

24: 8th_Science_Density_Classroom

Teacher: Is to recreate it and through that you're going to learn some things about water. Now "STUDENT" can you go eye level with this thing and tell us what you see. Get eye level with the water right here put your head down a little bit and tell us what you see.

STUDENT: It's a mixture of red and blue [inaudible 00:00:23].

Teacher: Tell us what you see on the bottom. You said there's layers, what's on the bottom? What do you see on the bottom?

STUDENT: Blue.

Teacher: You got blue? You guys see blue too? What's above the blue?

Student: White.

Teacher: There's white, we don't call it clear and what's on the top?

Class: Red.

Teacher: Red is on top. What I have here is a series of layers. There's three layers of water. You have red on top, clear in the middle and blue sitting at the very bottom. Your job today is to recreate that. Setup using the supplies I will give to you.

The first thing you're going to get is this container and this wood block. The wood block is just to hold it up at an angle. I'm going to show you what you're going to do. First thing you are going to do is you're going to fill this up with water. You [inaudible 00:01:22] at six tonight or no?

Teacher: When you fill up this water this is going to be your starting water every time. When you lean it up on the block you want to have a shore, some land on top. Does that make sense? You want to have some dry area. That's going to help when you're pouring in your colors. This is how you start it every single time. You're going to get a cup like this that has measurements on it, that has a 100 ml as the top measurement. As you attempt to recreate this you are going to be mixing things [00:02:00] into this cup. Let's say you are trying to make the red layer and there's a very specific process on how to do this. If I'm trying to create layers in my tub, would it be better pour it in quickly or slowly?

Class: Slowly.

Teacher: Slowly. Obviously, you don't want to stir it all up. You have to try and pour this on the shore line. We are going to call it the dry area. You're going to slowly

pour it along and it's going to just keep going and going and going. You don't want to go really fast like that because it's going to stir it all up. Your goal is to create layers. You have to go slow. Do you see a layer forming in that?

Class: No.

Teacher: No, because I did it wrong on purpose. Okay, your goal is to make layers not do this. If you make a mistake it is okay. You can retry and retry again. Alright, let's look at the rules. Number 1, use no more than one teaspoon of salt each time you make a layer. Okay you are going to be given salt. As group you are going to be given one of these containers of salt. You can use no more than one teaspoon. If you're trying to make a red deck, how much salt is a maximum you can put in it?

Class: One teaspoon.

Teacher: One teaspoon. Okay so don't put more, it's a waste. It's going to get stuck in the containers. Just one, that's all you need okay. Number 2, use only 3 drops of food coloring at a time. No more than that. 3 drops is more than enough to give you a blue colored water or red colored water so just don't waste it, okay. Number 3, this is probably one of the more important ones. Only water from the beakers should be added to the color. What that means is, let's say you're trying to create the red layer. You don't want to do this. You don't want to go, oh okay I'm going to put red food coloring right in here. It says only add water from the beaker so you're going to put your water into here or whatever you want to do, mix it, mix it, mix it. Then you pour it in like how I showed you.[00:04:00] Remember the procedure of how to pour it in?

Class: Mm-hmm (affirmative)

Teacher: Whatever you mix and you want to put in that water has to go in the cup first and then you pour it into that. Don't put anything directly into here. You think it's a good idea to stir this thing up?

Class: No.

Teacher: Yeah do not do that. Worse thing you could do. Okay? The last one, your red layer which is on top, you think that's a greater surface area or less surface area?

Class: Less.

Teacher: Greater. You're going to need more volume. How many millimeters of red water are you going to have?

Class: 100.

Teacher: 100. Your cup is going to be this big, some of your letters are going to be scratched out because these are old cups but it's right about there. It's a hundred and you blue is the smaller surface area on the bottom, so you're going to have less. How many milliliters of blue?

Class: 50.

Teacher: You're going to have 50 which is about half way down. Okay so any time you're making the blue layer, you're only going to put 50 milliliters of water. Make sense?

Class: Makes sense.

Teacher: Okay, now you've already got food coloring, these containers, you're going to get teaspoons. The other two things that I did not mention yet there are different types of water. "student" what kind of water is this?

Class: Hot.

Teacher: It's hot water. This is pretty much steaming, was boiling water, okay. This is kind of hot so you have to be careful. There is a safety button on it. It's oink, it says unlock. So you push the pink button first and then you push the dispense button to dispense hot water. Okay. Don't do that with all this water. That's how you get your hot water. In contrast to hot water, what water do you have?

Class: Cold.

Teacher: You have cold water and it is located over here. I know this cooler says cold but the cold water is actually in this. It's bigger so you can use this if you would like ice water. Okay. I know what you're thinking. I can read your mind. Do not drink that water. Okay. The reason is these cups are not mine so I do not know where they have been, literally. Okay, I don't know if some teacher put [00:06:00]something in here that you don't want to put in your mouth, I don't know. Do not drink water. If you guys want water after school come back here and I'd be happy to give you guys cold water. You hear that?

Class: Yes.

Teacher: In the classroom, lab, science, never eat, drink anything in the classroom. Can do?

Class: Can do.

Teacher: Okay. Any questions on the procedures or materials or anything like that? You guys all good?

Class: Yeah.

Teacher: You guys lets read number one together. Explain how -

I want you to discuss the top story for one minute. Why do you think there are layers in this. I'm not asking what formed the different layers or why another layer is different or what is in each layer. I asking why the layers formed. It's sort of a general question. Why do you think there are layers in this, not this one, in my demo one. Why are there layers in this. Discuss it and then write out your answer. Number one.

Okay start writing down your answers. Explain why you think layers have formed here. Why is the water not mixing around?

Student: [inaudible 00:07:18]

Teacher: Yeah, answer it now. Number one. Why are there layers of water in here and not one big clump of purple water. Why are there separations? Oh, I heard a key word.

I heard it's separating the layers of water.

Student: Are we supposed to be loud?[00:08:00]

Teacher: Don't say loud[inaudible 00:08:04], collaborative is a good word. Oh course you can when there's time.

[inaudible 00:08:11] demo but I forgot.

Student: Mr. [00:08:13] can I go to the bathroom?

Teacher: No, no I was going to put it over here and like unveil it in a big double tank but I forgot. I didn't want to mess up.

Okay, lets do number 2 and then you guys are off. Hypothesize, so using the correct format. Hypothesize what you'll need to do to recreate this double tank. The correct format of a hypothesis is? [inaudible 00:08:41]

Class: [inaudible 00:08:41]

Teacher: If we, blah, blah, blah, blah, blah.

Student: What are the options?

Teacher: Well you know what you have right? You can use whatever supplies I mentioned. You have salt, you have cold, you have hot ...

Student: We don't know what you used in there.

Teacher: No you do not. You need to investigate and hypothesize on your own.

Student: Can we feel the ...

Teacher: No you cannot feel the water. You guys can do anything you want as long as you follow ...

It's okay, as long as you are taking down your data, your observations and noting down what happened when you did a certain thing, if it's wrong have you learned from it?

Class: Yes.

Teacher: What have you learned? If something is wrong [00:10:00] what did you learn? Next time?

Class: [inaudible 00:10:04]

Teacher: Next time would you repeat the same thing?

Class: No.

Teacher: No you wouldn't. It's very important, even if it goes wrong. You have to make sure that you are recording your data because what I'm going to tell you right after you have a failure. Dump it out, try again. "student", did you guys hear? "student"? You're going to dump it out and try again. Don't dwell on it. Don't, "oh we're never going to get it." Look at your notes and make sure you recorded. Lets say you're trying for the blue, where does the blue have to go>

Class: The bottom.

Teacher: The bottom. Let's say you mix up the blue and pout it and it goes straight to the top. Many students are going to have the tendency to just dump it. Okay let's try something different. You have to go back to your data. Record what happened. What you did to the blue so that you don't repeat that same mistake again. On Thursday when you guys come back, we're going to expand on this lab and it's going to be even more difficult. You have to make sure you get an understanding of what's happening with these different types of what. What is it doing. What are the density differences going to be. You have to make sure you are taking good notes. You explain your observations. You say exactly what you did.

Did you put a quarter teaspoon of salt? Half a teaspoon of salt? Did you put all hot water? Did you out half hot water, half tap water? That's what you're going to do. On your table it says starting water. What did I do for my starting water in this one right here. When I had this small one right here, what did I do?

Class: Nothing.

Teacher: I just filled it up with what?

Class: Water.

Teacher: I used tap water. Okay so that's your starting water. So what color would you say that would be?

Class: Clear.

Teacher: Clear okay so you guys can fill that one in. The starting properties of the tap what, did I do anything to it?

Class: No.

Teacher: Not really so you can say tap water. It's just tap water from the sink, the faucet. For the notes. I'm not going to ask for your opinion.[00:12:00] I just want you to go over it and see what happens because you have time. Now if you continuing failing and some of you might, it's okay. The back side is open for you to take more notes. If you want to put it into a box or table then please do so. You need to know what's happening as you add things to the water. Like I said Thursday you're going to need this information. I think that's all I've got for you. If you get it, call me over, I want to see it. Any questions on procedures, material, what do you do?

Student: Can we start?

Teacher: When you do start I will assign you guys to a specific sink so please just work in that area so you don't get in the way of everybody else. The supplies are over there.

Class: [00:14:00]

[00:16:00]

[00:18:00]