# Investigating Diurnal Wind and Air Temperature Patterns
# in a Coastal Environment

Introduction:
Everyone feels the warmth of the sun and the wind blowing, but are there any regular patterns to these environmental factors that can be observed?   In this investigation we will analyze real environmental data from our local environment and try to make predictions based on the data.

Vocabulary:        diurnal

Hypotheses:  Consider a normal, not stormy, day.  Make a prediction based on your experiences.
a) What hour of the day is usually the windiest? _____ least windy?_____

b) What hour of the day is  usually the warmest? _____  coldest? _____

Materials:
             access to 3 consecutive days of your local weather numbers
             2 sheets of graph paper, pencil

Procedures:
1- Print out a copy of the following local weather numbers for 3 consecutive normal, not stormy, days:
             a. wind speed v. Time of day
             b. Wind direction v. Time of day
             c. Air temperature v. Time of day

2-  On one sheet of graph paper, calibrate your x-axis (horizontal axis) to show the hours of the day, for 3 consecutive days.  Let the y-axis represent wind speed.  Plot a line graph of the wind speed v. time of day numbers.  Next, print a code letter for each hour representing the wind direction along the line graph for wind speed.  (N= North, S=South, etc).

3-  On another sheet of graph paper, calibrate your x-axis (horizontal axis) to show the hours of the day, for 3 consecutive days.  Let the y-axis represent air temperature.  Plot a line graph of the air temperature v. time of day numbers.

Analysis of Data:
A. What hour of the day is usually the windiest? _____ least windy?_____ How did this compare to the predictions you made in the hypothesis section?

B. What hour of the day is  usually the warmest? _____  coldest? _____  How did this compare to the predictions you made in the hypothesis section?

C. Summarize your wind graph:  Describe the diurnal wind speed and direction patterns for a normal, not stormy, day in your local environment.

D. Summarize your air temperature graph:  Describe the air temperature patterns for a normal, not stormy, day in your local environment.

E. Place one graph on top of the other by holding the two pieces of paper together with a light shining behind them.  Look for any relationship between the two graphs.  Summarize the relationship between wind speed, direction and air temperature.

F. List and describe the physical principles that explain the wind, direction and air temperature patterns at your location.  Take into account the heating of the land and the ocean.  Put together a concept map or flow chart showing the relationships between wind and temperature events for a single day.

Extensions:
G. Obtain, graph and analyze similar data sets from other geographical locations.  Compare diurnal patterns and explain any observed similarities and differences.

H. Obtain data sets for other weather factors that are available.  Make a series graphs similar to those made during this investigation.  Which factors appear to show diurnal cycles?  Which do not?  Why?