

SCIENCE – GRADE 7**Grade:** 7**Academic Standard:** 7.1**Academic Standard Indicator:** 7.1.2**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that what people expect to observe often affects what they actually do observe and provide an example of a solution to this problem.

Suggestion for Integrating International Content: Have students use examples from Rudyard Kipling’s *Just-So Stories* that explain some observed occurrences in unexpected ways, emphasizing that a hypothesis needs to be rigorously tested before being accepted. **Suggested resources:** *Just So Stories* by Rudyard Kipling (Dover Publications, 2001); <http://chronicle.com/article/How-the-Scientist-Got-His/63287/>.

Grade: 7**Academic Standard:** 7.1**Academic Standard Indicator:** 7.1.4**Core Standard:** Yes

Standard Description (Academic or Indicator): Describe that different explanations can be given for the same evidence, and it is not always possible to tell which one is correct without further inquiry.

Suggestion for Integrating International Content: To illustrate the point that different explanations can be given for the same evidence, have students read and discuss a version of the Indian legend called “The Blind Men and the Elephant”. **Suggested resource:** http://www.noogenesis.com/pineapple/blind_men_elephant.html.

Grade: 7**Academic Standard:** 7.1**Academic Standard Indicator:** 7.1.5**Core Standard:** No

Standard Description (Academic or Indicator): Identify some important contributions to the advancement of science, mathematics, and technology that have been made by different kinds of people, in different cultures, at different times.

Suggestion for Integrating International Content: Using online resources, have students research about scientists and inventors from around the world and their contributions. Then have students make visual summaries on 8.5”x11” sheets and put these up on a wall around a world map, attached by string to their respective countries. **Suggested resources:** <http://web.mit.edu/invent/i-archive.html>; <http://www.astr.ua.edu/4000WS/>.

Grade: 7**Academic Standard:** 7.1**Academic Standard Indicator:** 7.1.8**Core Standard:** Yes

Standard Description (Academic or Indicator): Explain that technologies often have drawbacks as well as benefits. Consider a technology, such as the use of pesticides, which helps some organisms but may hurt others, either deliberately or inadvertently.

Suggestion for Integrating International Content: Have students research issues connected to e-waste (electronic waste) and WEEE (Waste Electrical and Electronic Equipment), which include harmful materials and require special handling and recycling methods worldwide. **Extension:** Have students list different sustainable methods of dealing with e-waste around the world.

Grade: 7**Academic Standard:** 7.2**Academic Standard Indicator:** 7.2.5**Core Standard:** No

Standard Description (Academic or Indicator): Estimate probabilities of outcomes in familiar situations, on the basis of history or the number of possible outcomes.

Suggestion for Integrating International

Content: Have students explore probability through international games. *Examples:* Japanese version of rock-paper-scissors, janken or jan-ken-pon; Korean version, gawi-bawi-bo or muk-chi-ba; ancient hand game of morra played in Roman and Greek times. *Suggested resources:*
<http://www.math.wichita.edu/history/activities/pr-ob-act.html#rock>;
http://www.utdanacenter.org/k12mathbenchmarks/tasks/22_rockpaper.php;
<http://www.netrover.com/~kingskid/rock/rock.html>, where students can play against a computer.

Grade: 7**Academic Standard:** 7.2**Academic Standard Indicator:** 7.2.7**Core Standard:** Yes

Standard Description (Academic or Indicator): Incorporate circle charts, bar and line graphs, diagrams, scatter plots, and symbols into writing, such as lab or research reports, to serve as evidence for claims and/or conclusions.

Suggestion for Integrating International

Content: Have students use data available online about natural disasters around the world to create graphic documents for discussions or research reports. *Examples:* 2010 earthquakes in Haiti and Chile; 2011 Japan earthquake and tsunami; 2004 South Asia tsunami. *Suggested resource:* www.usgs.gov.

Grade: 7**Academic Standard:** 7.3**Academic Standard Indicator:** 7.3.5**Core Standard:** Yes

Standard Description (Academic or Indicator): Recognize and explain that heat energy carried by ocean currents has a strong influence on climate around the world.

Suggestion for Integrating International

Content: Have students use a map of global ocean currents to make and discuss hydrographic observations worldwide, particularly how warm water currents can affect coastal areas.
Extension: Discuss the effects of El Niño and La Niña cycles.

Grade: 7**Academic Standard:** 7.3**Academic Standard Indicator:** 7.3.5**Core Standard:** Yes

Standard Description (Academic or Indicator): Recognize and explain that heat energy carried by ocean currents has a strong influence on climate around the world.

Suggestion for Integrating International

Content: Have students investigate and report on the oceans' role in global climate change.

Grade: 7**Academic Standard:** 7.3**Academic Standard Indicator:** 7.3.6**Core Standard:** No

Standard Description (Academic or Indicator): Describe how gas and dust from large volcanoes can change the atmosphere.

Suggestion for Integrating International

Content: Have students research Iceland's Eyjafjallajökull volcanic eruption in April 2010 and chart its impact on world travel on both a timeline and a world map.

Grade: 7**Academic Standard:** 7.3**Academic Standard Indicator:** 7.3.7**Core Standard:** Yes

Standard Description (Academic or Indicator): Give examples of some changes in Earth's surface that are abrupt, such as earthquakes and volcanic eruptions, and some changes that happen very slowly, such as uplift and wearing down of mountains and the action of glaciers.

Suggestion for Integrating International

Content: Have students investigate the global impact of major geological events and features. *Examples:* Mount Paricutin volcano in Mexico; 1995 earthquake in Kobe, Japan; December 2004 Indian Ocean tsunami; Greenland ice sheet/glacier; Himalaya mountains; Alps in Europe; mountains in New Zealand.

Grade: 7

Academic Standard: 7.3

Academic Standard Indicator: 7.3.10

Core Standard: Yes

Standard Description (Academic or Indicator): Explain how the thousands of layers of sedimentary rock can confirm the long history of the changing surface of Earth and the changing life forms whose remains are found in successive layers, although the youngest layers are not always found on top, because of folding, breaking, and uplifting of layers.

Suggestion for Integrating International

Content: Have students compare and contrast various rock and fossil columns or strata layers in different parts of the world. *Suggested resource:*

<http://slohs.slcusd.org/pages/teachers/rhamley/Biology/GeoHistory/Far-Flung%20Fossils%202004.htm>.

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.2

Core Standard: No

Standard Description (Academic or Indicator): Describe that all organisms, including the human species, are part of and depend on two main interconnected global food webs, the ocean food web and the land food web.

Suggestion for Integrating International

Content: Have students study a variety of food webs from different biomes and countries.

Examples: Grasslands (Australia, Africa); tundras (Arctic, alpine); rainforests (Central America, Southeast Asia, Congo, Madagascar, Amazon, Olympic); deserts (Sahara, Turkestan, Takla Makan-Gobi, Thar, Atacama, Arabian, Iranian, Australian, Kalahari, Namib, Patagonian); bodies of water (oceans, rivers; eg., the Amazon and Nile, the Great Barrier Reef).

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.9

Core Standard: No

Standard Description (Academic or Indicator): Understand and explain that as any population of organisms grows, it is held in check by one or more environmental factors. These factors could result in depletion of food or nesting sites and/or increase loss to increased numbers of predators or parasites. Give examples of some consequences of this.

Suggestion for Integrating International

Content: Have students explore the Great Barrier Reef and the pressures that affect coastal habitats. *Suggested resource:*

http://www.gbrmpa.gov.au/corp_site/info_services/publications/sotr/latest_updates/seabirds/pressure.

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.9

Core Standard: No

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Suggestion for Integrating International

Content: Have students investigate the impact of the Cane Toad, an animal introduced to Australia and which is now a threat to the biodiversity of the country's wilderness frontiers. *Suggested resource:* *Toad Overload* by Patricia Seibert (Millbrook Press, 1996).

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.10

Core Standard: No

Standard Description (Academic or Indicator): Describe how technologies having to do with food production, sanitation, and disease prevention have dramatically changed how people live and work and have resulted in changes in factors that affect the growth of human population.

Suggestion for Integrating International

Content: Have students compare and contrast sanitation and disease prevention in various countries using historical and current perspectives, as well as identify educational and technological practices that have helped improve human survival.

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.14

Core Standard: No

Standard Description (Academic or

Indicator): Explain that the environment may contain dangerous levels of substances that are harmful to human beings. Understand, therefore, that the good health of individuals requires monitoring the soil, air, and water as well as taking steps to keep them safe.

Suggestion for Integrating International

Content: Have students investigate the export of hazardous electronic waste to China, South East Asia, and India and the significant health risks posed as a result.

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.14

Core Standard: No

Standard Description (Academic or

Indicator): Explain that the environment may contain dangerous levels of substances that are harmful to human beings. Understand, therefore, that the good health of individuals requires monitoring the soil, air, and water as well as taking steps to keep them safe.

Suggestion for Integrating International

Content: Have students research and discuss the impact of cyanide use in gold mining in many countries across the world. *Examples:* U.S.; Canada; China; Guyana; Bolivia; Zimbabwe; the Philippines; Ghana.

Grade: 7

Academic Standard: 7.4

Academic Standard Indicator: 7.4.14

Core Standard: No

Standard Description (Academic or

Indicator): Explain that the environment may contain dangerous levels of substances that are harmful to human beings. Understand, therefore, that the good health of individuals requires monitoring the soil, air, and water as well as taking steps to keep them safe.

Suggestion for Integrating International

Content: Have students investigate global sites with the worst pollution, as well as stories of successful environmental clean up. *Suggested resource:* The Blacksmith Institute at <http://blacksmithinstitute.org/>.

Grade: 7

Academic Standard: 7.6

Academic Standard Indicator: 7.6.2

Core Standard: No

Standard Description (Academic or

Indicator): Understand and explain that Louis Pasteur wanted to find out what caused milk and wine to spoil. Note that he demonstrated that spoilage and fermentation occur when microorganisms enter from the air, multiply rapidly, and produce waste products, with some desirable results, such as carbon dioxide in bread dough, and some undesirable, such as acetic acid in wine. Understand that after showing that spoilage could be avoided by keeping germs out or by destroying them with heat, Pasteur investigated animal diseases and showed that microorganisms were involved in many of them. Also note that other investigators later showed that specific kinds of germs caused specific diseases.

Suggestion for Integrating International

Content: Have students research French chemist Louis Pasteur, known for creating the first rabies vaccine and for inventing a method to stop milk and wine from going sour. Discuss how this led to worldwide improvement in food for human consumption.

Grade: 7**Academic Standard:** 7.6**Academic Standard Indicator:** 7.6.3**Core Standard:** No

Standard Description (Academic or Indicator): Understand and explain that Louis Pasteur found that infection by disease organisms (germs) caused the body to build up an immunity against subsequent infection by the same organisms. Realize that Pasteur then demonstrated more widely what Edward Jenner had shown for smallpox without understanding the underlying mechanism: that it was possible to produce vaccines that would induce the body to build immunity to a disease without actually causing the disease itself.

Suggestion for Integrating International Content: Have students research Edward Jenner of Gloucestershire, England and the history of his discovery of a smallpox vaccination. Have them consider the World Health Assembly's official 1980 declaration that "the world and its peoples" are free from endemic smallpox.

Grade: 7**Academic Standard:** 7.6**Academic Standard Indicator:** 7.6.4**Core Standard:** No

Standard Description (Academic or Indicator): Understand and describe changes in health practices that have resulted from the acceptance of the germ theory of disease. Realize that before germ theory, illness was treated by appeals to supernatural powers or by attempts to adjust body fluids through induced vomiting or bleeding. Note that the modern approach emphasizes sanitation, the safe handling of food and water, the pasteurization of milk, quarantine, and aseptic surgical techniques to keep germs out of the body; vaccinations to strengthen the body's immune system against subsequent infection by the same kind of microorganisms; and antibiotics and other chemicals and processes to destroy microorganisms.

Suggestion for Integrating International Content: When discussing the evolution of germ theory, have students research the microbiology studies performed by Ferdinand Cohn, a German biologist; Robert Koch, a German physician; and Sir Alexander Fleming, a Scottish doctor.

Grade: 7**Academic Standard:** 7.6**Academic Standard Indicator:** 7.6.4**Core Standard:** No

Standard Description (Academic or Indicator): Understand and describe changes in health practices that have resulted from the acceptance of the germ theory of disease. Realize that before germ theory, illness was treated by appeals to supernatural powers or by attempts to adjust body fluids through induced vomiting or bleeding. Note that the modern approach emphasizes sanitation, the safe handling of food and water, the pasteurization of milk, quarantine, and aseptic surgical techniques to keep germs out of the body; vaccinations to strengthen the body's immune system against subsequent infection by the same kind of microorganisms; and antibiotics and other chemicals and processes to destroy microorganisms.

Suggestion for Integrating International Content: Have students investigate India's Sulabh International Social Service Organisation, paying particular attention to the Sulabh sanitation movement and the role of such efforts in improving public health. *Suggested resource:* http://www.sulabhinternational.org/sm/magnitude_sanitation_problemnational_global.php.