

SCIENCE – GRADE 8**Grade:** 8**Academic Standard:** 8.1**Academic Standard Indicator:** 8.1.8**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that humans help shape the future by generating knowledge, developing new technologies, and communicating ideas to others.

Suggestion for Integrating International Content: Have students research scientific theories or technologies that have been developed around the world and discuss how these developments are communicated and influence people globally. *Examples:* Darwin (England) and the theory of natural selection; Watson and Crick (U.S.) and the 3-D structure of DNA; evolution of the the microscope from the simple microscope of Z. and H. Janssen and Van Leeuwenhoek (Holland) to the light microscope of Hooke (England) and the perfection of the instrument by Spencer (U.S.).

Grade: 8**Academic Standard:** 8.2**Academic Standard Indicator:** 8.2.1**Core Standard:** No

Standard Description (Academic or Indicator): Estimate distances and travel times from maps and the actual size of objects from scale drawings.

Suggestion for Integrating International Content: Have students use world maps to estimate distances and travel times given specific parameters. Have them check their work using the Measure Distance Map at <http://www.freemapttools.com>.

Grade: 8**Academic Standard:** 8.2**Academic Standard Indicator:** 8.2.2**Core Standard:** No

Standard Description (Academic or Indicator): Determine in what unit, such as seconds, meters, grams, etc., an answer should be expressed based on the units of the inputs to the calculation.

Suggestion for Integrating International Content: Have students learn how scientists in the lab and working in the field typically use the International System of Measurement (SI Units or metric system) and discuss why scientists in the U.S. use this system, even though Americans as a whole do not. Be sure that students are familiar with the SI Units used to measure mass, length, distance, and volume and can use the appropriate tools of measurement.

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.3**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that the solid crust of Earth, including both the continents and the ocean basins, consists of separate plates that ride on a denser, hot, gradually deformable layer of earth. Understand that the crust sections move very slowly, pressing against one another in some places, pulling apart in other places. Further understand that ocean-floor plates may slide under continental plates, sinking deep into Earth, and that the surface layers of these plates may fold, forming mountain ranges.

Suggestion for Integrating International Content: Have students identify different areas on the earth where convergent, divergent, and transform boundaries are formed. Ask students to describe what the topography of the land would be like in these places and how it might affect the areas, cities, or people nearby.
Extension: Have students use this information to explain the 2011 Japan earthquake and tsunami.

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.4**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that earthquakes often occur along the boundaries between colliding plates, and molten rock from below creates pressure that is released by volcanic eruptions, helping to build up mountains. Understand that under the ocean basins, molten rock may well up between separating plates to create new ocean floor. Further understand that volcanic activity along the ocean floor may form undersea mountains, which can thrust above the ocean's surface to become islands.

Suggestion for Integrating International Content: Have student groups examine a map of the world that shows where many of the major earthquakes have occurred. Then have them mark these locations on a blank world map (8.5"x11") and "connect the dots" to visualize the major plate boundaries on earth. *Suggested resource:* Maps at <http://edsserver.ucsd.edu/visualizingearth/>.

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.6**Core Standard:** No

Standard Description (Academic or Indicator): Understand and explain that the benefits of the Earth's resources, such as fresh water, air, soil, and trees, are finite and can be reduced by using them wastefully or by deliberately or accidentally destroying them.

Suggestion for Integrating International Content: Have students research and discuss examples from around the world of the destruction of the Earth's resources. *Examples:* Destruction of rainforest and deforestation in Brazil; reduction of mangrove swamps and wetlands in coastal regions around the world; severe air pollution in Asia. *Suggested resource:* <http://earthtrends.wri.org/>.

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.8**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that all matter is made up of atoms which are far too small to see directly through an optical microscope. Understand that the atoms of any element are similar but are different from atoms of other elements. Further understand that atoms may stick together in well-defined molecules or may be packed together in large arrays. Also understand that different arrangements of atoms into groups comprise all substances.

Suggestion for Integrating International Content: Have students investigate some of the international history behind atomic theory. *Examples:* Work of Ernest Rutherford (New Zealand-English physicist); James Chadwick (English physicist).

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.18**Core Standard:** No

Standard Description (Academic or Indicator): Investigate and explain that electric currents and magnets can exert force on each other.

Suggestion for Integrating International Content: Have students research the development of Magnetically Levitated Trains (MagLevs) trains, discussing how they work and what the advantages and disadvantages are of these trains in different places around the globe. *Suggested resources:* www.howstuffworks.com/; Shanghai Maglev Train site at www.smtc.com/en/.

Grade: 8**Academic Standard:** 8.3**Academic Standard Indicator:** 8.3.20**Core Standard:** No

Standard Description (Academic or Indicator): Compare the differences in power consumption in different electrical devices.

Suggestion for Integrating International

Content: In addition to comparing the differences in devices, also have students compare electric power consumption among different countries. **Suggested resource:** http://www.nationmaster.com/graph/ene_ele_pow_con_kwh-energy-electric-power-consumption-kwh.

Grade: 8

Academic Standard: 8.4

Academic Standard Indicator: 8.4.3

Core Standard: Yes

Standard Description (Academic or Indicator): Recognize and describe that new varieties of cultivated plants, such as corn and apples, and domestic animals, such as dogs and horses, have resulted from selective breeding for particular traits.

Suggestion for Integrating International

Content: Have students compare and contrast the captive breeding of endangered species from around the world, such as the white rhinoceros and giant panda, to selective breeding of dogs and horses. Consider the implications and outcomes of breeding in captivity in zoos far away from their native countries and habitats.

Grade: 8

Academic Standard: 8.4

Academic Standard Indicator: 8.4.5

Core Standard: No

Standard Description (Academic or Indicator): Explain that energy can be transferred from one form to another in living things.

Suggestion for Integrating International

Content: Have student groups each choose a different habitat or biome from around the world. Then have them develop the relevant food chains or webs using native organisms and report to the class. **Examples:** African grasslands; Latin American rainforests. **Extension:** Lead the class in a comparison of the resulting food webs, identifying similarities and differences.

Grade: 8

Academic Standard: 8.4

Academic Standard Indicator: 8.4.7

Core Standard: No

Standard Description (Academic or Indicator): Recognize and explain that small genetic differences between parents and offspring can accumulate in successive generations so that descendants are very different from their ancestors.

Suggestion for Integrating International

Content: Have students read about and discuss research on guppies in the Caribbean island of Trinidad, which demonstrates evolution by the process of natural selection in a natural environment. **Suggested resources:** <http://cnas.ucr.edu/guppy/>; <http://www.pbs.org/wgbh/evolution/library/>.

Grade: 8

Academic Standard: 8.4

Academic Standard Indicator: 8.4.8

Core Standard: No

Standard Description (Academic or Indicator): Describe how environmental conditions affect the survival of individual organisms and how entire species may prosper in spite of the poor survivability or bad fortune of individuals.

Suggestion for Integrating International

Content: Have students discuss the presence of genetic mutations and allele frequencies in different regions of the world. **Example:** Common African mutation that is helpful in preventing malaria, but causes sickle cell anemia. Have students consider how the allele frequency of this gene might differ among individuals in populations in West Africa versus the U.S. **Suggested resource:** <http://www.pbs.org/wgbh/evolution/library/>.

Grade: 8

Academic Standard: 8.4

Academic Standard Indicator: 8.4.9

Core Standard: Yes

Standard Description (Academic or Indicator): Recognize and describe that fossil

evidence is consistent with the idea that human beings evolved from earlier species.

Suggestion for Integrating International

Content: Have students research and describe important fossil finds around the world.

Examples: Lucy (Australopithecus afarensis); the Laetoli footprints; the Hadar skull.

Suggested resource:

<http://www.pbs.org/wgbh/evolution/library/>.

Grade: 8

Academic Standard: 8.5

Academic Standard Indicator: 8.5.5

Core Standard: No

Standard Description (Academic or Indicator): Illustrate that it takes two numbers to locate a point on a map or any other two-dimensional surface.

Suggestion for Integrating International

Content: Using world maps, have students identify cities by using coordinates or using a map of a particular city. Also have them use coordinates to locate significant points of interest in a scavenger hunt. **Examples:** Museums; universities.

Grade: 8

Academic Standard: 8.5

Academic Standard Indicator: 8.5.9

Core Standard: No

Standard Description (Academic or Indicator): Compare the mean, median, and mode of a data set.

Suggestion for Integrating International

Content: Have students use data from the World Health Organization to calculate and compare the mean, median, and mode of a data set.

Example: Life expectancy of males and females in the U.S. and a variety of other countries.

Suggested resource:

www.who.int/whosis/en/index.html.

Differentiated Instruction- Special Needs

Accommodations: Suggest a variety of presentation modes for students to select from to demonstrate their knowledge - diorama, PowerPoint, chart, etc. Allow students to

research a particular point of interest and present on it.

Differentiated Instruction- Highly Able

Accommodations: Discuss and demonstrate how statistics can be manipulated to influence the audience. Have students compare how the mean, median, and mode averages can be used to convey different points of view.

Grade: 8

Academic Standard: 8.5

Academic Standard Indicator: 8.5.10

Core Standard: No

Standard Description (Academic or Indicator): Explain how the comparison of data from two groups involves comparing both their middles and the spreads.

Suggestion for Integrating International

Content: Have students use data to compare phenomena from around the globe. **Examples:** Volcanic eruption data from two similar volcanoes in two different areas of the world, or the number of people in two different regions or countries of the world who have contracted malaria.

Grade: 8

Academic Standard: 8.6

Academic Standard Indicator: 8.6.2

Core Standard: No

Standard Description (Academic or Indicator): Understand and describe that the accidental discovery that minerals containing uranium darken photographic film, as light does, led to the discovery of radioactivity.

Suggestion for Integrating International

Content: Have students discuss French physicist Antoine Henri Becquerel's life and work, including the details of his famous experiment that led to the discovery of radioactivity.

Grade: 8

Academic Standard: 8.6

Academic Standard Indicator: 8.6.3

Core Standard: No

Standard Description (Academic or Indicator): Understand that and describe how in their laboratory in France, Marie Curie and her husband, Pierre Curie, isolated two new elements that were the source of most of the radioactivity of uranium ore. Note that they named one radium because it gave off powerful invisible rays, and the other polonium in honor of Madame Curie's country of birth, Poland. Also note that Marie Curie was the first scientist ever to win the Nobel Prize in two different fields, in physics, shared with her husband, and later in chemistry.

Suggestion for Integrating International Content: Have students create a class scrapbook focusing on the Curies' lives. **Extension:** Have small student groups take the scrapbook and share it with younger students.

Grade: 8

Academic Standard: 8.7

Academic Standard Indicator: 8.7.6

Core Standard: No

Standard Description (Academic or Indicator): Recognize that and describe how symmetry may determine properties of many objects, such as molecules, crystals, organisms, and designed structures.

Suggestion for Integrating International Content: Have students consider additional examples of the concept of symmetry in artwork from around the world. **Examples:** Leonardo daVinci's "The Last Supper"; Islamic, Greek, or Mayan mosaics.
