

Local Weather and the Ocean

Objective

To assess how the ocean affects air temperatures.

Correlations

National Science Education Standards

Grades 5-8: A, B, D, E

Grades 9-12: A, B, D, E

California State Science Education Standards

Grade 6: 3c-d

Grade 7: 7a-b

Grade 8:

Grades 9-12:

Ocean Literacy Principles and Fundamental Concepts

Introduction

The circulation of the ocean's water affects regional weather. Ocean water has high heat capacity that results in the rather slow temperature changes of the ocean in comparison to the low heat capacity of air that results in rapid changes in air temperatures. The circulation of the ocean and the ocean's high heat capacity explain why the air temperatures in coastal locations are often cooler in the summer and warmer in the winter than inland locations. Predominant wind patterns blow air affected by ocean surface currents to coastal locations. In this exercise, you will investigate the influence of the ocean by comparing temperatures in coastal and inland locations.

Materials

- Computer
- Internet connection

Part A

Finding the present air temperature.

1. Go to <http://www.weather.com/>

2. Type in your city and record the air temperature at this time: _____ °C

3. If you live inland, locate a city by the ocean nearest you at the same latitude as your city and record the air temperature at this time: _____ °C

If you live at the ocean, locate a city inland from you at the same latitude as your city and record the temperature at this time: _____ °C

Note: We found that comparisons are best made between a city near the ocean and a city inland that have the same latitude. Check the ocean observing buoys for wind speed and direction. To convert from Fahrenheit to Celsius, use: $^{\circ}\text{F} - 32 * 5/9 = ^{\circ}\text{C}$.

Part B

Finding the ocean water temperature

1. Go to NOAA's National Data Buoy Center at <http://www.ndbc.noaa.gov/>
2. Locate the coastal area nearest you on the map. Click on the area. On the next screen, you may need to click on another area to zoom in even closer.
3. Click on a coastal buoy and scroll down to find the water temperature: _____ $^{\circ}\text{C}$
4. Compare your answer to the air temperature found in Part A above.

Suggested question

Which area's air temperature was the closest to the air temperature?

Part C

Finding monthly average high and low temperatures.

1. Return to the weather conditions for your city at <http://www.weather.com/>
2. Scroll down to the "36 hour forecast" and click on "averages".
3. Under the "monthly averages" menu, select "compare locations" and enter your ocean comparison city from Part A above and compare the average high and average low temperatures for the two cities.

Suggested questions

1. Which city had the highest monthly summer temperatures?
2. Which city had the lowest monthly winter temperatures?

Suggested critical thinking questions

1. What effect does the ocean have on coastal inland air temperatures?
2. Explain how the ocean affects local air temperatures.