Hydrosphere Investigation

A GLOBE® Learning Investigation
Hydrosphere Investigation
at a Glance

Protocols

**Weekly Measurements**

*Basic*
- Transparency
- Water Temperature
- Dissolved Oxygen
- Electrical Conductivity
- Salinity
- Salinity Titration (optional)
- pH
- Alkalinity
- Nitrate

**Additional Measurements**

- Freshwater macroinvertebrates (twice a year)
- Mosquito Larvae

Suggested Sequence of Activities

- Read the Introduction, especially the sections *What Measurements Are Taken* and *Getting Started*.
- The *Water Walk Learning Activity* sets the stage for developing a baseline knowledge and interest in your Hydrosphere Study Site.
- The *Model a Catchment Basin Learning Activity* provides the big picture view of the students’ watershed and the water and study site in relation to this watershed.
- Map Your Hydrosphere Study Site. At the beginning of your study as part of defining your site, and once each year thereafter, create a map of the Hydrosphere Site and take photographs.
- The *Practicing Your Protocols Learning Activity* guides students through learning how to use the instruments and following the protocols so they collect reliable data.
- Begin Field Sampling. Go to the site and begin the weekly measurements for water.
- Use the *Looking at Data* section at the end of each protocol as a guide to examine your data, ask questions and interpret what you find. Start linking water data to other GLOBE measurements.
- Focus on Key Science Ideas by performing the following Learning Activities:
  - *Water Detectives* and *The pH Game* introduce students to key water chemistry variables and to the need using instruments to take certain measurements.
  - *Modeling Your Water Balance* lets students explore how to use their data for modeling.
## Table of Contents

### Introduction
- Why Investigate Surface Water? .........................................................Introduction 1
- The Big Picture ................................................................................Introduction 2
- GLOBE Measurements ........................................................................Introduction 3
- Getting Started ..................................................................................Introduction 7

### Protocols
- Instrument Construction, Site Selection, Site Documentation and Mapping, and Sampling Procedures
- Water Transparency Protocol
- Water Temperature Protocol
- Dissolved Oxygen Protocol
- Electrical Conductivity Protocol
- Salinity Protocol
- pH Protocol
- Alkalinity Protocol
- Nitrate Protocol
- Freshwater Macroinvertebrates Protocol
  - Rocky Substrates in Running Water
    - Multi-habitat (sampling a lake, pond, or stream with sandy or muddy bottom)
- Salinity Titration Protocol
- Mosquito Larvae Protocol

### Learning Activities
- Water Walk
- Model a Catchment Basin
- Practicing Your Protocols
- Water Detectives
- The pH Game
- Modeling Your Water Balance

### Appendix
- Site Definition Sheet ........................................................................Appendix 2
- Quality Control Procedure Data Sheet ..............................................Appendix 8
- Hydrosphere Investigation Data Sheet ..............................................Appendix 9
- Freshwater Macroinvertebrate Identification Data Sheet ..................Appendix 15
- Hydrosphere Study Site Map ..........................................................Appendix 17
- Mosquito Larvae Data Sheet .............................................................Appendix 18
- Glossary ..........................................................................................Appendix 20