **BE PREPARED** – Come to class prepared each and every day with a writing utensil, homework assignments, and your binder. Failure to do so will result in a 5 point deduction from the final participation grade at the end of the 9 weeks.
* **RAISE YOUR HAND** – If you wish to speak during class time, raise your hand and the instructor will get to your comment/question. Do not interrupt the instructor or another student while they are talking.
* **DO NOT LEAVE THE ROOM** – Once you are in the classroom, you are not to leave unless you have a designated pass from the office or another teacher, in which case you will sign out on the sheet. Please use the restroom, go to your locker, get a drink, etc. before arriving to class. If a medical condition or emergency occurs, exceptions will be made.
* **NO FOOD OR DRINK** – Properly dispose of any food or drinks prior to entering the classroom. Bottled water and gum will be permitted during *CLASS* time unless they become a problem. No food or drinks are permitted in the *LAB* at any time.
* **EARTH SCIENCE ONLY** – Since this is an Earth Science class, it is unacceptable to work on other subjects during designated class time unless given permission from the instructor. Cell phones are only permitted when given permission.

**Tardiness**

All students need to be seated in the classroom by the time of the bell. Any student not doing so will be considered late. Students having a late pass will be excused by handing the pass to the instructor and quietly sitting in their assigned seat. Students without a late pass will be considered *TARDY*:

1. 1st tardy – Verbal warning
2. 2nd tardy – 5 points will be deducted from the final participation grade at the end of the 9 weeks
3. 3rd tardy (and more) – Additional 5 points will be deducted from the final participation grade at the end of the 9 weeks; discipline referral will be sent to the office for detention to be assigned

**Attendance**

In order to take the maximum amount of information away from this or any class, it is imperative to attend class every day. If a student is absent, *IT IS THE SOLE RESPONSIBILITY OF THE STUDENT* to retrieve any missed work, notes, or handouts. Extra handouts and worksheets will be in a separate bin on the side counter. The student who was absent can see the instructor if a lab, quiz, or test is needed for make-up. If work was due on the day of an absence, it is due the day of return. If work was completed during the day of an absence, the general rule is: 1 DAY ABSENT = 1 DAY TO MAKE IT UP!

**Late Work**

All assignments are due at the beginning of the class period. Any work not turned in at that time will be counted as late work. Students will be given plenty of time to complete all assignments, therefore, I expect all work to be handed in on time. Late work will be given a 50% grade reduction. Failure to turn in any work by the end of a unit will result in a “0” (zero) for the assignment.

**Tutoring**

I am willing to assist any student who desires additional help with a specific topic throughout this course. Schedule an appointment with me and we will work out any problems you may have. I am available most days either before school, after school, or during my planning period. Tell me when you are coming, and I will write you a pass for that time.

**Grading System**

The following grade school has been implemented by the Freeport Area School District and will be used throughout this course:

91% - 100% **A**

81% - 90% **B**

70% - 80% **C**

60% - 69% **D**

 0% - 59% **F**

Any decimal place at 0.50 or higher will be rounded up during the entirety of this course. The following classroom items will be graded throughout this semester. Students are responsible for making sure they turn in and complete all necessary work:

* TESTS: There will be one test at the conclusion of every unit we cover throughout the semester.
* QUIZZES: Announced and unannounced (pop-quizzes) will be given throughout each unit of study.
* LAB REPORTS: We will complete at least one lab per unit of study throughout the course.
* HOMEWORK: Homework will be given on a weekly basis and a due date will be assigned at that time.
* IN-CLASS ACTIVITIES: We will do a variety of in-class activities independently and in small groups.
* OPENERS: Your opener composition book will be collected at the end of the semester for grading.
* NOTEBOOKS: Your 3-ring notebook containing notes, handouts, etc. will also be collected at the end of the semester.
* PARTICIPATION: Your participation and attentiveness in the classroom will be measured and graded.
* FINAL EXAM: Your final exam will be a cumulative exam at the end of the semester covering all units.

**Integrity**

It goes without saying that all students should act with the utmost integrity at all times throughout the course of the semester. Cheating will not be tolerated by the instructor or the Freeport Area School District. Students found cheating, copying, or plagiarizing in any way will receive a “0” (zero) for the assignment, a discipline referral will be sent to the office for detention to be assigned, and parents will be notified.

**Discipline**

All disciplinary problems are unacceptable by the instructor within the classroom. Penalties for such problems include: reprimand/warning, 5 points off participation total per offense, discipline referral sent to the office for detention to be assigned, phone call to parents, and parent-teacher conference. For items not covered in this syllabus, please refer to the student handbook, which will be enforced at all times during this course.

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By signing below, I verify that I have read the Earth Systems Science course syllabus and fully understand the details, rules, and expectations the instructor has implemented for this course.

Student Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Parent/Guardian Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student Printed Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Parent/Guardian Printed Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Course Outline**

**Unit 1: Foundations of Science (Introduction)**

1. Technology, Science, and Scientific Measurement
	1. Scientific Method
	2. Scientific Notation
	3. Metric System
	4. Dimensional Analysis
2. Mapping Techniques
	1. Map Coordinates
	2. Cartography
	3. Topographic Maps
3. The Earth as a System
	1. Biogeochemical Cycles
	2. Universal Forces
	3. Newton’s Laws of Motion and Gravity

**Unit 2: The Exosphere (Astronomy)**

1. History of Astronomy
	1. Ancient Astronomers
	2. Kepler’s Laws of Planetary Motion
2. The Earth as a Planet
	1. The Moon
	2. Lunar Phases
	3. Eclipses
3. The Solar System
	1. Formation
	2. Terrestrial Planets
	3. Jovian Planets
4. Studying Light
	1. Telescopes
5. Properties of Stars
	1. Stellar Evolution
	2. Galaxies

**Unit 3A: The Lithosphere (Physical Geology)**

1. Minerals
	1. Physical Properties
2. Rocks
	1. The Rock Cycle
	2. Bowen’s Reaction Series
	3. Igneous Formations
	4. Sedimentary Formations
	5. Metamorphic Formations
3. Earth’s Resources
	1. Energy and Mineral Resources
	2. Alternative Energy Sources

**Unit 3B: The Lithosphere (Historical Geology)**

1. Earth’s Geologic History
	1. Geologic Time Scale
	2. Prehistoric Time
2. Plate Tectonics
3. Earth’s Interior
4. Sea-floor Spreading
5. Supercontinent Cycle
6. Deformation and Reshaping the Earth
7. Earthquakes
8. Volcanoes

**Unit 4: The Hydrosphere (Hydrology)**

1. The Water Cycle
2. River System Development
	1. Erosional Features
	2. Depositional Features
3. Earth’s Groundwater
	1. Water Table
	2. Soil Characteristics
4. Water Pollution
	1. Dissolved Oxygen (DO)
	2. pH Scale
	3. Hardness of Water
	4. Cleaning Polluted Water
5. Oceanography
	1. Ocean Floor Topography
	2. Aquatic Life

**Unit 5: The Atmosphere (Meteorology)**

1. Structure and Composition of Atmosphere
	1. Layers of the Atmosphere
2. Water in the Atmosphere
	1. Cloud Types
	2. Precipitation
	3. Fog
3. Weather Forecasting
	1. Air Movement
	2. Station Models
	3. Weather Map Symbols
4. Severe Weather
	1. Thunderstorms
	2. Tornadoes
	3. Hurricanes
5. Global Climate Change

All course information can be found on Freeport’s Schoology Website: [www.fasd.schoology.com](http://www.fasd.schoology.com) ACCESS CODE: \_\_\_\_\_\_\_\_\_\_\_\_

\*Course outline and schedule are subject to change at the instructor’s discretion.