Undercurrents

Powerful currents exist beneath the ocean's surface. Unlike the surface variety, these unseen currents are not created by the wind. Instead, their movement is driven by differences in density. In fact, these subsurface currents are called density currents. When salt water evaporates or becomes trapped as ice, its load of dissolved salts remains behind. This "leftover" salt dissolves in the remaining water to make it denser. If unmixed, this dense water sinks through the less saline water below. As it sinks, the water spreads out, forming the sideways movement of a density current.

Materials
Salt    Ice    A spoon    2 cups    2 clear plastic pitchers
Blue and red food coloring

To Do
Fill a cup halfway with ice water. Add several drops of blue food coloring.
Fill a second cup halfway with room-temperature water. Dissolve as much salt as possible into it. Add several drops of red food coloring to this saline water.
Fill a large pitcher halfway with room-temperature water. Slowly pour the dyed ice water into this pitcher. Tilt the pitcher so that the ice water runs down its inner side.
Observe what happens when the ice water meets the room-temperature water. Does the ice water float or sink?
Is ice water more dense or less dense than room-temperature water?
Fill a second pitcher halfway with room-temperature water. Slowly pour the dyed saltwater into this pitcher. Tilt the pitcher so that the salt water runs down the inner side of the pitcher. Observe what happens when the salt water meets the water. Does salt water float or sink? Is salt water more dense or less dense than water?
The Science
When water is cooled, its tiny particles (molecules) slow down. Their slower speed allows the molecules to pack closer together. The result is an increase in density.
Therefore, when the cold water was poured into the room-temperature water, it sank to the bottom of the container.
Since salt water is denser than fresh water, it should make sense that salt water “pours” through water and forms a separate lower layer.
Check It Out! Reverse the experiment. Add water to a pitcher that is half filled with ice water. Then add water to a pitcher that is half-filled with salt water