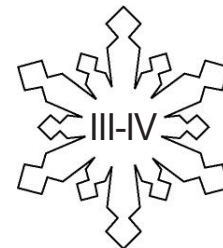


Historical Temperatures

Levels



Grades 5-8

Overview:

During this four-week project (starting at the beginning of a calendar month) students use a weather station and the Internet to collect and compare data from their local school weather station to data from historical regional temperatures for this time of year. Students determine whether the temperature at their school is warmer or colder than historical averages over the course of a month.

Objectives:

The student will:

- collect and record temperature data for a month;
- access remote data sets on the Internet;
- create graphs to compare one month's temperatures to historical temperature data; and
- determine if this month's temperature is colder or warmer than the historical average.

GLEs Addressed:

Science

- [5-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [6] SA1.2 The student demonstrates an understanding of the processes of science by collaborating to design and conduct simple repeatable investigations.
- [7] SA1.2 The student demonstrates an understanding of the processes of science by collaborating to design and conduct simple repeatable investigations, in order to record, analyze (i.e., range, mean, median, mode), interpret data, and present findings.
- [8] SA1.2 The student demonstrates an understanding of the processes of science by collaborating to design and conduct repeatable investigations, in order to record, analyze (i.e., range, mean, media, mode), interpret data and present findings.
- [5] SE2.1 The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by investigating a problem or project over a specified period of time and identifying the tools and processes used in that project.
- [6] S&P-3 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; or drawing or justifying conclusions) by using mean, median, mode, or range.
- [7] S&P-3 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating or making predictions; or drawing or justifying conclusions by determining range, mean, median, or mode (M6.3.3).

Materials:

- Weather station or thermometer
- Access to ACMP Website and Student Network for Observing Weather
- Global Climate Change CD-ROM
- Computer with Internet access
- Colored pencils
- Calculators
- STUDENT LAB PACKETS: "Historical Temperatures"

Activity Procedure:

1. Pass out the STUDENT LAB PACKETS. Introduce the testable question for this project: Will this month's temperature be warmer or colder than historical temperatures for the region for this time of year? Ask students to select a hypothesis.
2. Explain to students that they will be collecting daily data every school day for a month. This data will be compared to historical data from the region to determine if it was a warmer or colder than average.
3. For four weeks, starting the first week of a calendar month, go to the ACMP Website (<http://www.ArcticClimateModeling.com>). Navigate to the Student Network for Observing Weather from the ACMP home page. Look at the recorded temperatures for your village.
4. After four weeks, print out the 4-week data from the Student Network for Observing Weather on the ACMP Website and ask students to record the data on the chart on the student lab packets.
5. Visit <http://climate.gi.alaska.edu/Climate/>.
6. From that page, click on Climate Normals on the left-hand menu.
7. From that page, under the drop down menu called Daily Normals, the teacher should choose the station closest to the school (Nome, Wales or Unalakleet). Instruct all the students to use data from the same village.
9. Print out the page of data. This is actual National Weather Service data. Students will be using the third chart, titled Average Temperature.
10. Highlight the line for the month matching the data collected from the school weather station. This is the average historical temperature for each day of the month. The years data collected is listed at the very top of the page (most are from 1971-2000). Explain to students that the average temperatures for any given day (for example, January 1) from all the years between 1971 and 2000 were averaged together to come up with the average January 1 temperature.
11. Instruct students to record the average historical data on the chart on the student lab packets. Ensure the students are using the correct data.
12. Students should create a line graph to compare the two data sets. The X-axis should be labeled with the day of the month, and the Y-axis should be labeled with the temperature. Instruct students to use either two different colors, or two different styles of line (dashed and solid, for example) to differentiate between the historical average temperatures and the temperatures for the current year. Students should include a title, labels and a key.
13. Assist students in looking at their graphs to determine the overall trends of the data. Students should be able to determine how the school's temperature data compared to the regional historical average and answer the testable question.

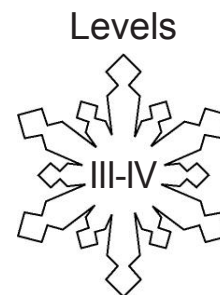
Answers to Student Lab Packets:

Answers will vary.

Name: _____

Historical Temperatures

Student Lab Packet (page 1 of 8)



Testable Question:

Will this month's temperature be warmer or colder than historical temperatures for the region for this time of year?

Hypothesis:

Make an educated guess and check one:

- ___ The temperatures during _____ (month), _____ (year) will be warmer than average.
- ___ The temperatures during _____ (month), _____ (year) will be cooler than average.
- ___ The temperatures during _____ (month), _____ (year) will be the same as the average.

Experiment

Materials:

- Computer with Internet access
- Colored pencils

Procedure:

1. For four weeks, starting the first week of a calendar month, get the daily temperature in your area from the Student Network for Observing Weather on the ACMP Website (<http://www.ArcticClimate-Modeling.com>). Record the data on the applicable week's data sheet.
2. At the end of each week, answer the questions on the applicable week's data sheet.
3. After four weeks, transfer the data from the weekly data sheets to the "School's Temperature Data" chart in this Lab Packet. Include the day, month, and year in the "Date" column.
4. Visit <http://climate.gi.alaska.edu/Climate/>. Click on "Climate Normals" on the left-hand menu.
5. From that page, under the drop down menu called Daily Normals, choose the station closest to your village. Your teacher will help you select the station. Print out the page of data.
7. Look at the third chart on the printout labeled "Average Temperature." Highlight the line that is the same month as the data you collected from your school weather station. This is the Region's Historical Temperature Data.
10. Record the data on the "Region's Historical Temperature Data" chart in this Lab Packet.
11. Using the data collected, create a line graph. Make two lines, one for the data from your school and one for the historical data. Either use two different colors, or two different styles (dashed and solid, for example) for the lines. Label the X-axis with the day of the month, and the Y-axis with the temperature. Include a key showing which line represents which data. Write a title on the graph.
12. Using the graph, answer the questions on the conclusion page.

Name: _____

Historical Temperatures: Week 1 Data

Student Lab Packet (page 2 of 8)

School Temperature Data:

Week of _____ (fill in dates, for example: March 5-11, 2003)

Date	Temperature

Essay Question:

Go to the ACMP website (<http://www.ArcticClimateModeling.com>) and click on "Student Network for Observing Weather." Which Bering Strait School District communities on the network had the warmest temperatures this month? Do you think this community always has the warmest temperatures in the Bering Strait School District? Why or why not?

Name: _____

Historical Temperatures: Week 2 Data

Student Lab Packet (page 3 of 8)

School Temperature Data:

Week of _____ (fill in dates, for example: March 5-11, 2003)

Date	Temperature

Essay Question:

Perform an Internet search about the history of the thermometer. Write a paragraph that answers the following questions: When was the thermometer invented? Who invented the thermometer? Who invented the temperature scales used today? How did they come up with these temperature scales?

Name: _____

Historical Temperatures: Week 3 Data

Student Lab Packet (page 4 of 8)

School Temperature Data:

Week of _____ (fill in dates, for example: March 5-11, 2003)

Date	Temperature

Essay Question:

View the Global Climate Change CD-ROM. List the five phase change processes of the hydrologic cycle. Explain how temperature affects each phase change process.

Name: _____

Historical Temperatures: Week 4 Data

Student Lab Packet (page 5 of 8)

School Temperature Data:

Week of _____ (fill in dates, for example: March 5-11, 2003)

Date	Temperature

Essay Question:

In your community, how do you know it is safe to walk on lake or sea ice without looking at a thermometer?

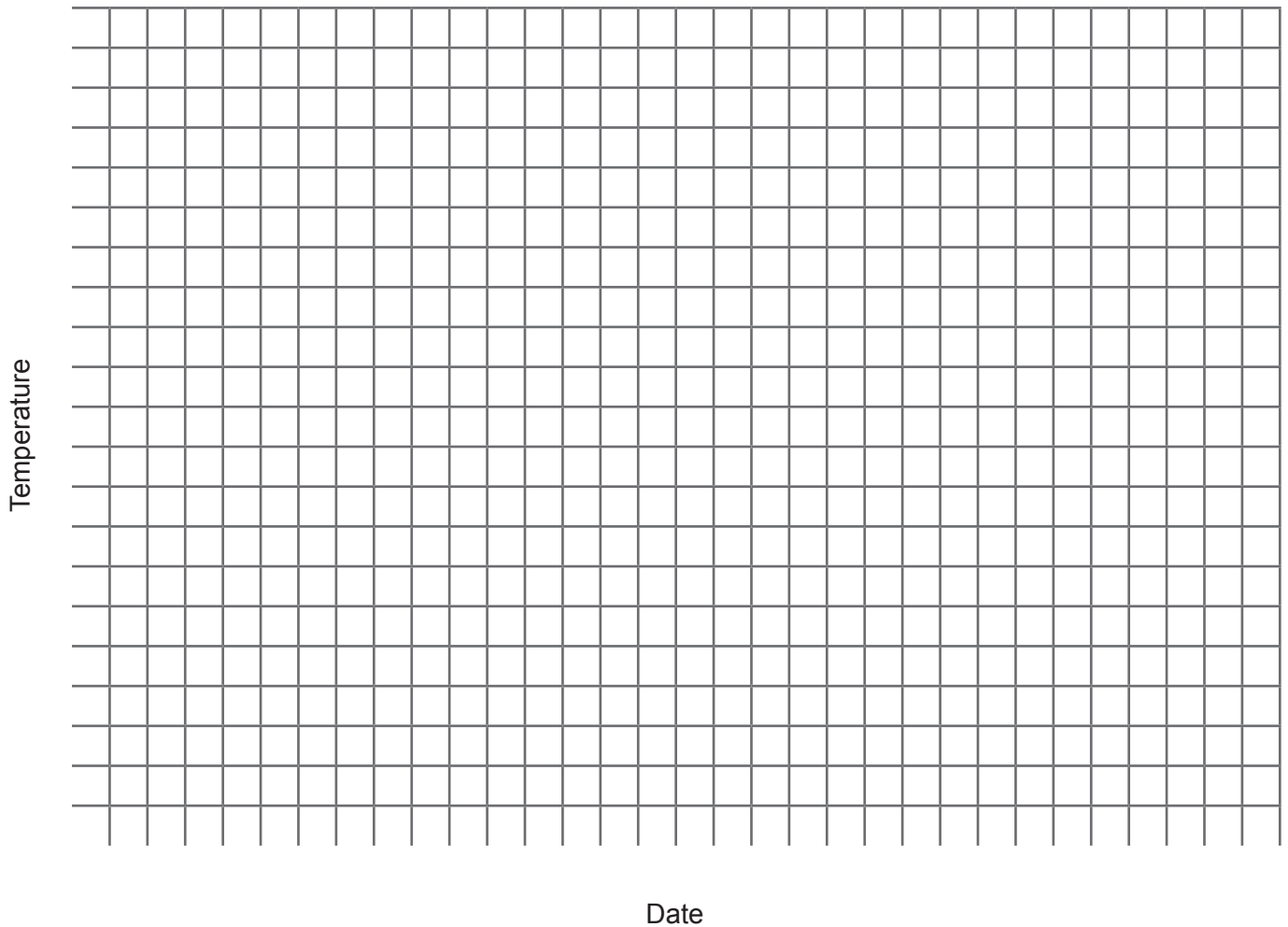
Name: _____

Historical Temperatures Comparison

Student Lab Packet (page 7 of 8)

Analysis of Data:

1. Create a line graph with the average monthly temperatures for each location. Use a different color for each location. Provide a title and key. Label the units on the x- & y-axes.



Look at the graph to determine:

4. Which location was coldest overall? _____
5. Which location was warmest overall? _____

Name: _____

Historical Temperatures Conclusion

Student Lab Packet (page 8 of 8)

Conclusion:

1. Select the conclusion reached after the experiment:

___ The temperatures during _____ (month), _____ (year) will be warmer than average.

___ The temperatures during _____ (month), _____ (year) will be cooler than average.

___ The temperatures during _____ (month), _____ (year) will be the same as the average.

2. How did you reach your conclusion? Explain using complete sentences.

Further questions:

1. Do you think the temperature for the entire year will follow the same trend (either warmer or cooler than average)?
