

# 6th GRADE EARTH SCIENCE

## Curriculum Guide

### Science

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Middle school students typically learn a smattering of earth science topics throughout their elementary years. An in-depth study of Earth Science topics usually does not take place until freshman year of high school. Unfortunately, many of our students elect to take a more challenging science course (Conceptual Physics) during their freshman year, effectively denying any comprehensive study of the fascinating world of Earth Sciences. The 6<sup>th</sup> grade science curriculum at Sacred Heart School seeks to overcome this lack of study by providing students with a solid and accurate understanding of earth science topics through a thematic and hands-on approach. Students will learn science process skills, use scientific principles and processes, develop scientific, mathematical, and technological literacy, and apply these skills in their first detailed course of scientific study. The topics covered include a look at the Earth's latitude and longitude, seasons, and timekeeping; a wide-ranging examination of the solar system and the universe; meteorology; physical and biological oceanography; water systems; fluvial landscapes; soils; as well as rocks, minerals, and geologic processes. A variety of exercises, labs, and activities provide a depth of learning in the earth science arena. Science Olympiad provides one such activity for learning.

#### I. Unit I: Science Basics

##### A. The Nature of Science

1. What is Science?
  - a. Discuss how science can help solve problems.
  - b. Describe and apply the skills used in science.
  - c. Develop the framework for scientific experimentation.
2. Doing Science
  - a. Demonstrate how science can solve problems.
  - b. Design an experiment.

#### II. Unit II: Geography and Astronomy

##### A. Relating Geography and Astronomy

1. Earth's Place in Space
  - a. Explain how the tilt of the Earth's axis causes seasons.
  - b. Analyze what causes the phases of the moon.
  - c. Determine latitude and longitude.
  - d. Identify the reasons for the International Date Line.
  - e. Accurately reproduce the alignment of earth-moon-sun to demonstrate the causes and effects of eclipses.
2. Topography
  - a. Identify the major types of landforms on the earth.
  - b. Use topographic maps.
  - c. Relate topographic map locations to real landforms.

##### B. The Solar System

- a. Recognize spatial relationships between distances in space.
- b. Compare and contrast objects in the solar system.
- c. Utilize a topographic map of Mars to identify major features.
- d. Identify the achievements of the Voyager program.
2. Science and Society: Space Exploration: Boom or Bust
  - a. Analyze the costs and benefits of space exploration.
  - b. Recognize bias in science articles.
  - c. State an informed opinion about the proposed lunar base and Mars expedition.
3. Stars and Galaxies
  - a. Discuss how a star is born.
  - b. Describe the galaxies that make up the universe.
  - c. Give examples of stars that are similar to and different from the sun.
  - d. Describe a main sequence star.

### III. Unit III: Meteorology

#### A. Earth's Atmosphere

1. What's in the Air?
  - a. Analyze the makeup of the atmosphere.
  - b. Identify the parts of the atmosphere.
  - c. Define meteorological terms.
  - d. Determine the effects of air pressure.
2. Weather
  - a. Discuss the causes of weather.
  - b. Compare and contrast different types of weather.
  - c. Identify different types of weather phenomenon.
  - d. Identify types of severe weather and the effects on life and property.
3. Science and Society: Forecasting the Weather
  - a. Explain how scientists forecast the weather.
  - b. Identify the tools used to forecast weather.
  - c. Analyze the relationship between a forecast and weather elements.

#### B. Climate

1. Climate Zones
  - a. Describe climate.
  - b. Analyze the effects that location has on climate.
  - c. Analyze the effects that topography has on climate.
2. Climate and Life
  - a. Analyze the effects that human beings have on climate.
  - b. Relate climate to biomes.

### IV. Unit IV: Water and Oceans

#### A. Water and Its Properties

1. Recycling Water
  - a. Investigate the hydrologic cycle.
  - b. Define groundwater and describe its movement.
  - c. Examine the movement of water through various materials.

- d. Understand the limited availability of potable water.
- 2. Earth Shaped by Water
  - a. Explain how water changes the earth's surface.
  - b. Determine the importance of water as a means of soil renewal.
  - c. Identify the stages of a river.
  - d. Recognize the importance of water as a landform sculptor.
- B. Oceans
  - 1. Physical Oceanography
    - a. Determine why oceans are salty.
    - b. Determine the causes and types of currents.
    - c. Analyze the effects of waves upon the shoreline.
    - d. Determine the causes and effects of tides.
    - e. Compare and contrast the physical characteristics of the world's oceans.
  - 2. Marine Biology
    - a. Identify the types of organisms that inhabit the oceans.
    - b. Recognize that most organisms require sunlight to survive.
    - c. Identify the various tools used by marine biologists.
    - d. Discuss the history of ocean science.
  - 3. Science and Society: Ocean Pollution
    - a. Discuss the importance of oceans as resources.
    - b. Describe various sources of ocean pollution.
    - c. Identify what each citizen can do to save the oceans.

V. **Unit V: Geology**

- A. Earth Materials
  - 1. Minerals: Earth's Jewels
    - a. Identify the properties of a mineral.
    - b. Compare and contrast rocks and minerals.
    - c. Identify minerals using their physical properties.
    - d. Recognize that some minerals are considered valuable.
    - e. Explain the methods used to identify minerals.
  - 2. Igneous and Sedimentary Rocks
    - a. Explain how igneous rocks form.
    - b. Identify the different types of igneous rocks.
    - c. Identify different igneous rock formations.
    - d. Explain how sedimentary rocks form.
    - e. Identify the different types of sedimentary rocks.
    - f. Identify different sedimentary rock formations.
  - 3. Science and Society: Monument or Energy
    - a. Investigate earth processes that produce resources for use.
    - b. Identify the pros and cons of designating an area as a National Monument.
    - c. Predict the consequences of changes in land use on the economy of an area.
    - d. Recognize that many common products must be mined.
  - 4. Metamorphic Rocks and the Rock Cycle
    - a. Explain how metamorphic rocks form.

- b. Identify the different types of metamorphic rocks.
- c. Identify different metamorphic rock formations.
- d. Identify the processes involved in the rock cycle.
- e. Recognize that the rock cycle is ongoing and constantly changing the earth's surface.

## B. Earth's Structure

1. What's Shaking?
  - a. Identify the structure of a volcano.
  - b. Investigate where volcanoes are most likely to occur.
  - c. Identify the types of volcanoes and the types of eruptions expected from each.
  - d. Determine the causes of earthquakes.
  - e. Analyze the structure of faults, convergent, and divergent zones.
  - f. Analyze the types of seismic waves and their relationship to earthquake location.
2. Science and Society: Predicting Earthquakes
  - a. Research the history of earthquake prediction.
  - b. Identify the agencies most involved in earthquake safety.
  - c. Research past earthquakes.
  - d. Relate the progress made in building safety.
3. A Journey to Earth's Center
  - a. Describe the layers of the earth's interior.
  - b. Identify the theory of continental drift.
  - c. Explain the evidence that supports the continental drift theory.
  - d. recognize that the continents have moved many times in the last 400 million years.
4. Crashing Continents
  - a. Analyze the structure of faults, convergent, and divergent zones.
  - b. Explain the difference between oceanic and continental crust.
  - c. Explain the formation of mountain ranges in relation to plate tectonics.
  - d. Identify landforms that are a direct result of plate movements.
  - e. Relate plate tectonics to volcanic eruptions, earthquakes, and other surface changes.
  - f. Identify areas of the world today where recognizable plate tectonic changes can be seen.