

SCIENCE – ENVIRONMENTAL SCIENCE, ADVANCED

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.1

Core Standard: No

Standard Description (Academic or Indicator): Know and describe how ecosystems can be reasonably stable over hundreds or thousands of years. Consider as an example the ecosystem of the Great Plains prior to the advent of the horse in Native American Plains societies, from then until the advent of agriculture, and well into the present.

Suggestion for Integrating International Content: Have student teams identify, research, and report about other countries or ecosystems that have remained stable and free from outside influence. *Example:* The Himalayan country of Bhutan has remained isolated from outside influences for hundreds of years.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.13

Core Standard: No

Standard Description (Academic or Indicator): Understand and describe how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Recognize that by burning these fossil fuels, people are passing stored energy back into the environment as heat and releasing large amounts of carbon dioxide.

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.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.14

Core Standard: No

Standard Description (Academic or Indicator): Recognize and explain that the amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle organic materials from the remains of dead organisms.

Suggestion for Integrating International Content: Have students develop an awareness campaign for large scale logging and livestock interests and government policy makers to explain that the short-term benefits from the clearing of rainforest land are outweighed by longer term problems such as erosion and desertification.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.19

Core Standard: No

Standard Description (Academic or Indicator): Demonstrate and explain how the factors, such as birth rate, death rate, and migration rate, determine growth rates of populations.

Suggestion for Integrating International Content: Assign students different countries with declining population growth and different reasons for the decline. Have them report on the factors affecting the decrease. *Examples:* Zimbabwe; Japan; Bulgaria; Armenia.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.2

Core Standard: No

Standard Description (Academic or Indicator): Understand and describe that if a disaster, such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one.

Suggestion for Integrating International

Content: Have students research the impact of different natural disasters that have occurred in the world and identify their immediate effects on local ecosystems. Then have them further identify how those ecosystems continued to change after the disaster. *Suggested resource:* http://en.wikipedia.org/wiki/List_of_natural_disasters.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.20

Core Standard: No

Standard Description (Academic or

Indicator): Demonstrate how resources, such as food supply, influence populations.

Suggestion for Integrating International

Content: Have students explain how the phenomenon of the Great Migration in the Serengeti-Maasai Mara areas of Kenya and Tanzania, the largest migration of land mammals on the planet, resulted from the explosive growth of the wildebeest population in the 1960s.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.22

Core Standard: No

Standard Description (Academic or

Indicator): Demonstrate knowledge of the distribution of natural resources in the U. S. and the world, and explain how natural resources influence relationships among nations.

Suggestion for Integrating International

Content: Have students participate in the World Water Day on March 22. *Suggested resource:* <http://www.worldwaterday.org/>.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.25

Core Standard: No

Standard Description (Academic or

Indicator): Recognize and describe alternative sources of energy provided by water, the atmosphere, and the sun.

Suggestion for Integrating International

Content: Contrast the environmental health of Bhutan, a Himalayan country using and exporting hydroelectric power, to that of Croatia, a country using primarily fossil fuel combustion, and Brazil, which produces and uses ethanol to be independent of foreign oil.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.3

Core Standard: No

Standard Description (Academic or

Indicator): Understand and explain that ecosystems have cyclic fluctuations, such as seasonal changes or changes in population, as a result of migrations.

Suggestion for Integrating International

Content: Show students a video about Monarch Butterfly migration and have them identify changes in the ecosystems that the Monarchs spend time in during their migration. *Suggested resource:* *The Incredible Journey of the Butterflies* at <http://video.pbs.org/video/1063682334/>.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.33

Core Standard: No

Standard Description (Academic or

Indicator): Identify natural Earth hazards, such as earthquakes and hurricanes, and identify the regions in which they occur as well as the short-term and long-term effects on the environment and on people.

Suggestion for Integrating International

Content: Have students explore the different effects of the 2010 earthquakes in California, Chile, and Haiti and explain the reasons for those differences.

Subject: Environmental Science, Advanced

Academic Standard: ENV.1

Academic Standard Indicator: ENV.1.4

Core Standard: No

Standard Description (Academic or Indicator): Understand and explain that human beings are part of the Earth's ecosystems, and give examples of how human activities can, deliberately or inadvertently, alter ecosystems.

Suggestion for Integrating International Content: Have students consider specific examples of human-induced ecosystem changes around the world. *Examples:* Effect of dumping untreated sewage into water on the growth of algae in coastal waters in China; effect of deforestation on the native people in the Amazon Basin; effect of global warming on the coral in the Great Barrier Reef and polar bears of the Arctic; introduction of the Nile Perch into Lake Victoria for food and sport fishing.
