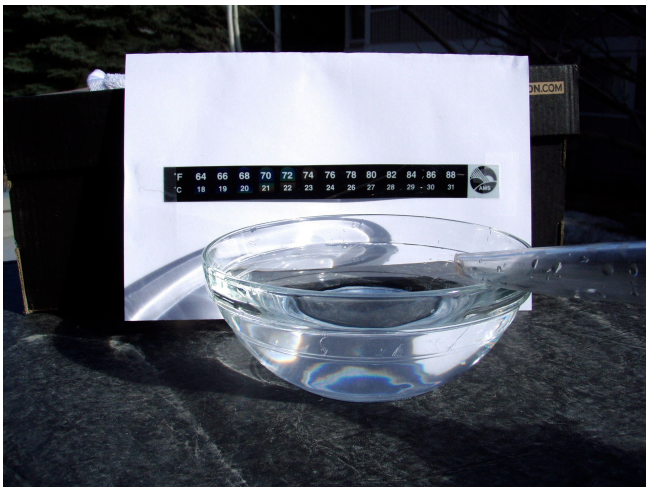
Surface Currents and Coastal Temperature

To accompany: http://serc.carleton.edu/eslabs/weather/3b.html#fronts

Gather the following materials:

- 2 shallow bowls of equal size
- 2 liquid crystal temperature strips
- 2 pieces of cardboard, or manila folders
- hot water
- cold water
- 2 droppers or pipettes (a turkey-baster works as well)
- tape



1. Read the information about surface currents and coastal weather, below. As you read, relate the information on the card to the steps in your demonstration.

2. Assemble and practice your demonstration of surface currents and coastal temperatures.

a. Tape the liquid crystal strips onto the cardboard pieces, at the height of the top of the bowl.
b. Fold the cardboard to make a stand. Or, prop the cardboard behind the bowl using books.
c. Fill one bowl with warm to hot water.
d. Fill a second bowl with cold water, if needed add ice to the water to cool it.
e. Carefully, use the pipette to blow air over the surface of the bowl and towards the temperature strip. Do not splash the water. Continue blowing for a minute or until the temperature on the strip has settled.
f. Measure the temperature of the air after it has crossed the bowl. Repeat the test several times. Record the temperatures.

3. Review the information about surface currents and coastal temperatures on your station card a second time; relate the information on the card to the steps in your demonstration. Use colored pencils and copy the location of the surface currents from the diagram, below, to your World Climate map. Compare the map of surface currents to the US Average temperature map. What is the effect of currents on coastal temperatures?

4. Prepare to share your demonstration with the class. Be sure everyone in your group has a role in the demonstration.

Surface ocean currents

Wind-driven surface ocean currents close to coastal areas, play a strong role in the weather of that region. Areas on western coasts of continents, where the prevailing westerly winds bring cool ocean air on shore, are generally cooler and wetter than the interior regions of continents or the eastern coasts. The temperature of the currents on the western side of continents is due to the fact that cold ocean currents are carrying cold polar water toward the equator; therefore the air above these currents tends to be cool, moist, stable, and fog-prone. Examples of areas influenced by cold surface ocean currents include Seattle and San Francisco, which is famous for its fog!

Where warm surface ocean currents are moving warm, equatorial water toward the poles, the air above tends to be warm, moist, and unstable, thus creating more turbulent and changeable weather. This occurs because the warm ocean water is evaporating and adding water vapor to the atmosphere. Generally, the eastern sides of continents are warmer than their western counterparts. The eastern seaboard of the United States is an example of a region with highly variable weather due to the influence of the warm Gulf Stream current.