

Thermocline Inquiry

This activity is adapted from Marine Science Activities On A Budget,
J. Michael Williamson, Wheelock College, Boston, MA, Copyright 1993

Procedure:

1. Tape the ruler to the side of the container so that the 0 cm mark is level with the surface of the water. Use the ruler on the side of the container and a thermometer to measure the water temperature every two centimeters from the surface down to the bottom. Use the bottom of the thermometer as the part to line up with the centimeter marks. Record your data in the before column on the Temperature-Depth Profile Table sheet provided.
2. Make a line graph of the depth as a function of the temperature (depth on the vertical axis, temperature on the horizontal axis). The 0 cm and degree measurements should be in the **upper** left corner of the graph to realistically show the temperature line at various depths.
3. **Do Not Mix!** Put 3-5 drops of food coloring in the water. **Do Not Mix!** Just observe. Allow the coloring to mix on its own. Write your observations below.
4. Become a source of wind (not a gale) and blow across the surface of the water for 3-5 minutes. Then re-measure the temperature at 2 cm intervals. Record the data on the chart in the after column. Graph these results on the same graph in another color.

5. Answer these questions

1. Where was the most dense water located?
2. Where was the most dense water located?
3. What is a thermocline?
4. At what depths was a thermocline present on your first graph?

5. Describe any changes that occurred in the thermocline after the water was disturbed by wind.

6. Judging from your observations of the food coloring, how might a thermocline affect the movement of substances in the water?

Thermocline set-up Instructions

Purpose - This activity will help students to better understand and visualize a thermocline.

Materials -

Thermometers C

Metric rulers, tape

Clear containers – 2 liter bottles with tops cut off or glass gallon jars from the cafeteria, etc.

Food coloring, droppers

Salt – water softener salt, rock salt or sea salts dissolve clearly one long funnel or funnel with a tube attached.

Instructions -

The Objective is to set up a thermocline in each container by creating a layer of colder, denser water on the bottom and a layer of warmer, less dense water on the top. The salt merely helps the cold water to be denser and therefore makes the activity more successful.

Cold, salt water –the water needed to fill the containers needs to be cold, salt water. Mix appropriately 35g of salt with each quart of water needed. You can fill several gallon milk jugs with the solution and put them in a refrigerator overnight.

Just before the activity, fill each container full with warm tap water. Slowly pour the cold water through the funnel into each container so that it creates a bottom layer of cold, dense water. Place the bottom of the funnel or tube very close to the bottom of the container when pouring so that very little mixing occurs. As soon as the water is poured the activity can proceed.

Data Sheet

Names _____

Temperature-Depth Profile Table

Depth in cm	0	2	4	6	8	10	12	14	16	18	20	22	24	26
Before temp. C														
after temp. C														

Graph