

**SCIENCE - EARTH AND SPACE SCIENCE I**

**Subject:** Earth and Space Science I  
**Academic Standard:** ES.1  
**Academic Standard Indicator:** ES.1.10  
**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Recognize and describe that the earth sciences address planet-wide interacting systems, including the oceans, the air, the solid Earth, and life on Earth, as well as interactions with the Solar System.

**Suggestion for Integrating International Content:** Have students consider the disruptions affecting numerous countries that the earth sciences address. *Examples:* El Niño; global climate change; 2010 eruption of Iceland’s Eyjafjallajökull Volcano; 2010 Gulf of Mexico oil spill; 2004 Indian Ocean tsunami; 2010 earthquakes in Haiti and Chile. *Extension:* Have students research all of the countries that jointly operate the international space station.

**Subject:** Earth and Space Science I  
**Academic Standard:** ES.1  
**Academic Standard Indicator:** ES.1.11  
**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Examine the structure, composition, and function of the Earth’s atmosphere. Include the role of living organisms in the cycling of atmospheric gases.

**Suggestion for Integrating International Content:** Have students make a graph of top carbon dioxide emitting countries to illustrate connections among developed and developing countries and their carbon dioxide emissions.  
**Suggested resource:**  
[http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/graph-showing-each-countrys.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/graph-showing-each-countrys.html).

**Subject:** Earth and Space Science I  
**Academic Standard:** ES.1  
**Academic Standard Indicator:** ES.1.11  
**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Examine the structure, composition, and function of the Earth’s atmosphere. Include the role of living organisms in the cycling of atmospheric gases.

**Suggestion for Integrating International Content:** Have students access the website <http://www.breathingearth.net/> to determine which countries are contributing the most to increased atmospheric carbon dioxide.

*Extension:* Have students research and report on different suggestions to reduce atmospheric carbon dioxide.

**Subject:** Earth and Space Science I  
**Academic Standard:** ES.1  
**Academic Standard Indicator:** ES.1.16  
**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Investigate the causes of severe weather and propose appropriate safety measures that can be taken in the event of severe weather.

**Suggestion for Integrating International Content:** Have students research and report on the Indian Ocean tsunami of 2004. Their focus should be on the underlying cause of the tsunami and what preventative measures could have reduced the loss of life.

**Subject:** Earth and Space Science I  
**Academic Standard:** ES.1  
**Academic Standard Indicator:** ES.1.18  
**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Demonstrate the possible effects of atmospheric changes brought on by things such as acid rain, smoke, volcanic dust, greenhouse effect, and ozone depletion.

**Suggestion for Integrating International Content:** Discuss with students effects.  
*Examples:* Disruption in air travel caused by the 2010 eruption of Iceland’s Eyjafjallajökull volcano; increased incidence of skin cancer in Australia as a result of ozone depletion; forest

destruction due to acid rain in the border among Germany, Poland, and the Czech Republic; polar bear endangerment due to glacial melting in the Arctic.

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**Subject:** Earth and Space Science I

**Academic Standard:** ES.1

**Academic Standard Indicator:** ES.1.23

**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Explain motions, transformations, and locations of materials in Earth's lithosphere and interior. For example, describe the movement of the plates that make up Earth's crust and the resulting formation of earthquakes, volcanoes, trenches, and mountains.

**Suggestion for Integrating International**

**Content:** Have students identify and locate on a globe the two most seismic regions in the world, the Pacific Ring of Fire and the Alpidic Belt in Eurasia.

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**Subject:** Earth and Space Science I

**Academic Standard:** ES.1

**Academic Standard Indicator:** ES.1.25

**Core Standard:** No

**Standard Description (Academic or Indicator):** Investigate and discuss the origin of various landforms, such as mountains and rivers, and how they affect and are affected by human activities.

**Suggestion for Integrating International**

**Content:** Divide students into two groups and have them research and debate the impact of the Three Gorges dam built on the Yangtze River in China. Half of the students should provide arguments in support of the dam and the benefits it offers the Chinese people. The other group of students should provide arguments indicating the negative impacts of the dam.

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**Subject:** Earth and Space Science I

**Academic Standard:** ES.1

**Academic Standard Indicator:** ES.1.28

**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Discuss geologic evidence, including fossils and radioactive dating, in relation to the Earth's past.

**Suggestion for Integrating International**

**Content:** Give students an overview of fossil discoveries in Olduvai Gorge, Tanzania. Note that, as indicated by the fossil record, survival seemed to favor hominids that were able to craft and use increasingly complex tools.

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**Subject:** Earth and Space Science I

**Academic Standard:** ES.2

**Academic Standard Indicator:**

**Core Standard:** Yes

**Standard Description (Academic or Indicator):** Students gain understanding of how the scientific enterprise operates through examples of historical events. Through the study of these events, they understand that new ideas are limited by the context in which they are conceived, that the ideas are often rejected by the scientific establishment, that the ideas sometimes spring from unexpected findings, and that the ideas grow or transform slowly through the contributions of many different investigators.

**Suggestion for Integrating International**

**Content:** On a map or globe, have students pinpoint the birthplace or workplace of individuals from all over the world whose work has contributed to modern knowledge of earth and space sciences. Note the name and date for each location. Emphasize that science involves the work of many individuals in many locations.

**Examples:** Claudius Ptolemy (2nd century, observations made in Alexandria, Egypt); Nicholas Copernicus (16th century, born in Torun, Poland); Johannes Kepler (late 16th/early 17th century, born in Weil der Stadt, Germany); Tycho Brahe (16th century, born in Scania, then Denmark, now Sweden); Galileo (late 16th/early 17th century, born in Florence, Italy); James Hutton (18th century, Edinburgh, Scotland); Charles Yell (19th century, born in Forfarshire, Scotland); Alfred Wegener (late 19th/early 20th century, born in Berlin, Germany).