



science

mobile inquiry technology

home activities help

ACTIVITY CONTENTS:

Environmental Temperatures

- [Introduction](#)
- [Thinking A bout the Question](#)
- [Materials](#)
- [Safety](#)
- [Investigation I : Selecting your habitat site](#)
- [Investigation II : Taking leaves or rock temperatures](#)
- [Investigation III : Finding ground temperatures](#)
- [Technical Hints](#)
- [Analysis](#)
- [Further Investigations](#)

[◀ back](#) [activity contents](#) [next ▶](#)



science

mobile inquiry technology

home

activities

help

Environmental Temperatures Introduction

Discovery Question: How do temperatures vary outside?

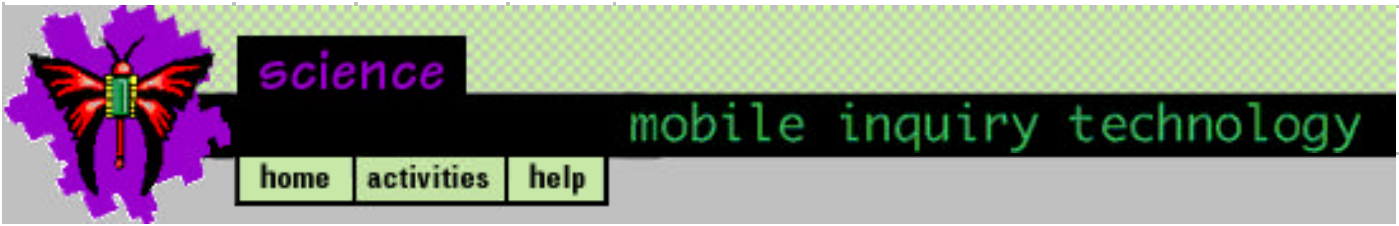


This activity enables you to explore temperatures in your surroundings.

◀ back

activity contents

next ▶



Thinking About the Question

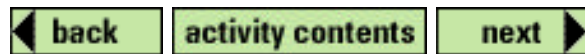
How do temperatures vary outside?

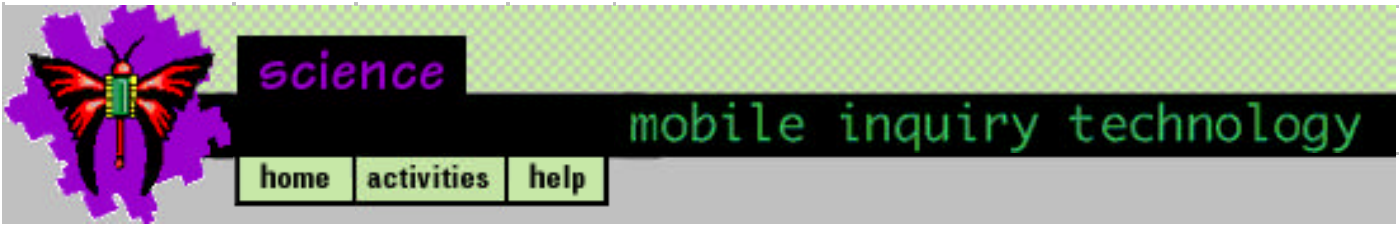
Humans are one of the few organisms that live in such a wide variety of habitats. As advanced builders and tool makers, we are able to make all varieties of clothing, as well as cooled and heated shelters. Most organisms live in a very specific kind of environment. Even just outside your school there are a variety of habitats that support different kinds of organisms. Have you ever wondered just how many living things there are in different locations? Temperature variation is one of the factors that influence where organisms live. Some like it hot and some like it cool!

During this activity you will investigate a small area of a field or wooded area and determine the range in temperatures found in it.

In your group predict the range of temperatures that you might find in a one square meter area if all the temperatures are taken within the same short time period. For example, would the temperature be the same under a rock as it is in grass?

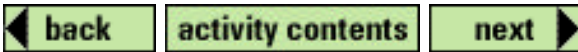
Go to "Investigating the Question."





Environmental Temperatures Materials

- temperature probe
- meter stick
- small stakes or sticks (at least 4 per group)
- string or marking tape (at 4 meters per group)
- pencil
- graph paper





science

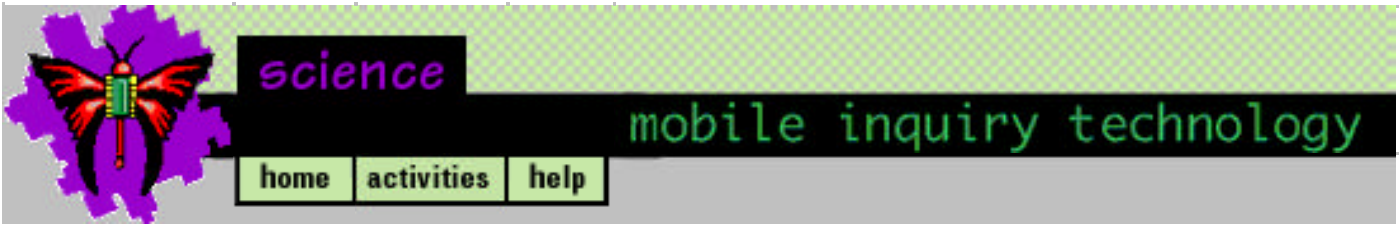
mobile inquiry technology

home activities help

Environmental Temperatures Safety

If placing the probe under a rock or in the ground, be careful to not damage the temperature probe.

◀ back activity contents next ▶



Environmental Temperatures Investigation I

Selecting your habitat site

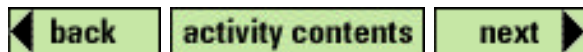
1. Before going outside, create a spreadsheet to record the following:

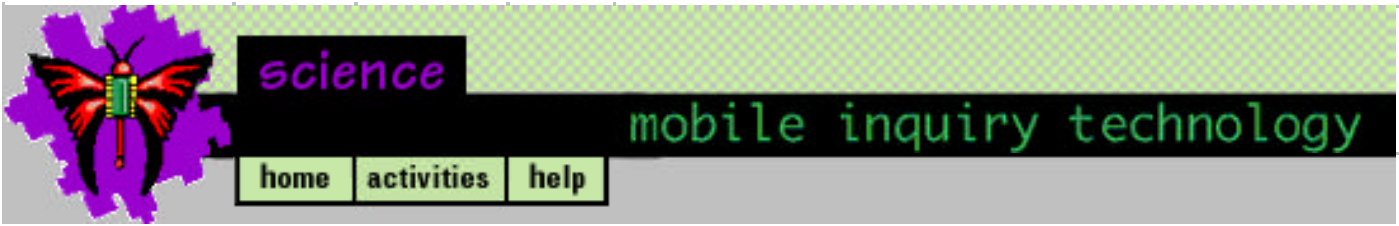
- temperature of the air
- temperature of the ground
- temperature above and below some leaves or small rocks
- temperature at ground level and 20 cm below ground level

You will take 5 readings for each type of location. Refer to [Technical Hints](#) to see how to create a spreadsheet.

2. Visit a field and select a square meter area that has a wide variety of habitats (rocks, grass, leaves, etc.) Use a meter stick to measure out one square meter. Use the stakes to mark all four corners of your site. Box in the site by wrapping the string around your habitat.

3. Using graph paper, draw a picture of your site. On a piece of graph paper mark off a large square to represent your square meter. Decide how many squares on your graph paper represent each centimeter in your observation area. Mark the locations of various objects in your observation area in the appropriate location on your graph paper by using your meter stick.

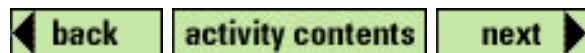


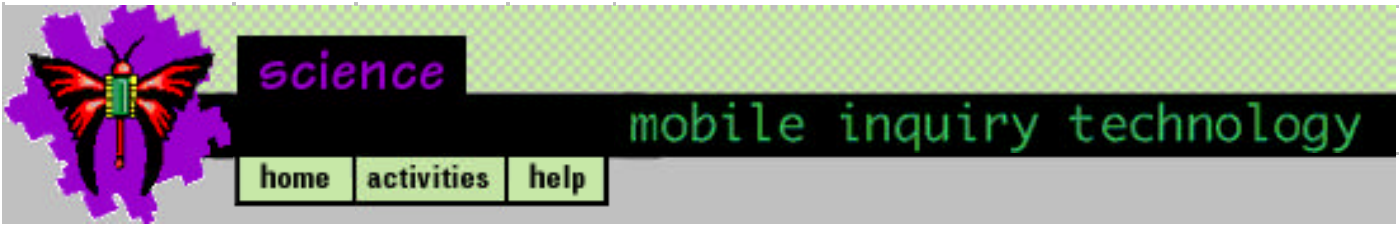


Environmental Temperatures Investigation II

Taking leaves or rock temperatures

1. Predict whether the temperature will be greater above or below the leaves or rocks. Discuss your reasons with your group.
2. Pick 5 piles of leaves or 5 small rocks to take your temperature measurements. Mark the locations of your objects on your graph paper.
3. Obtain the temperature on **top** of the leaves or rock with the temperature probe. Refer to [Technical Hints](#) to see how to use the DataLogger software to record temperature for 60 seconds. Record the final temperature on your spreadsheet. Refer to [Technical Hints](#) to see how to transfer data to your spreadsheet.
4. Obtain the temperature as the leaves or rock **cover** the temperature probe. Refer to [Technical Hints](#) to see how to use the DataLogger software to record temperature for 30 seconds. Record the final temperature on your spreadsheet. Refer to [Technical Hints](#) to see how to transfer data to your spreadsheet.
5. Create a bar chart of the temperature probe readings above and below the leaves or rocks. See [Technical Hints](#) to create a bar chart from your spreadsheet.
6. Answer Question 1 in "Analysis".

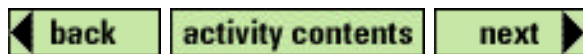




Environmental Temperatures Investigation III

Finding ground temperatures

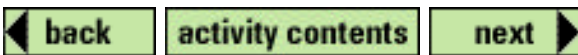
1. Predict whether the temperature will be greater at ground or below ground level. Discuss your reasons with your group.
2. Using the temperature probe, obtain measurements of the ground and air temperatures. Refer to [Technical Hints](#) to see how to use the DataLogger software to record temperature for 60 seconds. Record the final temperature on your spreadsheet. . Refer to [Technical Hints](#) to see how to transfer data to your spreadsheet.
3. Push a pencil down into the earth (about 20 centimeters) at the same place that you took a measurement of the ground. Obtain the temperature at the bottom of the hole with the temperature probe. Refer to [Technical Hints](#) to see how to use the DataLogger software to record temperature for 30 seconds. Record the final temperature on your spreadsheet. Refer to [Technical Hints](#) to see how to transfer data to your spreadsheet.
4. Repeat the tests at four more locations within your habitat site.
5. Create a bar chart of the temperature probe readings at and below ground level. See [Technical Hints](#) to create a bar chart from your spreadsheet.
6. Answer Question 2 -4 in "Analysis".





Environmental Temperatures Technical Hints

- [Creating a spreadsheet](#)
- [Using the DataLogger software to record temperature](#)
- [Transferring data to your spreadsheet](#)
- [Creating a bar chart from your spreadsheet](#)

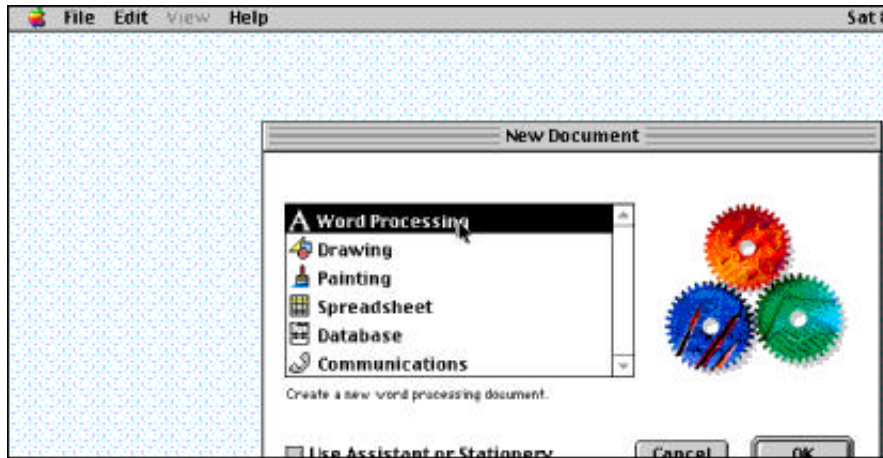




mobile inquiry technology Environmental Temperatures Technical Hints

To create a spreadsheet:

1. Select the spreadsheet option in ClarisWorks.



2. In Column A name the locations of your tests. Depending on whether you are testing rocks or leaves, place trials 1-5 below the air and ground temperature for Investigation II. For Investigation III, place trials 1-5 for the above and below ground readings.

	A	B	C	D	E	F	G	H	I
1	Location	Temp (C)							
2	air temp								
3	ground temp								
4									
5	leaves #1								
6	leaves #2								
7	leaves #3								
8	leaves #4								
9	leaves #5								
10									
11	ground #1								
12	ground #2								
13	ground #3								
14	ground #4								
15	ground #5								
16									
17									
18									
19									

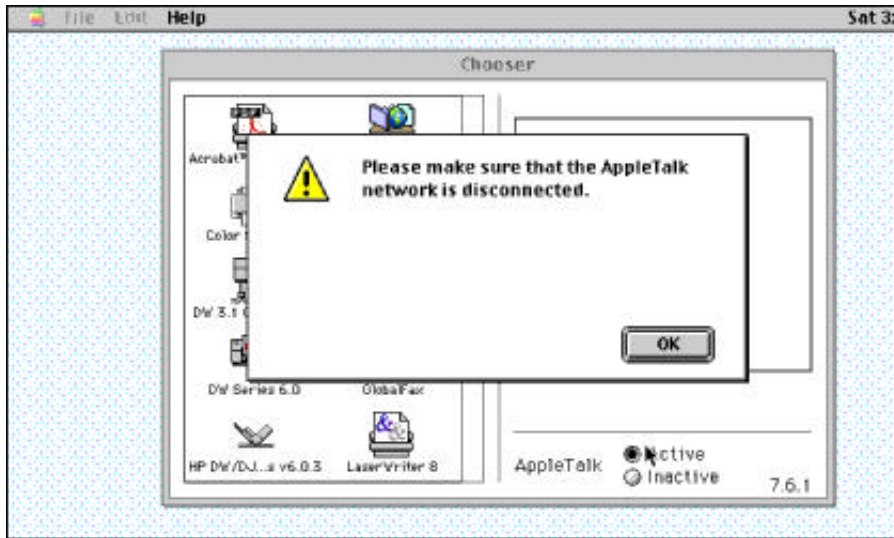
CLOSE



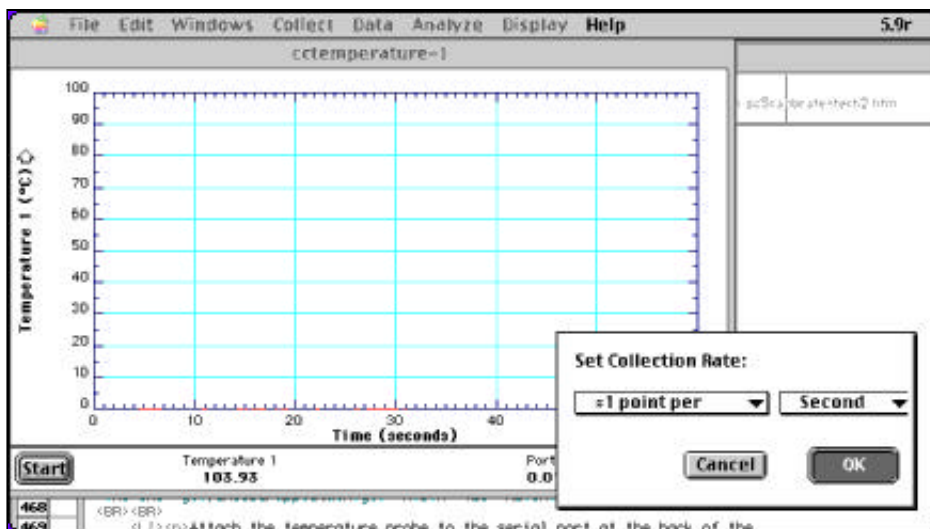
mobile inquiry technology Environmental Temperatures Technical Hints

To use the DataLogger software to record temperature:

1. Open the Chooser from under the Apple menu. Make sure AppleTalk is inactive.



2. Attach the temperature probe to the serial port at the back of the computer.
3. Double click on file named "cctemperature". It will automatically ask you if you want to load the "cctemperature.CLB" (calibration file for temperature probe). Click OK.
4. Select the Collect menu and choose Data Rate. For this activity select 1 points per second.
5. From the Display menu select One Graph. Also from the Display menu choose Set All Min, Max. For this experiment, select 0-60 for seconds. Click OK. Select 0-100 for degrees Celsius. Click OK.



6. Click Start to begin to collect data.

CLOSE

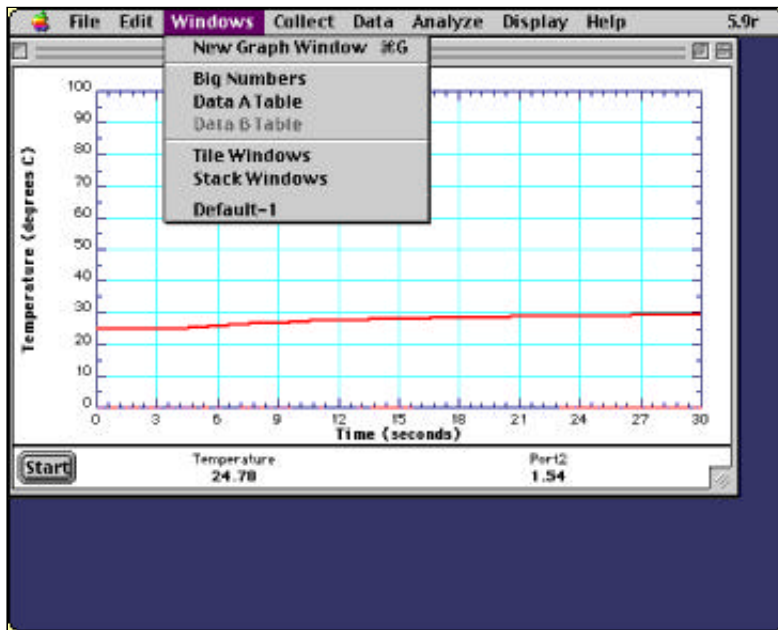


mobile inquiry technology

Environmental Temperatures Technical Hints

To transfer data to your spreadsheet:

1. Select Data Table A from the Windows menu. Highlight the last row of data and press Open Apple and the C key at the same time on the computer.
2. Open your Environmental spreadsheet. Choose an area away from your chart and press Open Apple and the V key at the same time. Select the temperature and click in the appropriate box. Choose Paste from the Edit menu to place the temperature.



3. Highlight the original data that was transferred and click on delete to erase. Continue your tests and transfer the final temperature from each test in the same way.

CLOSE



mobile inquiry technology Environmental Temperatures Technical Hints

To create a bar chart from your spreadsheet:

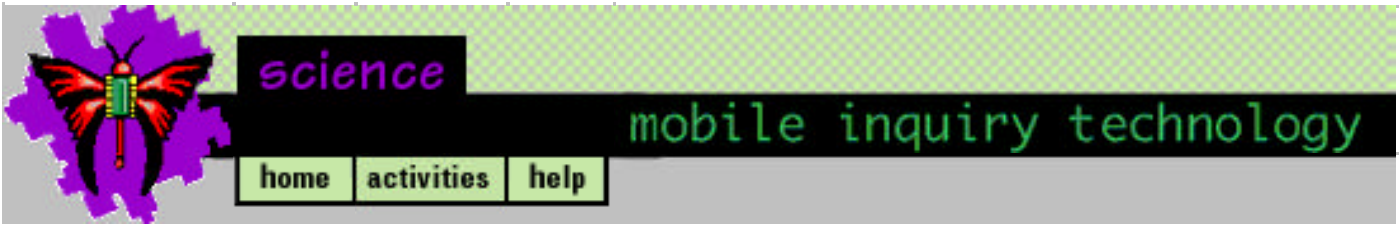
1. Highlight the data that you would like to graph. Include the headings if possible. Select Make Chart from the Options menu. Choose Bar graph from the Gallery. Click OK.

The screenshot shows a spreadsheet application window titled "untitled (SS)". The spreadsheet has columns A through G and rows 1 through 19. The data is as follows:

	A	B	C	D	E	F	G
1	Location	Temp (C)	Temp (C)				
2	air temp	10.37					
3	ground temp	9.21					
4		Above	Below				
5	leaves #1	10.24	9.83				
6	leaves #2	10.37	9.91				
7	leaves #3	10.18	9.7				
8	leaves #4	10.35	9.93				
9	leaves #5	10.29	9.88				
10		Above	Below				
11	ground #1						
12	ground #2						
13	ground #3						
14	ground #4						
15	ground #5						
16							
17							
18							
19							

2. Expand the graph by clicking on a corner and dragging to the desired size.

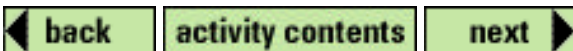
CLOSE



Environmental Temperatures Analysis

Answer the following questions on paper:

1. How did the temperature of the air and ground impact your results with the leaves and the rocks?
2. Did the temperatures above and below ground stay the same? Does the temperature of the air above the ground change the temperature below the ground?
3. What is the range of temperatures in your observation area?
4. What observations have you made about how temperature varies in **different locations**? Did the temperature changes dependent on the amount of sun, clouds, shade, etc. present?
5. What observations have you made about how temperature varies in **different places of the same type of location**?
6. Were any of your original temperature predictions not supported by the evidence you gathered with the probe? Think about why you made your original predictions. Now that you have more evidence have any of your original ideas about temperature variation changed? How?





science

mobile inquiry technology

home

activities

help

Environmental Temperatures Further Investigation

Investigate how temperatures vary throughout the year at your habitat site, including during different types of weather conditions and seasons (e.g., Fall, Spring, etc.).

◀ back

activity contents

next ▶