



Earth Science - Home Teacher Program

ACADEMIC INSTRUCTIONAL LIBRARY



EARTH SCIENCE

COURSE OVERVIEW

Earth Science is a high school science course that explores Earth's structure, interacting systems, and place in the universe. The course uncovers concepts and processes found in:

- Astronomy – Earth's place in and interaction with space,
- Geology – physical structure and dynamic processes,
- Meteorology – atmosphere, weather and climate, and
- Oceanography – oceans and marine life.

HOME TEACHER LABS

Labs for the Homeschool Plus program are those contained in the Ignitia Online Curriculum. No expensive equipment is required with only several requiring the purchase of small items or household items to conduct the experiments.

It is always advisable to be familiar with your surroundings and wear protective equipment when conducting any experiment. Never allow yourself to be distracted when completing an experiment.

UNIT 1 - DYNAMIC STRUCTURE OF EARTH

1. Course Overview

2. **Introduction to Earth Science**
3. **Project: Research a Career** (*Choose one of the following scientific career fields and write a report that will give you a closer look at what this type of scientist does in his/her work. Include the information listed below in your report. This report should be roughly one page in length. Choose one of these career fields: astronomer, geologist, meteorologist, oceanographer. List three tasks this type of scientist completes most days. List a location where such a scientist may work. Identify three reasons why this type of scientist's work is important. Identify what course of study is necessary to work in this field of science, as well as how many years of study are necessary to complete a degree in this field. Your paper should be at least 400 words in length.*)
4. **A Unique Planet**
5. **Quiz 1: Introduction to Earth Science**
6. **Layers of the Earth**
7. **Continental Drift**
8. **Plate Tectonics**
9. **Plate Boundaries**
10. **Quiz 2: Earth's Dynamic Internal Structure**
11. **The Spheres of Earth**
12. **Geochemical Cycles: Cycles of Earth Materials**
13. **Biogeochemical Cycles: Cycles of Life Materials**
14. **Flow of Energy in Ecosystems**
15. **Project: Flow of Energy** (*You have learned that a food chain can represent the flow of energy in an ecosystem. Most energy begins with the Sun. All food chains begin with a producer, which uses sunlight to make food through photosynthesis. Consumers obtain their energy by eating producers and other consumers. Primary consumers, or herbivores, eat plants. Secondary consumers feed on primary consumers, while tertiary*

consumers feed on secondary consumers. Secondary and tertiary consumers can be carnivores or omnivores, meaning they can eat only meat or eat both meat and plants. In nature, a linear food chain rarely exists. Most consumers eat a variety of organisms. A group of interconnected food chains is a food web. In this project, you will construct a food web. Imagine an ecosystem with the populations as listed on the Project page. List a food web representing the flow of energy in the ecosystem. Be sure to include all the populations. If necessary, research each animal's diet to determine its place in the food web. After completing your food web, answer the questions - If the ecosystem is balanced, which populations should be the largest? Which should be the smallest?)

16. **Quiz 3: Earth's Dynamic External Structure**
17. **Review**
18. **Test**
19. **Alternate Test**
20. **Glossary and Credits**

UNIT 2 – FORCES AND FEATURES OF EARTH

1. **Force of Earthquakes**
2. **Measuring The Force of Earthquakes**
3. **Features of Earthquakes**
4. **Quiz 1: Earthquakes**
5. **Force of Volcanoes**
6. **Impact of Volcanoes**
7. **Prediction of Volcanoes**
8. **Features of Volcanoes**

9. **Project: Volcanic Features Lab** (*Plate tectonics has changed the surface of the earth in many ways. Some of those changes are from volcanoes that plate movements create. And, as you know, volcanoes can cause many formations in Earth's crust. Visit many of these geological features by exploring the Volcanic Features Lab. Complete the lab and answer the question associated with the lab.*)
10. **Quiz 2: Volcanoes**
11. **Using Geologic Maps**
12. **Using Topographic Maps**
13. **Quiz 3: Identifying Features of Earth**
14. **Review**
15. **Test**
16. **Alternate Test**
17. **Glossary and Credits**

UNIT 3 - FEATURES OF EARTH'S CRUST

1. **Minerals**
2. **Mineral Identification**
3. **Quiz 1**
4. **Igneous Rocks**
5. **Sedimentary Rocks**
6. **Metamorphic Rocks**
7. **The Rock Cycle**
8. **Quiz 2**
9. **Renewable Resources**
10. **Nonrenewable Resources**

11. **Project: Nuclear Energy** (*You have learned that renewable resources can be replenished in a short time. Nonrenewable resources cannot. The sun, water, wind, and biomass are common sources of renewable energy. Coal, oil, and natural gas are sources of nonrenewable energy. Another source of energy is nuclear energy. Nuclear energy is the energy in the nucleus of an atom. We can release this energy and use it to make electricity. In this project, you will research nuclear energy. Use the library, internet, and other educational resources to research nuclear energy. Write a 250-word report on what you have learned. Be sure to include the uses of nuclear power, how it is generated, and the impact it has on the environment. Also, answer the question, "Is nuclear energy renewable?"*)
12. **Quiz 3**
13. **Review**
14. **Test**
15. **Alternate Test**
16. **Glossary and Credits**

UNIT 4 – SHAPING EARTH’S CRUST

1. **Weathering**
2. **Erosion**
3. **Soil Formation**
4. **Project: Soil Particles**
5. **Quiz 1: Shaping the Surface**
6. **Rivers and Waves**
7. **Gravity and Glaciers**
8. **Wind**
9. **Quiz 2: Weathering and Erosion**

10. **Destructive Forces**
11. **Constructive Forces**
12. **Quiz 3: Destructive and Constructive Forces**
13. **Review**
14. **Test**
15. **Alternate Test**
16. **Glossary and Credits**

UNIT 5 - SEMESTER REVIEW AND EXAM

1. **Review (1)**
2. **Review (2)**
3. **Exam**
4. **Alternate Exam**

UNIT 6 – EARTH’S WATER

1. **The Water Cycle**
2. **Project: Water Purification (*Imagine being stranded in the desert without any clean water. How would you survive without becoming dehydrated? As long as you have a piece of plastic, some rocks, and a cup, you can purify dirty water using the water cycle. The purification process uses the "greenhouse effect" to cause evaporation and condensation. The setup used to purify the water is called a solar still. In this experiment, you will purify water using a solar still. Follow the directions given to you and give the results of your experiment. Answers these questions: Is the water in the cup dirty? Why or why not? What happened to the water in the bowl? This project simulates a real-world process. What does the plastic wrap represent? What does the water in the cup represent? Which two parts of the water cycle are at work?*)**

3. **Water Basics**
4. **Water Distribution**
5. **Quiz 1**
6. **Groundwater**
7. **Lakes and Rivers**
8. **Glaciers and Ice Caps**
9. **Quiz 2**
10. **Ocean Water**
11. **Experiment: Fresh Water vs Salt Water**
12. **Waves and Tides**
13. **Currents**
14. **Quiz 3**
15. **Review**
16. **Test**
17. **Alternate Test**
18. **Glossary and Credits**

UNIT 7 - EARTH'S ATMOSPHERE

1. **Importance of the Atmosphere**
2. **Structure of the Atmosphere**
3. **Project: Layers of the Atmosphere** *(The atmosphere is made of different layers. Each layer has distinguishing characteristics. For example, long flights in a plane usually remain in the stratosphere. When you see a falling star, it is a meteorite burning up in the mesosphere. This project will test your knowledge of each layer and its characteristics. You can review the layers of the atmosphere in Lesson 3 of this unit. Create a*

model of the atmosphere above the earth. Use a different color to indicate each layer of the atmosphere. Provide a legend telling what each color represents. Note a special feature of each layer. Some ideas of special features could be special functions or activities that occur in each layer, like weather or ionization. Or, you can include objects you might see in each layer, like planes, falling stars, northern lights, satellites, etc. Note the average temperature or temperature range of each layer and how many miles from Earth each layer extends)

4. **Quiz 1: The Atmosphere**
5. **Atmospheric Cycles**
6. **Solar Interaction**
7. **Air Pressure and Winds**
8. **Project: Air Circulation** (*The earth is a sphere. The spherical shape causes the Sun's rays to hit the earth unevenly. The uneven heat distribution causes convection currents in the atmosphere that we call wind. In the atmosphere, many convection cells at different latitudes are produced by the Coriolis effect, which is caused by the earth's rotation. For instance, winds in the Northern hemisphere tend to flow clockwise while in the Southern hemisphere winds flow counterclockwise. Conduct the Air Circulation activity. Then, respond to the questions that follow. Does warm air rise or sink? Does cold air rise or sink? Air pressure can be high or low. Does air flow from low to high pressure or from high to low pressure? Which is heavier—warm air or cold air? Which has higher air pressure—warm air or cold air? How do you know? Global circulation cells occur because of uneven heat distribution and the earth's rotation. What do we call the effect of the earth's rotation on air circulation?)*
9. **Quiz 2: Earth-Sun Relationships**
10. **Air Pollution**
11. **Quiz 3: Human Relationship**
12. **Review**

13. Test
14. Alternate Test
15. Glossary and Credits

UNIT 8 - EARTH'S WEATHER AND CLIMATE

1. Weather and Climate
2. **Project: Weather or Climate?** (*Weather is the short-term changes in the atmosphere. Weather includes changes in temperature, humidity, precipitation, and winds. Weather can be difficult to predict, and it changes daily. Climate is the long-term or average weather conditions for an area. Climate is predictable. It is established using data collected for at least 30 years for a location. Climate includes expected weather extremes, as well. For example, if you live in Florida and a hurricane hits, it is a weather extreme you can expect for that region. For each of the following statements, indicate if it describes weather or climate, and briefly explain why. If you think a statement could describe both weather or climate, explain why that could be. An example is provided for you. Respond to the questions presented.*)
3. Clouds and Precipitation
4. **Project: Clouds and Weather** (*Sometimes, meteorologists can look at the clouds in the sky and predict the weather conditions that will occur. This is because different clouds produce different weather conditions. For this project, you're going to be a meteorologist. Let's see if you can identify the different types of clouds and predict the weather for your viewers, based strictly on cloud formation! Enter "The Cloud Caster" below. Select a city, identify the clouds for that city, and then select the weather you can expect for that type of cloud. Do this for each city. After completing "The Cloud Caster," answer the questions at the end of this exercise. Which type of clouds can you always expect to signal fair weather: cirrus, stratus, or cumulus? Which type of clouds can you always expect to bring precipitation: alto, nimbus, or cumulus? List these clouds from highest to*

lowest: cirrus, stratus, fog, altocumulus. Which type of cloud occasionally produces precipitation: stratus, short cumulus, or cirrocumulus? Did you make Prime Time television, or was your show cancelled?)

5. **Air Masses and Fronts**
6. **Quiz 1: Weather Factors of the Sky**
7. **Solar Power**
8. **Geographical Effects**
9. **Climate Regulation and Change**
10. **Quiz 2: Causes of Weather and Climate**
11. **Weird Weather**
12. **Measuring Weather**
13. **Quiz 3: Predicting Weather**
14. **Review**
15. **Test**
16. **Alternate Test**
17. **Glossary and Credits**

UNIT 9 – ASTRONOMY

1. **Earth's Place in the Solar System**
2. **Planetary Motion**
3. **Ability To Orbit**
4. **Earth's Motion, Seasons, and Moon**
5. **Quiz 1: Solar System**
6. **Characteristics of Stars**
7. **Structure of the Sun**

8. **Galaxies**
9. **Project: Identifying Galaxies**
10. **Quiz 2: Stars and Galaxies**
11. **Review**
12. **Test**
13. **Alternate Test**
14. **Glossary and Credits**

UNIT 10 – SEMESTER REVIEW AND EXAM

1. **Review (1)**
2. **Review (2)**
3. **Exam**
4. **Alternate Exam**