

PEARSON

Environment

The Science Behind the Stories

5TH EDITION GLOBAL EDITION

Jay Withgott Matthew Laposata



Environment: The Science Behind the Stories, Global Edition

Table of Contents

Cover

Title

Copyright

Contents

Part One Foundations of Environmental Science

1 Science and Sustainability: An Introduction to Environmental Science

Our Island, Earth

The Nature of Environmental Science

The Science Behind the Story: What Are the Lessons of Easter Island?

The Nature of Science

Sustainability and Our Future

2 Earths Physical Systems: Matter, Energy, and Geology

CENTRAL CASE STUDY The Tohoku Earthquake: Has It Shaken the Worlds Trust in Nuclear Power?

Matter, Chemistry, and the Environment

The Science Behind the Story: Tracking Fukushimas Nuclear Legacy

Energy: An Introduction

Geology: The Physical Basis for Environmental Science

The Science Behind the Story: Have We Brought On a New Geologic Epoch?

Geologic and Natural Hazards

3 Evolution, Biodiversity, and Population Ecology

CENTRAL CASE STUDY Saving Hawaiis Native Forest Birds

Evolution: The Source of Earths Biodiversity

The Science Behind the Story: Hawaii: Species Factory and Lab of Evolution

Levels of Ecological Organization

Population Ecology

The Science Behind the Story: Monitoring Bird Populations at Hakalau Forest

Conserving Biodiversity

4 Species Interactions and Community Ecology

CENTRAL CASE STUDY Black and White, and Spread All Over: Zebra Mussels Invade the Great Lakes



Species Interactions

Ecological Communities

The Science Behind the Story: Determining Zebra Mussels Impacts on Fish Communities

The Science Behind the Story: Chronicling Ecological Recovery at Mount St. Helens

Earths Biomes

5 Environmental Systems and Ecosystem Ecology

CENTRAL CASE STUDY The Vanishing Oysters of the Chesapeake Bay

Earths environmental systems

Ecosystems

Biogeochemical Cycles

The Science Behind the Story: Turning the Tide for Native Oysters in Chesapeake Bay

The Science Behind the Story: FACE-ing a High-CO2 Future

6 Ethics, Economics, and Sustainable Development

CENTRAL CASE STUDY Costa Rica Values Its Ecosystem Services

Culture, Worldview, and the Environment

Environmental Ethics

Economics and the Environment

The Science Behind the Story: Do Payments Help Preserve Forest?

The Science Behind the Story: Ethics in Economics: Discounting and Global Climate Change

Sustainable Development

7 Environmental Policy: Making Decisions and Solving Problems

CENTRAL CASE STUDY Hydrofracking the Marcellus Shale

Environmental Policy: An Overview

The Science Behind the Story: Does Fracking Contaminate Drinking Water?

U.S. Environmental Law and Policy

International Environmental Policy

Approaches to Environmental Policy

Part Two Environmental Issues and the Search for Solutions

8 Human Population

CENTRAL CASE STUDY Chinas One-Child Policy

Our World at Seven Billion

The Science Behind the Story: Mapping Our Populations Environmental Impact

Demography

Population and Society

The Science Behind the Story: Did Soap Operas Reduce Fertility in Brazil?

9 Soil and Agriculture



CENTRAL CASE STUDY Iowas Farmers Practice No-Till Agriculture

Soil: The Foundation for Sustainable Agriculture

Soil as a System

Conserving Soil

The Science Behind the Story: Can No-Till Farming Help Us Fight Climate Change?

Watering and Fertilizing Crops

The Science Behind the Story: Restoring the Malpai Borderlands

Agricultural Policy

10 Agriculture, Biotechnology, and the Future of Food

CENTRAL CASE STUDY Transgenic Maize in Southern Mexico?

The Race to Feed the World

Raising Animals for Food

Preserving Crop Diversity

Conserving Pollinators, Controlling Pests

Organic Agriculture

The Science Behind the Story: How Productive Is Organic Farming?

Genetically Modified Food

The Science Behind the Story: Transgenic Contamination of Native Maize?

Sustainable Food Production

11 Biodiversity and Conservation Biology

CENTRAL CASE STUDY Will We Slice through the Serengeti?

Our Planet of Life

Extinction and Biodiversity Loss

The Science Behind the Story: Wildlife Declines in African Reserves

Benefits of Biodiversity

Conservation Biology: The Search for Solutions

The Science Behind the Story: Using Forensics to Uncover Illegal Whaling

12 Forests, Forest Management, and Protected Areas

CENTRAL CASE STUDY Certified Sustainable Paper in Your Textbook

Forest Ecosystems and Forest Resources

Forest Loss

Forest Management

Parks and Protected Areas

The Science Behind the Story: Fighting over Fire and Forests

The Science Behind the Story: Forest Fragmentation in the Amazon

13 The Urban Environment: Creating Sustainable Cities

CENTRAL CASE STUDY Managing Growth in Portland, Oregon



Our Urbanizing World

Sprawl

Creating Livable Cities

Urban Sustainability

The Science Behind the Story: Baltimore and Phoenix Showcase Urban Ecology

14 Environmental Health and Toxicology

CENTRAL CASE STUDY Poison in the Bottle: Is Bisphenol A Safe?

Environmental Health

The Science Behind the Story: Testing the Safety of Bisphenol A

Toxic Substances and Their Effects on Organisms

Toxic Substances and Their Effects on Ecosystems

Studying Effects of Hazards

The Science Behind the Story: Pesticides and Child Development in Mexicos Yaqui Valley

Risk Assessment and Risk Management

Philosophical and Policy Approaches

15 Freshwater Systems and Resources

CENTRAL CASE STUDY Starving the Louisiana Coast of Sediment

Freshwater Systems

Human Activities Affect Waterways

The Science Behind the Story: Is It Better in a Bottle?

Solutions to Depletion of Fresh Water

Freshwater Pollution and Its Control

The Science Behind the Story: Hypoxia and the Gulf of Mexicos Dead Zone

16 Marine and Coastal Systems and Resources

CENTRAL CASE STUDY Collapse of the Cod Fisheries

The Oceans

Marine and Coastal Ecosystems

The Science Behind the Story: Will Climate Change Rob Us of Coral Reefs?

Marine Pollution

The Science Behind the Story: Predicting the Oceans Garbage Patches

Emptying the Oceans

Marine Conservation

17 Atmospheric Science, Air Quality, and Pollution Control

CENTRAL CASE STUDY Clearing the Air in L.A. and Mexico City

The Atmosphere

Outdoor Air Quality

The Science Behind the Story: Measuring the Health Impacts of Mexico Citys Air Pollution



Ozone Depletion and Recovery

The Science Behind the Story: Discovering Ozone Depletion and the Substances Behind It

Addressing Acid Deposition

Indoor Air Quality

18 Global Climate Change

CENTRAL CASE STUDY Rising Seas May Flood the Maldives

Our Dynamic Climate

Studying Climate Change

The Science Behind the Story: Reading History in the Worlds Longest Ice Core

Current and Future Trends and Impacts

The Science Behind the Story: How Do Climate Models Work?

Responding to Climate Change

19 Fossil Fuels, Their Impacts, and Energy Conservation

CENTRAL CASE STUDY Albertas Oil Sands and the Keystone XL Pipeline

Sources of Energy

Fossil Fuels and Their Extraction

The Science Behind the Story: Locating Fossil Fuel Deposits Underground

Addressing Impacts of Fossil Fuel Use

The Science Behind the Story: Discovering Impacts of the Gulf Oil Spill

Energy Efficiency and Conservation

20 Conventional Energy Alternatives

CENTRAL CASE STUDY Swedens Search for Alternative Energy

Alternatives to Fossil Fuels

Nuclear Power

The Science Behind the Story: Health Impacts of Chernobyl and Fukushima

Bioenergy

The Science Behind the Story: Assessing EROI Values of Energy Sources

Hydroelectric Power

21 New Renewable Energy Alternatives

CENTRAL CASE STUDY Germany Goes Solar

New Renewable Energy Sources

The Science Behind the Story: Comparing Energy Sources

Solar Energy

The Science Behind the Story: What Are the Impacts of Solar and Wind Development?

Wind Power

Geothermal Energy

Ocean Energy Sources



Hydrogen

22 Managing Our Waste

CENTRAL CASE STUDY Transforming New Yorks Fresh Kills Landfill

Approaches to Waste Management

Municipal Solid Waste

The Science Behind the Story: Tracking Trash

Industrial Solid Waste

Hazardous Waste

The Science Behind the Story: Testing the Toxicity of E-Waste

23 Minerals and Mining

CENTRAL CASE STUDY Mining for . . . Cell Phones?

Earths Mineral Resources

Mining Methods and Their Impacts

The Science Behind the Story: Mountaintop Removal Mining: Assessing the Environmental Impacts

Toward Sustainable Mineral Use

24 Sustainable Solutions

CENTRAL CASE STUDY De Anza College Strives for a Sustainable Campus

Sustainability on Campus

Strategies for Sustainability

Precious Time

Appendix A Answers to Data Analysis Questions

Appendix B How to Interpret Graphs

Appendix C Metric System

Appendix D Periodic Table of the Elements

Appendix E Geologic Time Scale

Glossary

Selected Sources and References for Further Reading

Credits

Index

