



# Density and the Oceans

**Earth and Space Research**

-A Nonprofit Research Institute

<http://www.esr.org>

Presenters: Susan L. Howard ([showard@esr.org](mailto:showard@esr.org)) and Scott Springer

## Polar Science at ESR

**Scientists at ESR** study the polar oceans and their effect on sea ice and ice sheets. We address questions such as: What ocean factors determine the extent of the sea ice? How quickly do ice shelves melt? How does the melting of sea ice affect deep water formation and ocean circulation, and How do the oceans influence the loss of ice from the vast Greenland and Antarctic ice sheets? The last question also addresses the major issue of: How quickly is sea level rising?

**Today we explained** what density is and why it is important in understanding the global oceans. The temperature and the amount of salt in ocean water vary from place to place, and with depth. Together these affect the **DENSITY** of the ocean. Cold salty water formed in the polar region is very dense and sinks. This drives ocean circulation, and helps move heat and salt around the world.



**The polar oceans** are beautiful, spectacular regions that inspire a love and concern for the Earth. ESR scientists share their experiences through our online photo galleries ([www.esr.org/esrphotos.html](http://www.esr.org/esrphotos.html)) and in public talks to schools and other venues.

## Try This At Home:

**Build a density tower using liquids of different densities by layering the following:**



Rubbing Alcohol with blue food coloring

Vegetable Oil

Water with red food coloring

Green Dish soap

Milk (whole)

Maple Syrup

Karo Corn Syrup

Add liquid layers slowly! And remember - the densest liquid is on the bottom!

## Test This!

Get three glasses:

- 1) In one, mix ice cold water, lots of salt, and blue food coloring.
- 2) In another glass, add red food coloring to hot water.
- 3) Get a larger glass of room temperature water.

Using an eye dropper, slowly add drops of 1) and then 2) to the third glass.

Does the cold salty water sink?

Can you get the warm fresh water to float?