



**mobile inquiry technology**  
**Teacher Notes**

---

## **Environmental Temperatures Introduction**

This activity is designed to be part of an ongoing investigation in which students are observing and investigating how such environmental conditions as moisture, dissolved oxygen and carbon dioxide, salinity, temperature, sunlight, and pH affect organisms, and how organisms interact.

This activity is designed for students to investigate the temperatures of their surroundings. Using the temperature probe will afford them the opportunity to easily observe, record, and compare the temperatures in various locations and relate them to the temperature of the air above the ground and the ground itself. They will then be able to construct and analyze a temperature bar graph for various objects and locations to better understand how the earth and the atmosphere impact the temperature of objects found at their site.

Students investigate and observe the factors of an aquatic ecosystem while they are:

- understanding that for ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis.
- making explanations and predictions from evidence and drawing logical conclusions.
- identifying variables that can affect the outcome of an experiment. In addition they will learn to identify other variables in an experimental design that must be controlled in order to isolate the affect of one variable.
- gaining skills and confidence in using a scientific measurement tool, temperature probe, as well as the spreadsheet and graphing capacity of a computer to represent and analyze data.
- learning to value accuracy and precision in scientific investigation.





**mobile inquiry technology**  
**Environmental Temperatures Teacher Notes**

---

## Discussion Guide

Distribute a small rock and a few leaves to each group of students. Challenge the class to discuss how each of these objects would influence or be influenced by other environmental factors in their immediate vicinity. It might be useful to have the students make a list of these factors based on their investigations up to this point. This is meant to be fairly simple. For example students might be asked, "How would leaves influence the conditions under them?" or "How would the surface of a leaf be influenced by the air above?"

After about 10 minutes ask the groups to share some of their ideas. Propose that they will begin an investigation of one of the variables they indicated: temperature variation. Review their statements about temperature variation, noting especially the varying hypotheses.

If the class has not used a temperature probe before, briefly demonstrate how it works in cups of cold and warm water. Indicate that the probe will permit them to both note small temperature variations (up to 0.10 Celsius). Ask the class how accurate other thermometers they have used are (You may wish to have a thermometer on hand). Point out that it will also permit them to record and view data for analysis after their observations. (It is suggested that students do "Calibrating a Thermometer" as an introduction to the temperature probe.)

Direct the students to "Thinking About the Question".

This activity is built on investigating environmental factors in a selected area, a one square meter quadrant. This will enable students to observe and carefully note various conditions. Students may not be aware of the temperature variation in such a small area. It is not advisable at this point to draw conclusions about a direct relationship between temperature variation and the survival of organisms, since this may be influenced by a host of other variables. The primary goal is awareness of variation.

Explain to the students that they will be testing areas outside with the temperature probe. Suggest that different groups investigate areas outside that include areas in direct sunlight and in the shade, areas closer and higher from the ground, and around differing amounts of water.

Direct the students to "Investigation I".





mobile inquiry technology  
**Environmental Temperatures Teacher Notes**

---

### **Additional Teacher Background**

Just as students often think that a blanket provides the warmth when they are in bed, many will believe that it will be cooler above the leaves (and small rocks) than below them. In reality, the blanket provides a buffer between the heat given off by your body and the temperature in the room. The temperature variance that the students experience above and below the leaf (or small rock) will depend on the temperature of the air and the ground that it is on.

An area gets hotter when it is heated by the sun, and cools by dispersing the heat over the land and up into the atmosphere. The coldest time of the day is just before sunrise, after the earth has been losing heat at night. The earth largely heats our atmosphere from below. The energy from the sun is first absorbed by water, rocks, and soil and changed into heat. These warmed substances then heat the layer of air closest to the surface. The temperature of the atmosphere is warmer closer to earth than farther away because of this heating process.



Copyright © 1999 [Hudson Public Schools](#) and The Concord Consortium, All rights reserved.



**mobile inquiry technology**

## **Environmental Temperatures Suggested Timeline**

---

The amount of time you spend on introductory discussions, data collection, and analysis, will determine your overall timeline. The following represents a possible timeline.

- One class period - Introductory Discussion
- One class period - Investigation I: Selecting your habitat site
- One class period - Investigation II: Taking leaves or rock temperatures
- One class period - Investigation III: Finding ground temperatures
- One class period - Analysis

Additional days can be used for further investigations.



Copyright © 1999 [Hudson Public Schools](#) and The Concord Consortium, All rights reserved.