

## 24: 8th Science Density PreInterview

Speaker 1: The concept of density is very important for eighth grade earth and space science, because they need to understand how many of the processes work. They need to understand that heat is going to tend to rise. They need to understand that cold things are going to tend to sink. The differences in density is what's driving a lot of the processes. Another thing that I like about this lesson is that as a teacher I can step back a little bit, and not be so much of a presenter, or a lecturer, and more of a facilitator, or a guide. I can lay off the instructions. Give them the supplies, and I can take a step back, and let them work independently, and discover problems on their own.

I really like to see trial and error in this lesson. I like to see students making mistakes. From the beginning I need to emphasize that it's okay to fail, and it is expected. One of the things that I want them to remember is keep track of their observations. In an activity like this with the hands-on they're so engaged in the water, and the activity that they're doing they often forget they need to think back to what's the concept I have to remember, or I have to learn. I have to really make sure that I hit that.

I would also like to see discussions. Especially students who are bringing in past experiences maybe they know a little something about diving deeper in the water. They remembered, "Oh yeah it was actually kind of colder when I went deeper." Using that as far as feedback for their group to give them some ideas, to spark some questions so that they can contribute as a whole, and they can reach their goal. [00:02:00]

From the beginning I'd be walking around constantly listening in on discussions. I'd be listening for things like common misconceptions, if they are going way off task, if they're having trouble starting. Many groups are going to sit there, and stare at each other. I have to prompt them a little bit. Maybe give them a little kick start. Some groups are going to be well on their way so I can spend a little bit less attention on them, and I can focus on the ones who need the support.

During the post assessment of this assignment summative I'd really like to see that they did gain a direct instruction that colder water is going to tend to sink, and the warmer water is going to tend to rise which is the concept of density. I'd like them to really understand that, and be able to tie that into not just, "Oh yeah in the container cold water sinks water rises." But they need to be able to tie that into something a little bit different, for example, maybe the composition of earth, or the layers of our atmosphere. Can they tie that back in what they did in this activity. It's important for me since I'm doing this early in the year I can always refer back to it. When we come to the second, third quarter, fourth quarter I can refer back. "Oh you remember that lab that we did with the red, and the blue water. How the cold water started to sink, the more dense things went down." They'll go, "Oh, yeah, yeah." They'll make that connection, and it's really about the repetition.

This is going to be a very challenging lab to manage. There are many potential areas that student could get involved with misbehavior. For example there's going to be ice water. There's going to be hot steaming water. There is going to be food coloring. There's going

to be salt. There's going to be spoons. A lot of movement around the classroom. Dumping out water in sinks. Passing the other groups, so as the teacher I really need to be prepared. I need to strategically place the tables. [00:04:00] I need to place certain groups near the sinks. I need to assign them to a certain sink. I need to make sure the instructions are very clear.

If the students have a lot of downtime, if they finish early, or if they don't understand the instructions if they're not clear you're going to get a lot of misbehavior. You're going to get restlessness, they're going to want to bother the next group. It's very important for me as the leader of the assignment I need to make sure everything is clear, everybody's been paying attention, and they know where everything is, and my supplies are good to go.

One of the last things that I learned about classroom management in the lab such as this where you have a lot of supplies is the teacher needs to be prepared for anything that you don't expect to happen, and they probably will happen. There always spills that occur, especially dealing with water that's moving all over the room. I need to have everything ready to go. I need to have paper towels all over the place. I have to have a system ready if something breaks, because if there is something that happens, for example, a tub spills all over the floor. That could cause a ten minute delay, which could screw up the entire class period.

I want students to be discussing past experiences. Bringing up things they're familiar with. They may have a few experiences, especially here in Hawaii being swimming in the ocean, the pools. They know a thing or two about the water. I really have to tie that in, and get them to talk about it. I need to make sure that conversation is dealing directly with that the activity is, not just talking story, but talking about what's the approach going to be to solve the problem.

Typically when you have a group assignment like this it's possible for one or two dominant personalities to try and take over the decisions that the groups make, especially if there's only one decision that needs to be made. As the facilitator I need to be aware of that, and I need to address it right away. I need to either have a talk with that student, or talk to the entire group, and say, "Hey you know I need everybody here to contribute equally." Oftentimes it's not that the others are being dominated [00:06:00] but they're just afraid to share their ideas. Afraid to be wrong in front of their group. I let that go in the beginning, and I wait a little while, because a lot of times the dominant personality might make a mistake. They might mess up, and that's when I see the quieter people start to step in, and offer some idea, some insight, and it balances out a little bit better that way.

I think all students are engaged in a hands on activity. They really enjoy that manipulating things, doing things with their hand rather than looking at a book, and a paper. I feel that engagement really starts before the actual lab. When we start introducing the whole purpose of doing this lab I need to really hook them into it. If they're not mentally engaged, they're not physically going to be engaged in the lesson. I need to make it really relevant to them. I need to start out with a real general question.

For example, this water density lab, I'll start with a question that many of them can say yes, or they'll at least nod their head. How many of you have ever been to the beach, or you've touched water before, so everybody is into it already. They can say they can relate. They can say yes I have. From there I can get a little bit more specific, but I already got their attention going. With that engagement the activity even pushes it further.

The trial and error aspect of this activity also engages them naturally. They have a natural tendency to try and challenge themselves, challenge their group mates, their other groups around them. They want to succeed. Even if there's no prize they just want to get this done. I need to set this up as a teacher to make it a challenge. Even if it's not worth extra credit, but they have to want to try. If I succeeded in doing that they're really going to try their best effort to make sure it gets done.

My hope is not that they get frustrated, and [00:08:00] tend to give up in this lesson through trial and error, but it's more of a look at your data, look at what's been happening, look at the results you've been getting, and try and revise a new hypothesis based on your evidence, and then discuss. Then you can approach the problem a little bit differently so you don't constantly fail some more. We may take two class periods before the students actually get it, but at the end those students feel more accomplished than the student who have finished it the first time.

Being in Hawaii we're constantly exposed to ocean activities. We have swimming pools. We can swim all year round. An activity such as this I really have to think of a way to bring it home to each of the students. We mention things like, how many of you have gone swimming? How many of you have been to the ocean? Then from there we try to bring it, "Oh what did you do there? What did you notice the last time you dove deeper into the ocean?" That way they can relate to their own personal experience, and it clicks. It connects. "Oh, okay this lab is important for me. It makes sense. I can connect with it. I'm not just doing this for no reason." After the lab is done maybe the students haven't had a opportunity to swim in the ocean. Maybe they haven't swam deeper, and felt the cold water beneath them. I would be prompting questions for the future. Next time you go to the beach ... there's probably going to be a next time the students will hit the water. They'll go to the beach. It's getting them thinking, "Oh yeah I can relate to this. I will be going to the beach." Maybe they're going camping next weekend, so it's clicking in their brain why this is important for me.