**Lesson Plans**

Hello, my name is Mary, and I will be here with you one day each week of the summer to make some science experiments with you. Do you all like science? After you build these experiments you will! We will have three sections this summer. Our first section starting today is on water.

**Water Works - Day 1**

Everyone here has seen water before. Just down the street is a big source of water, Lake Atitlan.

What do you know about water? What properties does it have? What can it do?

***Answers or ideas*** – you can drink it, it can cool you off, you can clean things with it, etc.

Good. An important fact about water is that things can float in it! That lets us travel across the water, fish far in deep water, and go swimming!

What floats in water?

***Answers or ideas*** - Wood, boats, paper, etc.

Let’s see.

(Do we have like a large clear plastic tub?)

(Paper Aluminum foil from breakfast place.)

Will this float in water?

How about now?

Does air float? Yes or no?

Yes! If air sank, the water in the lake would fly up and the air in the sky would sink underneath!

Think about this, if you’re swimming and you take a deep breath the air in your lungs makes you float!

What determines if things float or do not float?

***Answers or ideas –*** weight/if they weigh a lot, if they are heavy or light,if they are made of wood

Weight is close but not quite.

Things float because they are less **dense** than water.

**Density** is how compact something is.

***Write down density on the board and have them repeat it***

What is density?

(Is there paper for them to use?)

If you have some clay and you spread it out with your hands it is less dense. If you ball it up tightly so that it’s very small and compact it is more dense. If you have a piece of paper and you ball it up it is more dense than if it is lying flat.

Without ripping it, make your clay/paper more dense! Now make it less dense! Now more dense!

When things are more spread out they are less dense

Air is usually very spread out so that makes it less dense than water!

That’s what makes it float on top of water!

Is there a way you can ball up air to make it more dense like we did with the clay or paper?

***Answers or ideas-*** squeeze it, catch it, put it in a container

What if you put air inside a sealed container like a water bottle and then squeeze the bottle? Would that make the air more dense? Yes or no?

If you put air in a sealed container and squeeze the container tightly there is less room for the air, but the air cannot escape the container so it squishes/scrunches/balls/groups together. Squeezing the container makes the air inside more dense!

If you put air and water in a sealed container and squeeze the container, the container pushes on the water then the water pushes on the air and makes the air more dense!

What if the container is not sealed?

Then, when you squeeze it, the air and water have room to spread out and they spill out! Things do not get more dense if they have space to spread out.

So what determines if things float or sink?

And how can you make something more dense?

Next week we will all build an experiment just like this one to see if we can make air sink in water.

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Cartesian Divers – need plastic water bottles for everybody