Table of Contents

Introduction

Chapter 1: About This Teaching Guide GO

Arrangement of the Guide
Curriculum Planning
Science Standards addressed in this guide

Chapter 2: The Hubbard Brook Ecosystem Study and Acid Rain GO

Brief History of Acid Rain Research at HBEF
The Interplay between Monitoring and Experimentation
What Does Long-Term Data Tell Us about Acid Rain?
Ecosystem Recovery from Acid Deposition
The Calcium Experiment

Chapter 3: Concept-Building Lessons GO

3.1 Pre/Post-Test
3.2 Pick Your Brain about Acid Rain
3.3 The pH Game
3.4 Model a Catchment Basin
3.5 Just Passing Through
3.6 Buffering Experiments
3.7 What Does the Data Tell Us?
3.8 What Is Ecosystem Recovery?

Chapter 4: Fieldwork GO

Introduction
Preparation
4.1 Globe Video, *Student Inquiry*
4.2 Practicing Your Protocols
4.3 Globe Video, *Data, Process, and Flow*
4.4 Planning Fieldwork Sessions
Protocols
4.5 Precipitation Collection
4.6 pH
4.7 Alkalinity
4.8 Soil Characterization
4.9 Soil pH
Results
4.10 Interpreting and Synthesizing Results
4.11 Representing and Communicating Results

Chapter 5: Slideshows GO

5.1 Acid Rain 101
5.2 *Hubbard Brook Acid Rain Story, Part I: The Discovery*
5.3 *Hubbard Brook Acid Rain Story, Part II: The Calcium Experiment*
5.4 *Hubbard Brook Acid Rain Story, Part III: Ecosystem Recovery*

Chapter 6: Curriculum Options GO

6.1 A Suggested Framework for Middle School Inquiry
6.2 Understanding by Design
6.3 Student Investigations
6.4 Scientific Posters
6.5 Student Independent Research Projects
6.6 Designing Student Assessments

Appendix A: Glossary GO

Appendix B: Resources GO

Scientific Papers
Popular Articles
Books and Magazines
Web Sites