

Environmental Science

Environmental Science

An exploration of the Earth's systems, from its geology and ecology, to the myriad ways in which humans interact with their natural environment. Environmental Science engages students with a wide variety of activities, incorporating sound ecological theory with many topical and thought provoking examples.

Based on the **International Baccalaureate** and **Advanced Placement** programs with applicability to wide audiences.

Suitability:

- Grades 10-12
- Community College

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Biozone's unique formula encourages self direction, while dovetailing with traditional resources.

Chapters

- The Earth's Systems
- Ecosystems
- Populations
- Investigating Ecosystems
- Land, Water and Energy
- Pollution & Global Change

Features

- **Introduction to the topic:**
A concise introduction to the concepts in the activity.
- **Easy to understand diagrams:**
Highly visual, clearly annotated diagrams improve the accessibility of information.
- **Consolidation and branching out:**
Activities provide information to consolidate basic knowledge, while allowing scope for exploring. Differential instruction becomes easier and students at all levels are encouraged to be 'thinkers'.
- **Write-on format:**
Activities provide information to consolidate basic knowledge, while allowing scope for exploring.
- **Tear-out pages:**
Each page has a perforation to allow easy removal for marking, or placement in a ring binder.
- **Links:**
Reference to specific web sites (accessed via Biozone's web site) and links to activities with related content elsewhere in the workbook.
- **Activity Code:**
Each activity is coded to identify the skills required for its completion.



Variation and Oscillation

Energy from the sun is distributed through a global system of atmospheric and ocean circulation that creates the Earth's climate. Resulting from moving towards the poles from the equator are the major climate zones: tropical, temperate, and polar. The distribution of the Earth's climate is the result of the interaction of atmospheric and oceanic circulation systems in both hemispheres. The interaction of atmospheric systems are so complex that concepts such as the Coriolis effect, frontal weather, and the greenhouse effect are seen across the globe from one pole to the next. However, it is possible to find similar patterns in circulation systems. The Northern Hemisphere circulation, which has a clockwise rotation, is mirrored in the Southern Hemisphere circulation, which has a counter-clockwise rotation. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses.

The Coriolis Effect

All objects moving in a straight line, from the equator towards the poles, are deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. This deflection is caused by the Earth's rotation. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses.

Frontal Weather

A boundary that separates the atmosphere into air masses of different densities. A front is about 100-200 km wide and extends into the atmosphere. A front separates air masses of different densities. A front separates air masses of different densities. A front separates air masses of different densities.

The Earth's Systems

1. Explain the role of the Coriolis effect in creating the prevailing winds in different regions of the globe.

2. In the spaces provided below, draw schematic diagrams, similar to that in the top left of the photograph above, to show:

(a) Movement of air from a high pressure to a low pressure system in the Northern Hemisphere.

(b) Movement of air from a high pressure to a low pressure system in the Southern Hemisphere.

Related activities: The Atmosphere and Climate **R.A. 3**

The Sulfur Cycle

Although much of the Earth's sulfur is tied up underground in the form of sulfide minerals, it is possible to find similar patterns in circulation systems. The Northern Hemisphere circulation, which has a clockwise rotation, is mirrored in the Southern Hemisphere circulation, which has a counter-clockwise rotation. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses. The Coriolis effect is a result of the Earth's rotation and is responsible for the deflection of moving air masses.

The Sulfur Cycle

1. Describe two ways in which sulfur can enter the atmosphere from natural sources.

2. Describe two ways in which sulfur can enter the atmosphere from a result of human activity.

3. Describe three processes that make sulfur available for sulfate by plants.

4. Describe two major roles of sulfur in the biosphere.

Related activities: Atmosphere, Pollution, Acidification **A. 2**

Energy Resources

The type and amount of energy resources are major factors in determining the quality of life and societal development. The amount of energy used to heat the Earth is only one possible source of renewable energy. The amount of energy used to heat the Earth is only one possible source of renewable energy. The amount of energy used to heat the Earth is only one possible source of renewable energy.

Commercial Energy Resources from the Earth's Crust

1. Describe the biological basis and historical trends of each of the following sources of power generation:

(a) Coal

(b) Oil

Related activities: Markets, Global Planning, Energy Consumption **R.A. 3**

Energy Conservation

An energy conservation code is required to make better use of the energy used in domestic or commercial buildings. The amount of energy used to heat the Earth is only one possible source of renewable energy. The amount of energy used to heat the Earth is only one possible source of renewable energy.

Energy Efficiency at Home

1. Explain why reducing energy use is seen as important in this century.

2. Discuss the methods by which you can save energy in transportation.

3. Describe how an energy efficient building is designed to reduce energy waste.

Related activities: Energy Resources **R.A. 2**

Content Overview

THE EARTHS SYSTEMS

The Earth's History
Fossil Formation
The Earth and the Sun
The Earth's Crust
Plate Boundaries
The Rock Cycle
Soil and Soil Dynamics
Atmosphere and Climate
Variation and Oscillation
Ocean Circulation and Currents
Global Water Resources
Global Water Use

ECOSYSTEMS

Components of an Ecosystem
Biomes
Physical factors and Gradients
Habitat
Ecological Niche
Energy Inputs and Outputs
Food Chains and Webs
Energy Flow in an Ecosystem
Ecological Pyramids
The Productivity of Ecosystems
The Carbon Cycle
The Nitrogen Cycle
The Water Cycle
The Phosphorus Cycle
The Sulfur Cycle
Environmental Change
Ecosystem Stability
Ecological Succession

POPULATION

Features of Populations
Density and Distribution
Population Regulation

Population Growth
Life Tables and Survivorship
Survivorship Curves
Population Growth Curves
Population Age Structure
World Population Growth
Humans and Resources
r and *K* Selection
Species Interactions
Interspecific Competition
Intraspecific Competition

INVESTIGATING ECOSYSTEMS

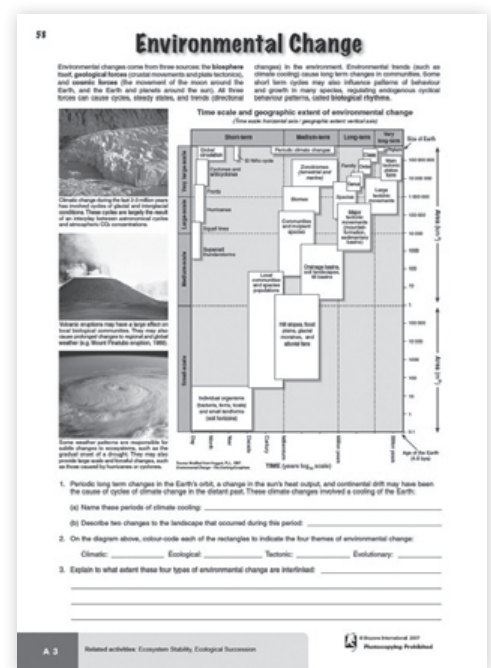
Sampling Populations
Monitoring Physical Factors
Quadrat Sampling
Quadrat-based Estimates
Sampling a Leaf Litter Population
Transect Sampling
Mark and Recapture Sampling
Sampling Animal Populations
Indirect Sampling
Monitoring Changes in an Ecosystems

LAND, WATER & ENERGY

The Importance of Plants
Global Human Nutrition
The Green Revolution
Cereal Crop Production
Pest Control
Soil Degradation
The Impact of Farming
Sustainable Agriculture
Energy Resources
Biofuels
Energy Conservation
Ecological Impacts of Fishing
Fisheries Management

POLLUTION & GLOBAL CHANGE

Types of Pollution
Water Pollution
Sewage Treatment
Waste Management
Atmospheric Pollution
Global Warming
Stratospheric Ozone Depletion
Acid Rain
The Economic Impact of Pollution
Loss of Biodiversity
Tropical Deforestation
The Impact of Alien Species
Endangered Species
Conservation of African Elephants
Nature Reserves



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USA & Canada

Biozone International Ltd
P.O. Box 13-034, Hamilton 3251,
New Zealand
Toll Free: 1 866 556 2710
Free Fax: 1 800 717 8751
Email: sales@biozone.co.nz
www.thebiozone.com

UK & Europe

Biozone Learning Media (UK) Ltd
Bretby Business Park, Ashby Road,
Bretby, Burton upon Trent, DE15 0YZ, UK
Phone: +44 1283 553 257
Fax: +44 1283 553 258
Email: sales@biozone.co.uk
www.biozone.co.uk

Australia

Biozone Learning Media Australia
P.O. Box 2841, Burleigh BC, QLD 4220,
Australia
Phone: +61 7 5535 4896
Fax: +61 7 5508 2432
Email: sales@biozone.com.au
www.biozone.com.au

Rest of the World

Biozone International Ltd
P.O. Box 13-034, Hamilton 3251,
New Zealand
Phone: +64 7 856 8104
Fax: +64 7 856 9243
Email: sales@biozone.co.nz
www.biozone.co.nz