



mobile inquiry technology

Teacher Notes

Temperature Highs and Lows Introduction

In this activity, students will use a temperature probe to observe changes in temperature over time. Using the temperature probe will afford them the opportunity to log temperatures even when they are not present. Students will be able to represent the data they collect both in a spreadsheet and in a line graph. They will be able to calculate the mean temperature and the range of temperatures in two 24-hour periods. After collecting data over a complete day they will be able to make observations about the coldest and warmest times of the day.

In addition, students will:

- describe patterns in daily temperature fluctuations;
- identify variables that can affect the outcome of an experiment.
- gain skills and confidence in using a scientific measurement tool, the temperature probe, as well as the spreadsheet and graphing capacity of a computer to represent and analyze data.





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Discussion Guide

Display a large graph on chart paper or on an overhead with the y-axis labeled temperature and the x-axis labeled time. Label the time axis with 12-2 hr, intervals from 0 to 24 hours. Leave the y axis intervals blank.

Challenge the students to discuss how a graph of temperature changes over a 24-hour period. Direct the students to "Thinking About the Question". Ask the students what could affect temperature readings in their area. Have the groups report their ideas to the class. Suggestions probably will include cloud cover, rain, night fall, etc. Ask the students how they think that temperature varies throughout the day.

Discuss with the class when they think the coldest and warmest periods of the day might be. Discuss whether the temperature changes gradually or suddenly as the sun rises and sets. With various colored markers invite a few students to draw their predictions.

Show the temperature probe to the students. Indicate to the students that unlike a thermometer that only shows the temperature at one moment, the probe when it is linked to a computer can record temperatures over a long period of time. Demonstrate the temperature probe by:

1. Placing the probe in the ice water and showing what happens on the graph.
2. Placing the probe in the room temperature water and showing what happens on the graph.
3. Next, pour a little ice water into the room temperature water and place the probe in the water. Show the resulting graph.

Allow the students to select a location that is safe around the school that they would like to test for change in temperature. Remind them that the probe must be positioned outside in the elements. Locations should be chosen that allow the computer to remain around the clock yet away from of weather conditions. A good position might include resting the computer on a window sill with the probe extended outside of the window or air conditioning vent, resting the computer on a bench in a garage with the probe under the garage door, etc. Encourage the student groups to select areas that would vary in amount of light and exposure to the elements. Have the groups report their locations to the class.

Direct students to "Investigation I".





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Additional Teacher Background

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 usually 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.

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Temperature Highs and Lows 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: Preparation of test site
- One day - Investigation II: Logging temperatures Day one
- One day - Investigation III: Logging temperatures Day two
- One class period - Analysis

Additional days can be used for further investigations.



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