

# Bringing the Topic of Specific Gravity Into the Classroom Transcription

Another lab that we do to go through some of these physical properties is what I call a specific gravity lab. Students change the density of water by adding salt. They quantify salinity through measurement. All the while, they get a bead to suspend in the middle of the water column. A connection is made as to how the human body floats in the Dead Sea. This concept is often used during their mineral segment, as much as specific gravity is used to identify a mineral. Now, this is another lab out of the COSEE manual, so that's something you can look up and get online there.

Again, just a quick setup. What they do is they have salt in this cup here. They need to weigh it, how much they put in, keep track of that. Again trying to get them to use math skills and quantify things. They have fresh water here that they are going to add. They are going to make a solution over here of salty water. They have these plastic beads that initially sink. Their specific gravity is greater than fresh water so they initially sink. Their goal here is to get the beads suspended in the middle. I kind of cheated here. I have beads for the demonstration. These beads are not uniform obviously. Some of them are going to float; some of them are going to sink. I only give them one bead. They have to get one bead to suspend in the middle, and that takes a couple of days just to work on it, and get that so that they can calculate salinity, they understand specific gravity, they understand buoyancy, those types of things.

OK. So how does this relate to climate change? We've talked about surface currents. How do deep density currents affect climate? Well, there's a couple of different ways. Let's go to this graph which they are very familiar with after our astronomy unit. Believe it or not, we talk about these great fluctuations in temperature and carbon dioxide back in astronomy because we think a lot of these ice age cycles are related to changes in earth's orbit.

The earth's orbit is elliptical, but it's not the same elliptical year after year, century after century. It wobbles. The earth also wobbles. They're called these *Milankovitch Cycles*, so they're very familiar with these spikes in temperatures, long before man was adding CO<sub>2</sub>. What scientists are trying to figure out is this last ten thousand years, right here has been relatively stable. You don't see stability like this anywhere else in this diagram. What causes this stability?

They think it has to with that global conveyor belt. They think that it might be the fact that the isthmus that Panama formed 3 million years ago, so now the waters don't mix between the Atlantic and the Pacific. It could be because even the Himalayas can affect surface currents and surface winds and affect climate. There's all kinds of things that are happening, including the melting of ice caps in Greenland. That's going to change the salinity; it's going to decrease the salinity. And because this is a density current, changing the salinity of the ocean water off of Greenland is going to maybe shut down the conveyor belt.