

Table of Contents

Module Overview

Program Features	1
Objectives, Concepts & Skills, and Vocabulary	8
Unit Summary	12
Pacing Chart	14
Kit Materials List	18

Unit 1 – Environmental Issues

Lab 1: Landfills	21
Activity 1: Biodegradation in a Landfill	24
Lab 2: Radiation Effects	31
Activity 1: Observing Radiation Effects on Plants	34
Lab 3: Bioremediation of an Oil Spill	43
Activity 1: Biodegrading a Simulated Oil Spill	47
Activity 2: Cleaning Up Shore Environments	51
Activity 3: Examining Oil-Degrading Microbes	55
Lab 4: Climate Change	59
Activity 1: The Greenhouse Effect and Global Warming	62
Lab 5: Water Pollutants	67
Activity 1: Modeling Salt Runoff Discharge	70

Unit 2 – Air, Water, and Soils

Lab 6: Air Quality	75
Activity 1: Identifying Airborne Pollutants	78
Activity 2: Observing Air Pollution Indicators – Lichens	81
Lab 7: Soils	87
Activity 1: Soil Analysis	90
Activity 2: Soil Porosity and Permeability	94
Activity 3: Soil Testing for Nitrogen, pH, and Phosphates	98
Lab 8: Water Quality	103
Activity 1: How Water Pollutants Are Measured	107
Activity 2: Water Analysis	111
Activity 3: Determining the LD ₅₀ of a Water Pollutant	119
Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants	123

Unit 3 – Ecosystems, Energy, & Biodiversity

Lab 9: Learning About Food Webs & Energy Pyramids	133
Activity 1: Food Web Organization	137
Activity 2: A Closer Look at Energy Pyramids	140

Table of Contents *(continued)*

Lab 10: Using Owl Pellets to Learn about Predator-Prey Relationships	143
Activity 1: Dissecting an Owl Pellet	146
Activity 2: Identifying Owl Prey	150
Activity 3: Constructing a Predator-Prey Food Web	154
Lab 11: Biodiversity	159
Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems	163
Activity 2: Determining the Carrying Capacity of a Population	170

Unit 4 – Comprehensive Inquiry Investigation

Lab 12: Culminating Lab	177
Activity 1: Modeling a Water Treatment Plant	181
Activity 2: Biological Treatment of Pollution	185
Activity 3: Evaluating the Health of an Ecosystem	187

Appendix

Science Safety	193
Science Safety Rules	194
Postulates of Science	195
The Laboratory Notebook: Recording, Analyzing, and Reporting Data	196
Scientific Notation	199
Useful Equivalents, Symbols, and Equations	200
Field Biology Techniques and Resources	201
Glossary	226
Material Safety Data Sheets	234

Student Guides and Copymasters

Lab 1: Landfills	235
Lab 2: Radiation Effects	243
Lab 3: Bioremediation of an Oil Spill	255
Lab 4: Climate Change	267
Lab 5: Water Pollutants	275
Lab 6: Air Quality	281
Lab 7: Soils	291
Lab 8: Water Quality	305
Lab 9: Learning About Food Webs & Energy Pyramids	329
Lab 10: Using Owl Pellets to Learn about Predator-Prey Relationships	339
Lab 11: Biodiversity	353
Lab 12: Culminating Lab	369