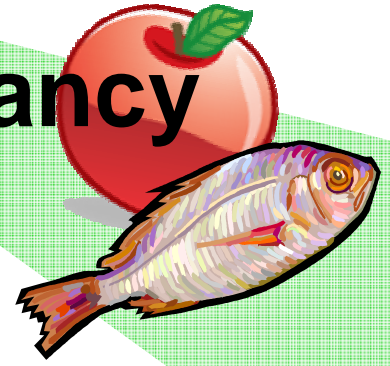


# Blubber vs Buoyancy



**QUESTION:** How do marine mammals stay afloat?

**MATERIALS:**

- cups - 3
- olives (pitted)
- salt
- shortening
- staples
- water
- wooden splint

**PROCEDURE:**

1. Fill cup 2/3 full of tap water and place a pitted olive inside. Be sure it fills with water. Olive tissue like animal flesh has a higher specific gravity than water. It has negative buoyancy and will sink.
2. To simulate the effect of blubber, put a small amount of shortening into the opening of the olive, displacing water as necessary (do not drain). Test the olive after each dab you add to see any changes. Soon the olive will float. It now has a lower specific gravity than water (overall density is less than an equal volume of water). It has positive buoyancy and will float.
3. Now stick both points of a staple into the side of the olive. This simulates the effect of bone on buoyancy. Test it in the water now. It should be negative. If not, put another staple in the opposite side.
4. Your job now is to try to achieve neutral buoyancy. That is, make the olive hang in midwater, neither sinking nor floating. It wont be easy. This is a desirable condition for many marine mammals, since it allows them to stop and rest without a constant effort to maintain their position in the water column.
5. Once you have a neutral olive, get additional cups, containing warm water, ice water, salty water. Predict in the table what will happen when you place the olive, which is now neutral in room temperature water, into each of these cups. Enter a prediction first, then the result, and finally, explain the results in terms of the effects of temperature and salinity on the density of water.

**DATA:**

WATER	PREDICTION	RESULT	EXPLANATION
Tap water			
Ice water			
Salt			

## LS – Activity #4

### QUESTIONS:

1. What is density?
2. In this experiment, salinity and temperature were used to change the density of the water. What affect will each of the following conditions have on the neutral buoyancy of a marine mammal? Mark “D” if the condition would decrease the buoyancy and “I” if the condition would increase the buoyancy.  
  
\_\_\_ increased water temperature  
  
\_\_\_ decreased water temperature  
  
\_\_\_ increased salinity  
  
\_\_\_ decreased salinity
3. What condition of buoyancy is best for whales and other marine mammals?
4. What condition of buoyancy would be best for bottom-dwelling animals?
5. According to recent research, how do whales regulate their buoyancy?
6. How do fish regulate buoyancy? Which fish don't need to regulate their buoyancy?