Further Reading

Unit 1
An era-by-era guide through geologic time using stratigraphic and fossil records.

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

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

Unit 2

Unit 3
A summary showing how atmospheric and oceanographic research have improved our capability to predict climate fluctuations.

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

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

Unit 4
A survey of major questions in ecology, including why every species has its own niche.

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.

Contrary to their popular image as mindless eating machines, great white sharks’ foraging strategies are selective and efficient.
**Unit 5**


*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.*


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


*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.*


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


*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.*


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


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

---

**Unit 6**


*An overview of the REACH regulation, including information on benefits and costs.*


*A comprehensive textbook, including risks involving air, water, food, occupational exposures, and consumer products.*


*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.*


*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**


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

Further Reading

Unit 8
Current information on water needs, trends, and policies worldwide.

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

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

Unit 9
Two units from a professional development course for high school biology teachers, including video, online text, and supporting materials.

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

News, evidence, and updates from the researchers who claimed to have found an ivory-bill in 2004.

Explore the unique environment of Arctic sea ice communities.

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

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

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

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

Unit 11

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.

Scientific information about particulate emissions and their impacts, produced by a North American consortium for atmospheric research in support of air quality management.

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

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.

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.

In this speech and accompanying slides, a leading U.S. climate scientist makes the case for action to slow global climate change.

Unit 13


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


Credits

PROJECT ADVISORS
Michael Brody, Montana State University
Rita Chang, Wellesley High School, Wellesley, MA
John Gollisz, High School for Environmental Studies, New York City
Jon Harbor, University of Denver
Eric Klopfer, Massachusetts Institute of Technology
Julie Libarkin, Michigan State University
Susan Rauchwerk Collins, Lesley University, Cambridge, MA
Kris Scopinich, Massachusetts Audubon Society

CONTENT DEVELOPMENT
Course Design and Content Management
Daniel Schrag

Unit Online Text and Video Content Developers
David E. Bloom
Charles Harvey
Noel Michele “Missy” Holbrook
John P. Holdren
Daniel Jacob
James J. McCarthy
Paul Moorcroft Anne Pringle
John H. Shaw
John Spengler
Steven Wofsy

Professional Development Guide Developers
Michael Brody
Warren Tomkiwicz
Mary Ann McGarry, Plymouth State University, NH
Penny Juenemann. Two Harbors High School, Two Harbors, MN
Jessica Krim, Montana State University
Judith Pyle, Abington High School, Abington, PA

Online Textbook Writer
Jennifer Weeks

Web Site Development
Juliet Jacobson
Don Button
Alison Plante
Lisa Portolesi

Web Site Text Writer
Amy Bebergal

Interactive Labs
Ian Albinson
Ginger Booth
Kurt House
Eric Klopfer
Eli Meir
Jaimie Miller
Alison Plante

Evaluation
Kim Noethen

PRODUCTION
Executive Producer
Alex Griswold

Producers
John Browne, Alex Griswold, Clive Grainger, Tobias McElheny

Videographers
Robert Duggan, James Day, Clive Grainger, Alex Griswold, Tobias McElheny, David Rabinovitz, Ryan Vachon

Additional Videography
John Browne, Ozzie Forbes, Larry Foster, Paul Hoffman, Tom Lynn, Tamsin Orion, Matthew Sullivan, Reginaldo Taison

Editors
Steven Allardi, Neil Duffy, Keri Green, Maria Kobrina, Julie Lewis

Sound Recordists
John Cameron, Joseph Chilorio, Robert Duggan, Alex Griswold, Tobias McElheny, John Osborne

Animators/Graphic Artists
Ian Albinson, Sarah Delahanty, Raedia Sikkema

On-Line Editors
Ian Albinson, Douglas K. Plante

Production Photographer
Clive Grainger

Production Coordinator
Robert Duggan

Production Assistants
James Day, Caitlin Rotman

Sound Mixers
Steven Allardi, Caleb Epps, Abraham Stein

Music
Alson Plante—Treble Cove

Narrator
Anna Lewicke

Outreach/Scheduling
Dana Rouse

Annenberg Channel Coordinator
Michelle Hardy

Financial Manager
Oral Benjamin

Administrator
Linda Williamson

Project Manager
Nancy Finkelstein

Executive Director
Dr. Matthew H. Schneps