

Further Reading

Unit 1

University of California Museum of Paleontology, Web Geological Time Machine,
<http://www.ucmp.berkeley.edu/help/timeform.html>.

An era-by-era guide through geologic time using stratigraphic and fossil records.

Science Education Resource Center, Carleton College, "Microbial Life in Extreme Environments,"
<http://serc.carleton.edu/microbelife/extreme/index.html>.

An online compendium of information about extreme environments and the microbes that live in them.

James Shreve, "Human Journey, Human Origins," National Geographic, March 2006,

<http://www7.nationalgeographic.com/ngm/0603/feature2/index.html?fs=www3.nationalgeographic.com&fs=plasma.nationalgeographic.com>.

An overview of what DNA evidence tells us about human migration out of Africa, with additional online resources.

Unit 2

National Aeronautics and Space Administration, "The Importance of Understanding Clouds," NASA Facts,
FS-2005-0-073-GSFC, http://www.nasa.gov/pdf/135641main_clouds_trifold21.pdf.

Unit 3

National Academy of Sciences, Office on Public Understanding of Science, "El Niño and La Niña: Tracing the
Dance of Ocean and Atmosphere," March 2000, <http://www7.nationalacademies.org/opus/elnino.html>.

*A summary showing how atmospheric and oceanographic research have improved our capability to predict climate
fluctuations.*

National Weather Service Climate Prediction Center, <http://www.cpc.ncep.noaa.gov/>.

*Assessments, weather forecasts, graphics, and information on climate cycles including El Niño/La Niña, NAO, PDO, and
others.*

Woods Hole Oceanographic Institute, "Ocean Instruments: How they work, what they do, and why they do it,"
<http://www.whoi.edu/science/instruments/>.

A guide to gravity corers, seismometers, and other ocean research tools.

Unit 4

Paul A. Colinvaux, *Why Big Fierce Animals Are Rare: An Ecologist's Perspective* (Princeton, NJ: Princeton
University Press, 1979).

A survey of major questions in ecology, including why every species has its own niche.

Chris Reiter and Gina C. Gould, "Thirteen Ways of Looking at a Hedgehog," *Natural History*, July/August 1998.

*Hedgehogs' spines are unique adaptations, but they have thrived in many regions for millions of years because they
are generalists in terms of climate zones and diet.*

ReefQuest Centre for Shark Research, "Catch As Catch Can," http://www.elasmo-research.org/education/topics/b_catch.htm.

*Contrary to their popular image as mindless eating machines, great white sharks' foraging strategies are selective and
efficient.*

Further Reading

Unit 5

Jeffrey Sachs, *The End of Poverty: Economic Possibilities For Our Time* (New York: Penguin, 2006).
Economist Jeffrey Sachs offers a plan to eliminate extreme poverty around the world by 2025, focusing on actions to improve the lives of the world's one billion poorest citizens.

John Bongaarts, "How Long Will We Live?" *Population and Development Review*, vol. 32, no. 4 (December 2006), pp. 605–628.

A look at the factors that have increased life expectancy in high-income countries since 1800 and at prospects for continued gains.

Joel E. Cohen, "Human Population Grows Up," *Scientific American*, September 2005, pp. 48–55.

In the next 50 years, Earth's human population will be larger, slower-growing, more urban, and older than in the 20th century, with significant implications for sustainability.

"The Economics of Demographics," (whole issue) *Finance & Development*, vol. 43, no. 3, September 2006.

A detailed look at policy adjustments that can help world leaders cope with demographic change.

Mike Davis, "Slum Ecology," *Orion*, March/April 2006.

Living conditions in urban slums invert the principles of good urban planning: houses stand on unstable slopes, people live next to polluted and toxic sites, and open space is scarce or lacking.

Malcolm Gladwell, "The Risk Pool," *New Yorker*, August 28, 2006.

Population age structures and dependency ratios explain Ireland's recent economic boom and the woes of many U.S. corporate pension plans.

Paul Harrison and Fred Pearce, *AAAS Atlas of Population and the Environment* (Berkeley: American Association for the Advancement of Science and University of California Press, 2000), <http://atlas.aaas.org/index.php?sub=intro>.

An online source of information on the relationships between human population and the environment, with text, maps, and diagrams.

Unit 6

European Commission, Environment Directorate, "REACH," http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm.
An overview of the REACH regulation, including information on benefits and costs.

Dennis Paustenbach, ed., *Human and Ecological Risk Assessment: Theory and Practice* (New York: Wiley, 2002).
A comprehensive textbook, including risks involving air, water, food, occupational exposures, and consumer products.

National Research Council, *Science and Judgment in Risk Assessment* (Washington, DC: National Academy Press, 1994).

An exploration of how risk analysts make assumptions and deal with uncertainty, written to help the EPA make risk assessments more valid and credible by using scientific data more fully and making the limits of knowledge clear.

U.S. National Institutes of Health, National Library of Medicine, "Tox Town," <http://toxtown.nlm.nih.gov/>.

An animated online guide to connections between chemicals, the environment, and public health, including common exposure locations, non-technical descriptions of chemicals, and links to scientific and health resources.

Unit 7

Evans, L.T., *Feeding the Ten Billion: Plants and Population Growth* (Cambridge, UK: Cambridge University Press, 1998).

Halweil, Brian, "Can Organic Farming Feed Us All?" *Worldwatch*, May/June 2006.

King, John, *Reaching for the Sun: How Plants Work* (Cambridge, UK: Cambridge University Press, 1997).

Leigh, G.J., *The World's Greatest Fix: A History of Nitrogen and Agriculture* (Oxford, UK: Oxford University Press, 2004).

Pew Initiative on Food and Biotechnology, <http://pewagbiotech.org/>.

Research and recommendations from a now-complete project on issues arising from advances in agricultural biotechnology.

Jennifer Thomson, *Seeds For the Future: The Impact of Genetically Modified Crops on the Environment* (Ithaca, NY: Cornell University Press, 2007).

Further Reading

Unit 8

Peter H. Gleick, *The World's Water 2006-2007: The Biennial Report on Freshwater Resources* (Washington, DC: Island Press, 2006).

Current information on water needs, trends, and policies worldwide.

John McPhee, "Atchafalaya," in *The Control of Nature* (New York: Farrar Strauss Giroux, 1989).

A renowned journalist describes the technical challenges and environmental impacts of human efforts to manage the flow of the Mississippi River.

Sandra Postel, *Liquid Assets: The Critical Need to Safeguard Freshwater Ecosystems*, Worldwatch Paper 170 (Washington, DC: Worldwatch Institute, July 2005).

An overview of the valuable functions performed by freshwater ecosystems and policy options for protecting them.

Unit 9

Annenberg Media, *Rediscovering Biology: Molecular to Global Perspectives*, Units 4 ("Microbial Diversity") and 12 ("Biodiversity"), <http://www.learner.org/channel/courses/biology/index.html>.

Two units from a professional development course for high school biology teachers, including video, online text, and supporting materials.

Center for Biological Diversity, "The Road to Recovery: 100 Success Stories for Endangered Species Day 2006," <http://www.esasuccess.org/reports/>.

Profiles of species that have increased their populations under the U.S. Endangered Species Act.

Cornell Laboratory of Ornithology, *The Search for the Ivory-Billed Woodpecker*, <http://www.birds.cornell.edu/ivory>.
News, evidence, and updates from the researchers who claimed to have found an ivory-bill in 2004.

Rolf Gradinger, "Arctic Sea Ice: Channels of Life," NOAA Ocean Explorer, http://oceanexplorer.noaa.gov/explorations/02arctic/background/sea_ice/sea_ice.html.

Explore the unique environment of Arctic sea ice communities.

University of California Museum of Paleontology, "The Phylogeny of Life," <http://www.ucmp.berkeley.edu/alllife/threedomains.html>.

Detailed information on the structure, ecology, and fossil records of major subgroups in the three domains of life.

<http://www.discoverlife.org>.

An online guide to the world's flora and fauna, with information on each group's taxonomy, natural history, abundance, distribution, and ecology.

Unit 10

"Fuel Cells: Collecting History with the Worldwide Web," Smithsonian Institution, <http://americanhistory.si.edu/fuelcells/intro.htm>.

An online project documenting the development of fuel cells, with descriptions and diagrams of many fuel cell technologies.

National Research Council and National Academy of Engineering, *The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs* (Washington, DC: National Academies Press, 2001).

A broad assessment of issues involved in making a 50-year transition to a hydrogen economy in the United States.

Michelle Nijhuis, "Selling the Wind," *Audubon*, September/October 2006.

Expanding wind power is a balancing act between energy concerns and ecosystem protection.

Further Reading

Unit 11

C.T. Driscoll et al., *Acid Rain Revisited: Advances in Scientific Understanding Since the Passage of the 1970 and 1990 Clean Air Act Amendments*, Hubbard Brook Research Foundation, Science Links Publication, vol. 1. no. 1 (2001), http://www.hubbardbrook.org/hbrf/publications/Acid_Rain_Revisited.pdf.

Daniel Jacob, *Introduction to Atmospheric Chemistry* (Princeton University Press, 1999).
An overview of the field that shows how to use basic principles of physics and chemistry to describe a complex system such as the atmosphere.

Peter H. McMurry, Marjorie F. Shepherd, and James S. Vickery, eds., *Particulate Matter Science for Policy Makers: A NARSTO Assessment* (Cambridge University Press, 2004).
Scientific information about particulate emissions and their impacts, produced by a North American consortium for atmospheric research in support of air quality management.

National Research Council, *Air Quality Management in the United States* (Washington, DC: National Academies Press, 2004).
A Congressionally mandated study of how well major U.S. air quality laws have worked from a scientific and technical perspective, and ways in which they could be strengthened.

Unit 12

Center for Health and the Global Environment, Harvard Medical School, *Climate Change Futures: Health, Ecological, and Economic Dimensions* (Boston, MA: Harvard Medical School, November 2005).

Climate Timeline (<http://www.ngdc.noaa.gov/paleo/ctl/index.html>).
This web site, maintained by the National Geophysical Data Center at the National Oceanographic and Atmospheric Administration, links changes in weather and climate through history to specific historic events.

"The Discovery of Global Warming," (<http://www.aip.org/history/climate>).
Created by Spencer Weart, author of the book of the same title, this site includes detailed essays on the history of climate change science, case studies, and links to relevant scientific and historical publications.

James E. Hansen, "Can We Still Avoid Dangerous Human-Made Climate Change?" February 10, 2006, http://www.columbia.edu/~jeh1/newschool_text_and_slides.pdf.
In this speech and accompanying slides, a leading U.S. climate scientist makes the case for action to slow global climate change.

Unit 13

Cohen, *How Many People Can the Earth Support?* New York: W. W. Norton. 532 pp. 1995.

Pacala and Socolow, "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science* 305, 968–972, 2004.

Pandolfi et al., "Global Trajectories of the Long-Term Decline of Coral Reef Ecosystems," *Science* 301, 955–958, 2003.

Schrag, "Confronting the Climate-Energy Challenge," *Elements*, 3, 171–178, 2007. (Text is reproduced from this source with permission.)

Schrag and McCarthy, "Biological-physical interactions and global climate change: Some lessons from Earth history," in *The Sea*, vol. 12, edited by Allan R. Robinson, James J. McCarthy, and Brian J. Rothschild, John Wiley & Sons, Inc., New York, 605–619, 2002.

Wilson, *Consilience: The Unity of Knowledge*, Knopf, 1998.

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