FIREBAUGH HIGH SCHOOL

**Course: Earth Science in Agriculture**

**Grade Level: 9th & 10th Grade**

**Prerequisite: Algebra I or concurrent enrollment in Algebra I**

**Length of Course: 1 year**

**Meets: High schools Earth Science graduation requirement and meets the UC “g” admission requirement for science**

# I. COURSE DESCRIPTION

Earth Science in Agriculture is a one-year, laboratory science course, designed for the college bound student with career interests in Agriculture. Using agriculture as a learning vehicle, the course emphasizes the principles and practices of Earth Science as a way to demonstrate the relevance of Earth Science in Agriculture to each student’s life and environment. This class will utilize local and regional issues and concerns to stimulate problem-solving activities and to foster a sense of Earth stewardship by students in their communities. The class will establish an expanded learning environment, which incorporates fieldwork, technological access to data, and traditional classroom and laboratory activities. The course is centered around an extensive laboratory component in order to connect the big ideas of all earth sciences with agricultural applications, physical science principles, and other curricular areas, including written and oral reporting skills.

 **A. COURSE GOALS**

1. Develop knowledge and understanding of practical and essential Earth Science concepts and the principles Earth Science shares with other disciplines.

2. Understand basic principles of Earth System Science and think from an Earth System Science perspective

3. Develop an understanding of scientific inquiry and abilities needed to conduct scientific inquiry.

4. Understand the nature, origin, and distribution of Earth’s energy, mineral, and water resources; understand technologies used to locate, extract, and process these resources; and be aware of the dependency on these resources to satisfy our wants, needs, and expectations.

5. Utilize agricultural applications as a relevant vehicle to teach Earth Science principles and improve the scientific literacy of students.

6. Strengthen instruction in science for students pursuing professional level careers in agriculture.

7. Integrate mathematics, language arts, and career employability standards including creative thinking and problem solving skills, and technological literacy related to the agriculture industry.

8. Meet a portion of the laboratory science requirement for admission to the University of California and California State University systems.

9. Develop a sense of interrelationships between earth science and its relationship to agricultural applications.

**B. PREREQUISITE**

The course is recommended for freshmen students who plan to attend college and pursue a major in the area of agriculture sciences.

**C. COURSE FORMAT**

1. Forty percent classroom instruction, including:

* Discussion
* Demonstration
* Lecture
* Examinations
* Reading assignments
* Guest speakers

2. Forty percent laboratory and/ or field instruction, including:

* Science laboratory experience
* Field research projects
1. Ten percent FFA leadership experiences, including:
* Verbal and written communication exercises
* Leadership development activities

4. Ten percent supervised agricultural experience project

**D. ASSESSMENT**

1. 40% of the grade will be based on classroom instruction, including:

* Exams
* Quizzes
* Research Paper
* Homework and reading assignments

2. 40% of the grade will be based on laboratory and field research

3. 10% of the grade will be based on the student portfolio, including:

* Key classroom projects
* Major field and laboratory activities
* Written summaries of individual research projects

4. 10% of the grade will be based on FFA leadership participation

5. Ongoing Supervised Agricultural Experience Project, statistical

 management of project,

# II. COURSE OUTLINE

## A. Agriscience in the Information Age

1. California Agriculture

2. Professional Career Opportunities in Agriscience

3. Supervised Agriscience Experience

4. Leadership Development in Agriscience

### B. Earth Science

1. The Nature of Science

2. What is Earth Science

3. Mapping our World

4. Latitude and Longitude

5. Types of maps

## C. Composition of Earth

1. Matter and Atomic Structure:

a. What are elements?

b. How atoms combine

c. States of matter

2. Minerals:

a. What is a mineral?

b. Identifying Minerals

c. Igneous Rock

d. What are igneous rocks?

e. Classifying igneous rocks

f. Sedimentary and Metamorphic Rocks

g. Formation of Sedimentary Rocks

h. Types of Sedimentary Rocks

i. Metamorphic Rocks

**D. Surface Processes on Earth**

1. Weathering, Erosion, and Soil:

a. Weathering

b. Erosion and Deposition

c. Formation of Soil

2. Mass Movements, Wind, and Glaciers:

a. Mass Movement at Earth’s Surface

b. Wind

c. Glaciers

d. Surface Water

e. Surface Water Movement

f. Stream Development

g. Lakes and Freshwater Wetlands

h. Groundwater

i. Movement and Storage of Groundwater

j. Groundwater Erosion, Deposition, and Systems

E. FFA Leadership, Critical Thinking & Interpersonal Skill Development

1. Aims and Purposes; History and Background

2. FFA Leadership Opportunities

3. FFA Contests and Judging Activities

4. FFA Record Keeping of SAE Project

## F. The Atmosphere and the Oceans

1. Atmosphere:

a. Atmospheric Basics

b. State of Atmosphere

c. Moisture in Atmosphere

d. Meteorology

2. The Causes of Weather:

a. Weather Systems

b. Gathering Weather Data

c. Weather Analysis

3. The Nature of Storms:

a. Thunderstorms

b. Severe Weather

c. Tropical Storms

d. Recurring Weather

4. Climate:

a. What is Climate?

b. Climate Classification

c. Climatic Changes

d. The Human Factor

e. Physical Oceanography

5. The Oceans:

a. Seawater

b. Ocean Movements

c. Marine Environment

d. Shoreline Features

* 1. The Seafloor

## G. The Dynamic Earth

1. Plate Tectonics:

a. Drifting Continents

b. Seafloor Spreading

c. Theory of Plate Tectonics

d. Causes of Plate Motions

2. Volcanic Activity:

a. Magma

b. Intrusive Activity

c. Volcanoes

3. Earthquakes:

a. Forces Within the Earth

b. Seismic Waves and Earth’s Interior

c. Measuring and Locating Earthquakes

d. Earthquakes and Society

4. Mountain Building

a. Crust-Mantle Relationships

b. Convergent-Boundary Mountains

c. Other types of Mountains

## H. Resources and the Environment

1. Earth Resources:

a. What are resources? Renewable Vs. Non-Renewable

b. Land Resources

c. Air Resources

d. Water Resources

2. Energy Resources:

a. Conventional Energy Resources

b. Alternative Energy Resources

c. Conservation of Energy Resources

d. Human Impact on Earth Resources

3. Populations and the Use of Natural Resources:

a. Human Impact on Land Resources

b. Human Impact on Air Resources

c. Human Impact on Water Resources

**III. TEXTBOOKS**

Modern Earth Science 2nd Edition (Holt, Rinehart & Winston, 2000)

Laboratory Investigations in Earth Science (Holt, Rinehart & Winston, 2000)

Biological Science Applications in Agriculture (Osborne, 1994)

**IV. KEY ASSIGNMENTS:**

A.                 Research Paper on Earth Science Principles of Agriculture

B.                 Seminar Presentation on Earth Science Principles of Agriculture

C.                 Development of Science Fair Project relating to Agricultural Earth Science

D.                 Laboratory activities

E.                  Supervised Agricultural Experience Project & Data Collection

F.                  FFA Leadership Participation

G.                 Development of Student Portfolio

**V. ASSESSMENT METHODS**

1. Tests – including teacher made and standardized tests developed by authors.

B. Evaluation of class assignments.

C. Classroom activities.

D. Laboratory research investigations – weekly.

1. Homework & Reading assignments.
2. Research Paper.

**VI. LABORATORY ASSIGNMENTS**

A. Graphing Data

B. Metrics Measurement

C. Daylight Hours on Earth

D. Planet Sizes

E. Solar System Distance

F. What does a Can of Pepsi Weigh on Other Planets

G. H-R Diagram

H. Composition of Air and Layers of the Atmosphere

I. Convection Currents

J. Calculating Relative Humidity

K. Weather Station Model

L. Rain Shadow Effect

M. Dew Point

N. Tree Ring Growth

O. Pangaea Puzzle- Do the Pieces Fit

P. Locating an Earthquake

Q. Virtual Earthquake

R. Volcano Identity

S. Pet Rock Investigation

T. Crayon Rock

U. Distillation Lab

V. The Ups and Downs of the Ocean Floor

W. Movement of a Water Particle in a Wave

X. California Commodity Map

Y. Plant Commodity Investigation

Z. Egg Dissection

AA. Butter

BB. Ice Cream