

Environmental Science A

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The first half of the course (A) provides a comprehensive exploration of ecosystem structures and functions, studies the various global biomes, and the relationships between natural and human populations. Laboratory activities embedded within each unit allow for hands-on, practical applications of various concepts and the interrelationships that exist at different levels within the living world.

SEQUENCE OF SKILLS

UNIT 1 – Ecosystem Structure

- Introduction to Ecosystems: Structure of the Biosphere
- What is an Ecosystem?
- A Detailed Look at Ecosystem Structure
- Investigate Your Ecosystem
- Making an Ecosystem: Part One – Modeling Land Ecosystems
- Making an Ecosystem: Part Two – Modeling Aquatic Ecosystems
- Who’s Eating Whom?
- Identifying Ecosystem Roles
- The Web of Life
- Energy – Where Does It Go? Energy Pyramids and Trophic Levels
- The Importance of Biodiversity
- The Exxon Valdez Oil Spill
- Exxon Valdez Ecosystem Impact

UNIT 2 – Ecosystem Function

- Sunlight and Photosynthesis
- Ecosystem Vocabulary
- Energy Flow
- Energy Pyramids
- Symbiosis
- Renewable Versus Non-Renewable Resources
- Natural Cycles
- Carbon and Oxygen Cycles
- Water and Nitrogen Cycles
- Competition and Succession
- Succession Exploration (Field Experiment)
- “Vivo”
- Career Connection: Exploring Resources

UNIT 3 – Natural Populations

- Review Nutritional Relationships
- Exploration of Local Ecosystem Populations
- Ecosystem Impact from Food Web Changes
- Estimating Population Size
- Carrying Capacity
- Interpreting Population Data
- Kaibab Deer Graphing Activity
- Natural Selection Activity
- Introduced Species: Issues and Challenges
- Invasive Species Project
- Reintroduction Programs: Pros and Cons
- Career Connection: Population Analyst
- Natural Controls for Pest Species

Environmental Science A

SEQUENCE OF SKILLS

UNIT 4 – Biome

- Definition and Description of Classification of Biomes
- Rainforests
- Temperate Deciduous Forest
- Taiga/Coniferous Forest
- Desert
- Tundra
- Grasslands
- Freshwater
- Wetlands
- Marine
- Biome Adaptations
- Biome Project
- Career Connection: Conservation Law Enforcement

UNIT 5 – Human Populations

- World Populations: Numbers, Trends, and Reasons for Growth
- Predictions on Consequences of Continued Growth
- Population Comparisons: Developed Versus Developing Nations
- Feeding More People
- Space Concerns and Energy Use of Growing Populations
- Graphing Population Growth
- Shared Global Resources
- Feeding A Growing Global Population
- Sustaining Limited Resources
- Factors Influencing Population Growth
- Career Connection- Demographer
- Individual Responsibility
- Population Policy Project

Environmental Science B

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The second half of the course (B) provides a comprehensive exploration of various sources of energy, the structure and function of the atmosphere, the water cycle and factors impacting this valuable resource, the land and its responsible management, and the environmental movement over the years. Laboratory activities embedded within each unit allow for hands-on, practical applications of various concepts and the interrelationships that exist at different levels within the living world.

SEQUENCE OF SKILLS

UNIT 1 – Energy

- Fossil Fuel – Oil
- Fossil Fuels – Coal and Natural Gas
- To drill or not to drill?
- Solar Energy
- Solar Energy Storage
- Wind Power
- Hydroelectric Power
- Nuclear Power
- Chain Reaction Demonstration
- Geothermal and Tidal Power
- Biomass
- Energy Use at Home
- Hydrogen

UNIT 2 – Atmosphere

- The Atmosphere
- Air Pressure
- What Is Air Pollution?
- Global Warming
- Greenhouse Effect Demonstration
- Acid Rain
- Effects of Acid Rain
- Ground Level Ozone
- The Ozone Layer – Stratospheric Ozone
- Environmental Issues – Global or Local?
- How Clean Is the Air Around You?
- Noise Pollution
- Air Pollution Control

UNIT 3 – Water

- Water Pollution
- Plant Nutrients
- Sediment Pollution
- Groundwater Pollution
- Groundwater Pollution Activity
- Aquifer in a Cup
- Toxic Waste
- Municipal Solid Waste (MSW)
- Thermal Pollution
- Water Treatment Filtration Activity
- Water Treatment Facilities
- Sewage Treatment
- Water Conservation Activity

Environmental Science B

SEQUENCE OF SKILLS

UNIT 4 – Land

- Overview of Environmental Hazards / Focus on Land
- Municipal Solid Waste
- Reducing Solid Waste / Municipal Solid Waste Activity
- Hazardous Chemicals – Focus on Pesticides
- Activity – How do Pesticides Affect an Ecosystem?
- Biomagnification and the Pesticide Treadmill
- Alternate Pest Control – Natural Methods
- Love Canal History
- Love Canal Testimony
- Dioxin – Food and Drug Administration / Interagency Report
- Public Awareness and Superfund
- EPA and National Priority Listings
- Environmental Responsibility in Your Area / NPL

UNIT 5 – Past, Present, and Future

- History of the Environmental Movement
- The Value of Biodiversity
- Diversity in Your Own Backyard
- Urban Sprawl
- Invasive Non-Native Species
- Habitat Restoration – You and Your Community
- Rachel Carson – Someone Who Made a Difference
- Costs and Benefits of Environmental Protection
- Major Federal Environmental Laws
- A Scientific Debate
- Environmental Careers
- Job Shadowing
- Ask the Question