

HUMAN INTEREST/LIFESTYLE

The Aquatic Side of Boyle's Law

When you took your Open Water SCUBA certification, your eyes glazed over when they got to the technical part. Now that you are considering getting an Advanced certification you think maybe you ought to know what it was you learned. Boyle's law is simply this: the pressure of a given mass of an ideal gas is inversely proportional to its volume at a constant temperature. What does that mean to you, the SCUBA diver? This means that the volume of air you take underwater with you, will no longer be that volume when you get to depth. Think about that for a second. If you take a full tank down to 99 feet (to make the math simpler than 100), you will have a third of a tank (minus whatever you were breathing on the way down there).

How does that work? Air is compressible in a way that water is not. That's why we can have compressed air, and hydraulic brakes. The science is based on the fact that a one-inch column of air from sea level to the top of our atmosphere (62 miles or 100 kilometers) weighs 14.7 pounds. We call this one "atmosphere" or ATM. Not all of the earth is at sea level, as we well know there are places on earth that are far closer to the top of the atmosphere than others, like the tops of mountains. Did you ever travel above 10,000 feet and get altitude sickness? That's because your body is used to having that full 1 ATM compressing the air in your lungs. Another example is when your ears pop in an airplane. This is your body adjusting to the lower pressure of the cabin. They are pressurized, but not to the full 1 ATM.

Inversely, when you go underwater, you have more pressure exerted on you, but since water is denser than air, it only takes 33 feet of water to equal the pressure of 1 ATM. Now, let's apply that pressure to the air in your tank. The walls of the tank do not "protect" the air, it is still subject to the same laws of physics. Since we know that matter can neither be created nor destroyed, what is happening to the air? It's getting denser. If you compressed it enough, it would be as dense as water. That would never happen in your tank, because water is about 800 times denser than air, but you get my point.

Here's the thing though, and the reason you were taught never to hold your breath on ascent. When you rise in the water column, the air expands again. You could have next to nothing in your tank at 100 feet (don't ever do this), but if you rose to 50 feet you would have "more" air. It's not technically more, it's that the air you had expanded to take up more space in the tank, and thereby more space in your lungs. The air in your lungs does the same thing when you surface. The air you breathe at depth is now that compressed air and will start to expand as you go up.

Anytime you are breathing, your body is passing tiny particles of air into your veins. The body can only use the part of that air that is oxygen, so the nitrogen just hangs around and eventually is released in an exhale or in the toilet. Seriously. If you surface too quickly, you allow those tiny particles of harmless nitrogen in your body to expand, and they can come out of solution and become bubbles. If you've ever seen a doctor tap the side of a syringe before giving a shot, they are trying to make sure there are no bubbles in the liquid. That's because bubbles in the body are bad. They can cause all kinds of trauma, from Pneumothorax or collapsed lung to barotrauma to decompression sickness or the bends.

They are all as painful as they sound, and the only real treatment is time in a hyperbaric chamber where they put you under pressure again to shrink the bubbles back into particles, and then very slowly raise the pressure so the nitrogen does not become bubbles again. This is why most proper dive planning takes you to the deepest part of the dive first, and then slowly rises to different depths so the particles never have the chance to expand all at once. It is also the theory behind the 15-foot safety stop, and the surface interval. It's a chance for your body to safely expel some of that excess nitrogen. There is anecdotal evidence that drinking lots of water after a dive can help as well, since dehydration thickens the blood making gas exchange or "off-gassing" more difficult. Dehydration is actually a much bigger problem than you might think, but that's a topic for another article. Hopefully, your eyes didn't glaze over this time, and you've learned a thing or two about physics and why the lessons you are taught in class are important.

Mary, Mary, Quite Contrary, How Does Your Garden Grow?

Every time I plant a garden, I am somehow amazed when things grow and become food. It's not that I don't know how it works, it's that...well, maybe because I don't really know how it works. I know seeds plus sun and water make food, but how exactly? I could look it up, read some vastly complicated scientific explanation involving chlorophyll and converting energy into sugar or carbohydrates, but that wouldn't help me envision what is happening inside the seed after I put it in the ground. I assume that for a couple days at least that it does nothing. It spends several days just warming up. I read somewhere that a seed has to achieve a certain internal temperature to bust open and start growing. I'm not sure what the water does. Maybe it absorbs it and that softens the seed casing to make it easier for it to break open. At this point I would forgive you if you just opened a browser window and looked it up for yourself. I would have.

It's not possible to really watch something grow, as it happens too slow to perceive in real time, but I do have a bulb in a glass of water that you nearly could watch grow. The speed with which it sprouted was astounding and the plant is now around 2 feet tall. I was similarly impressed with how fast the potato plants in my garden grew. I wasn't really sure they even would. I didn't use proper seed potatoes; we just had a few soft potatoes in the cupboard and I decided to cut them into pieces, keeping an "eye" in each piece. I didn't even bother to set them out in the sun and let them cure, like the internet suggested. I just popped those suckers straight into my garden bed where I had a little extra room—no rows, or hills or proper spacing—just shoved them a few inches under the soil. And you know what? They grew. I had tiny little green potato plants faster than any of the other seeds I planted.

I shouldn't have been that surprised, I mean, I've seen the Matt Damon movie, *The Martian*. In fact, I'm re-watching it right now so I could try to judge how long it took for his plants to grow. They show him planting them on Sol 31, and it's Sol 54 when he sees the first shoots. I looked up my credit card statement and determined that I planted my garden on March 31st. I didn't happen to record what date I saw the first shoots, but it's May 11th and the plants are 10 inches tall. I don't know about you, but I call that impressive. I just can't help but wonder what it looks like when that starts. There's no clear soil, so you can't see through it. Perhaps the answer to my query is hydroponics. I just looked up to see if that was possible and read a whole page about how potato plants grow twice as fast in a hydroponic system. While I have room in my yard for a garden, I sadly don't have room in my house for a proper hydroponic system, so I may never get to see this for myself. Though I might be able to rig up a tiny experimental version with one potato.

Mikey likes it, but will I want to eat it?

It's a challenge cooking for any dietary requirement or avoiding allergens but doing it within the further restriction of a particular calorie count is daunting. My particular allergen is soy, and when I first became intolerant of it, I was astounded by how many foods contain it. The first big blow was chocolate. Almost all the chocolate in this country contains soy. I haven't had a Girl Scout cookie or a Snickers bar in over two years. That's another thing: baked goods. Bread, rolls, pie, cakes, cupcakes – everything in the bakery department at the grocery store contains soy. The majority of any processed frozen food, canned soups, frozen tv dinners—all of these things contain soy. So, in order to not starve, I had to become a really good cook.

Did you know you can make something similar to a Thin Mint yourself? It does involve locating some form of soy-free chocolate, and I'll tell you that's not easy. You are pretty much restricted to expensive, small batch dark chocolate. And I bet you couldn't even find that outside a major city. I have yet to figure out how to reverse engineer any form of candy bar, so I'm pretty much out of luck there. I have to bake my own pies, cakes, cookies—but you know what? A lot of the time mine is better anyway. But I'd still kill for an Oreo.

And I can't even tell you the last time I got Chinese take-out. To be safe, I assume that all Asian food contains soy, simply because every recipe for Chinese or Thai food that I've made calls for it. I do still make some Asian food, but instead of soy sauce I use something called Coconut Aminos. Don't kid yourself, it doesn't taste like soy sauce, but it's better than nothing when you're stir-frying a bunch of fresh vegetables.

I got by this way for a couple of years and assumed that since I couldn't eat candy or processed foods that I would lose weight. Well, that didn't happen. Apparently, my cooking is too good, and I forgot to account for portion size. And measuring the calories in every single ingredient in homemade food and then calculating the total calorie count is a royal pain. Heck, measuring the ingredients at all is tedious. I became the kind of cook who could just throw things together and they would end up tasting great. Well, I finally admitted that I would have to start paying more attention.

I have a cookbook from Betty Crocker in which all the recipes have 300 calories or less per serving. The problem is that a lot of them have an outrageous number of servings, and most of the time we feel like they are too small. Plus, I don't want to be eating the same thing for a week, especially if I didn't like it the first time. I had to dismiss any recipes that call for a processed ingredient (you'd be surprised how often they appear in modern recipes), and any that had more than 8 servings. The rest I could divide in half to make 2-4 servings. Then I had to discount any that had broccoli or seafood ingredients, as my spouse won't eat them. From what was left, I choose a week's worth of recipes.

I was actually a bit surprised by how many of them not only tasted pretty good but were also fairly filling. I then expanded our repertoire by purchasing a magazine with recipes of a

moderate calorie count and made several of those. To be fair, most of them involved a lot of spices and roasted vegetables, and it's hard to go wrong there. I even got my spouse to admit that he liked the one with roasted cauliflower which he didn't previously rate much higher than broccoli. However, any recipe that tries to pass off cauliflower as something that it's not (it's not pizza crust and it's not rice) is terrible. I'm all for reducing calories by adding vegetables to a dish, but not in a sneaky, imitation way like that. Life is too short for that.

It took a while, but I finally found some ranch dressing without soy, so salads aren't out of the question any more. I just have to figure out a way to take it with me to restaurants. In the meantime, I will continue to have them for lunch so that I have a few more calories to spend on dinner. That's how I think about them. Available calories are like capital. Or in the terms of a disability metaphor, they are like spoons. You only get so many a day. You can't really save them up and they are use or lose. But in this case, if you don't use them, you really do lose—weight. And that's the secret of life, right there. And unlike spoons, you can earn more by exercising. Some people are currently trying to propose theories that what you eat and what time of day you eat it makes any difference to your weight, but I don't buy it. The math of calories in/calories out has always worked for me. You can eat a heck of a lot more vegetables than cake so you will feel fuller afterwards, but sometimes, you just have to eat the cake.

Where does it stop?

When you purchase a home, a lot of the time you are buying it for the location, or the style, or the “bones.” In that case, there are usually at least a few upgrades or changes that you want to make. I’ve always done the obvious, painting, because who doesn’t want a bit of color after years in drab, beige apartments? This time around, we went full out. Sure, we started with paint, because that’s just where you usually start. From there, it was new vinyl windows and a tile backsplash in the kitchen. The backsplash, however, we did ourselves. We had never done one before, so there was a bit of a learning curve and more than a little fine scraping of dried thinset off glass tiles, but in the end, it looked fabulous. To complement it, we had granite countertops put in, and a new double wide sink. We gradually invested in new stainless steel appliances to complete the look. After that, we set our sights on the bathroom.

I’d never used a sledge hammer on ceramic tile before, but it was a little cathartic. Ripping down the walls around the old mauve bathtub was great. We had someone come in and remove the tub itself and set the base of our new walk-in shower. Then we were ready for more tiling work. Having made what we thought were all the mistakes in the kitchen, we started laying twelve inch porcelain floor tiles. It quickly became apparent that we were not going to get through this without a tile saw. Since the thinset was already mixed, I started laying them while my spouse ran to Home Depot to rent one.

By the time he came back, I’d already laid all the full-size tiles and was having quite a hard time not stepping on any of them. That’s when I realized that tile spacers are not reliably the same width, as they are compressible. Not many people would notice, and none of my guests have, but the row of full size tiles isn’t spaced exactly evenly. We made some adjustments and laid the rest. Then we started on the walls around the shower.

Let me just say right now, putting large, heavy tiles on a wall is really difficult. Remember the spacer compression problem I told you about? Imagine all the wall tiles above the bottom row are successively putting more and more pressure on the bottom spacer, because thinset does not dry right away, and there’s a little thing called gravity. Add to that, the difficulty of the math required to calculate the precise angle that the shower tray slopes down to the drain. Not to mention, we made the hilarious mistake of doing an accent row of glass tiles and completely forgot to measure how far down (or up) the row would fall, and it’s about two inches lower than the similar accent row on the niche shampoo inset box. Then we tiled the floor of the shower. Laying diagonal, herringbone pattern tiles in a smallish rectangular space takes a fair bit of talent with a tile saw. I am now very talented with a tile saw. After that, it was just a matter of lifting very heavy glass panels up to install the shower doors. Add a new toilet, medicine cabinet, towel bars and granite counter-top and you’ve got a pretty swanky bathroom.

Then we started tackling the other floors. This involved pulling up 30 year old carpet and padding. Do you have any idea how much dirt and things I don’t want to think about are in and

under carpet? I will say this, anyone who's ever pulled up their own carpet will likely never install it again and insist on something else. We decided on hardwood floors. First was my office as the test case. Watching YouTube videos to learn how to install hardwood floors does you no good if the wood you happen to choose is bamboo. Why? Because the nailer or stapler or any other method of securing them to the floor won't work because bamboo is one of the hardest substances on earth. Not really, but it really is one of the hardest of hard woods. An industrial nail gun, loaded with eighteen gauge nails makes a huge, scary noise, looks like it has the same muzzle flash as a real gun, and the nails wad up on the bamboo like used chewing gum. They simply cannot get through.

After consulting with every authority on the subject we could find, we decided we would screw them down. But you can't just screw them down. First you drill a hole. Then you drill a countersink. Then you vacuum up all the sawdust. Only then can you install the screw. And it takes one every six inches to keep it from squeaking. Measure your standard room and figure out how many that is. It took 3 days over Christmas break to do my ten by ten office and it's attached closet, and that was using two different drills.

We took about a year off from home improvements after that, but the very next Christmas we bought a third drill and were at it again, starting in the bedroom. We got a little sloppy and spaced the screws out too far, trying to finish quicker. We should not have done that, and yes, the floor squeaks. We ran the wood out the door of the bedroom, into the hallway, matched it up with the doorway of the office and bathroom, and out to the edge of the sunken living room. Getting the angle correct for the stairnose at the end took cutting the board five times. Having to measure the angle with a paper protractor that we printed off the internet, and the precision that a \$99 compound miter saw can produce are no way to go through life. After that, the living room was much easier, though it was the largest room we'd done. We didn't skimp on screws, so it's near perfect. But we had one more big project we had to complete before we could finish the floor—the entryway.

Our 1982 split-level came with orange, wood railings between the living room level and the front door. We decided we'd rather have a half-wall and took the railing out. That meant we had to build a half-wall. Having never framed or built a wall before, this was more new territory. We did some measuring (ok, a lot of measuring) and managed to get the frame attached to the subfloor fairly sturdy and straight. The side facing the living room we decided to shore up using plywood instead of drywall. The door side, we decided to create little built-in nooks as an aesthetic feature. We drywalled around them, painted them inside and added trim to frame them nicely. The problem with new drywall, is that it's smooth. None of the walls in our house are smooth. They have that orange peel texture to them and smooth spots stick out like a sore thumb. This meant we had to add the orange peel texture. It apparently comes in a can, that requires a whole lot of shaking, and the stuff spits out in a complete mess and you have to spray it on in a particular way to create a random pattern of texture. It also takes a lot of it to cover a half-wall. Three cans later, and we had a wall that reasonably matched the rest of them. We added a nice cap board on top to cover the drywall and plywood and called it good.

One would think that we'd be over hardwood floors by this point, but there was the matter of the stairs. Besides being troublesome to vacuum, they were in the worst shape of any carpet in the house so they had to go. Learning the ins and outs of stair building is exhausting. For one, you have to start at the bottom stair, which meant if we were going to do the stairs going up, we would have to decide right then if we were also going to do the stairs going down. Split-level, remember? We decided it would look terrible to do only half of the stairs, so we tore up all the carpet, and proceeded to cut the noses off all the treads. This was necessary to make sure the new stair noses would sit flush against the risers. If you don't know your tread from your riser from your nose, don't worry. Neither did we when we started this. And don't even get me started on the discussion that took place about wood flooring versus painted risers. In the end, we went with painted risers to make the math easier.

The landing in front of the door was a wood parquet that was a strange, dated pattern so it had to go as well. With a wonder bar and a hammer, I tore it up in an hour, but hurt my shoulder so badly that it took six weeks of physical therapy to make it right. After that, the rest of the stairs were pretty uneventful, and we even figured out a nice way to finish the noses on the open side, as the stairs going up only had a wall on one side. With those completed, we only had to wait for someone to custom manufacture new stair railings which only took a few weeks.

All the work we did was definitely worth it as we saved thousands doing it ourselves, I'm not entirely sure that had I known how much work it would be that I would have been so adamant that we do it ourselves. And I'm not sure our dogs will ever forgive us for taking away their carpet. One day we may swap out the vinyl floor in the kitchen, but not anytime soon. Does this ever stop?

How much is that doggie in the window?

To some people, dogs are pets. To others they are so much more. Long ago, my spouse and I decided not to have human children. So, when we got a tiny, black, Pug puppy, she took up that spot in our hearts where a baby would have been. We named her Leeloo (after the character in the movie Fifth Element), and she was so adorable that we spoiled her rotten. We failed to do all the things they say you should do when they're puppies—trim their toenails, brush their teeth—so it would be easier when they are adult dogs who really need it done. She got away with everything...until the night she peed on the bed for the second time. It wasn't in her sleep either. We were just going to bed, the light was still on, and she looked me square in the eye and squatted on the bed spread. Well, that broke the spell a little bit, and we made her up a little bed under the pantry shelves just outside the bedroom door and put up a baby gate to keep her from wandering. It took a little getting used to, but once we went ahead and got her a real crate, she just kind of knew that it was her domain and that's where she would sleep.

After a while, we decided that Leeloo needed a playmate. We weren't up for raising another puppy, so we decided to look at rescues. At first, we were thinking French Bulldog, or Pekingese. We even went to see one to see if they would get along, but the Pekingese was far too docile for our rambunctious baby. Then, when she was 7 months old, we took her to her first Pug Crawl. If you are a fan of Pugs and ever find yourself in the vicinity of Portland, Oregon on the third Sunday in May, you owe it to yourself to attend a Pug Crawl. Hundreds of people, most with at least one Pug each converge on a local brew house in town for the Humane Society fundraiser and costume contest of the year. There's beer, food, vendors and the aforementioned costume contest. There is always a theme, and the costumes are quite spectacular. At this particular Pug Crawl, we wandered over to the Pacific Pug Rescue booth to see if we could find Leeloo a friend. And there was Luna.

I had only asked if any of the ones available were female, and she handed me this frightened, little darling 3-year old black Pug, who lay cradled in my arms, looking at me with a hopeful, wide-eyed stare. We had found our dog. We had to go through the process, which took a little time. We filled out the adoption form, only to learn that another family had already chosen Luna. We were crushed, but they had another young fawn Pug for adoption, but she was a special needs baby. At around the same age as Leeloo, the little ball of fluff was only three quarters of her size and didn't move around much. She was deadly cute, but we were afraid that Leeloo would hurt her. We said we would think about it. Before we were able to give our answer, we got word that the other family had passed on Luna, and did we still want her? We gave them a resounding yes, and Luna joined the family.

The following year, I decided that our girls would be in the costume contest for the Pug Crawl. I had forgotten that there were themes, so when I came up with the idea of all four of us going as characters from the Wizard of Oz, it seemed like the greatest idea. I had found a pattern at the fabric store and got busy sewing. Yes, there are in fact patterns for dog costumes at the fabric store. Little Leeloo was our Tin Man, complete with a hat made from a tiny funnel that

we spray painted silver. Luna, appropriately was our Cowardly Lion, my spouse was a sport and agreed to be the Scarecrow, and I made myself the cutest little Dorothy costume, complete with lace trimmed white apron. We didn't win the costume contest, although over 30 people had individually told us that we would and dozens more had taken our photo, but we did appear as the lead photo in the Humane Society magazine above the article about the Pug Crawl.

The years that followed, I kept sewing fantastical costumes—Thing 1 and Thing 2 and me as the Cat in the Hat, fluffy white sheep and me as Little Bo Peep, the Xenomorph and Chestbuster from Aliens—but we never won until the year I decided that we would conform to their theme. That year happened to be “sports.” We are not sports fans in this house, but by golly we were going to try. The idea I came up with was tangentially related to sports, in that it was car racing. But the reason we won, is because my spouse took a Barbie Dream Car (the kind that little kids can ride around in), redesigned the body like a formula one car, complete with circle decal on the side, and made it remote controlled. I fashioned Leeloo a helmet from a Styrofoam ball, and went about training her to sit still and ride in a moving car.

You can imagine the reaction from the crowd, when a Pug in a helmet seemed to be driving a race car down the parade route. My spouse was cleverly hidden in the crowd so nobody knew he was doing the driving. I was walking backwards down the parade route, keeping eye contact with Leeloo and holding the treat bag to make sure she stayed in the car. She stood up a few times, but I was able to get her to sit back down and continue the ride up to the judges' tent. We were pretty proud of ourselves, so it wasn't a huge shock when we took home First Place. What was a shock, was how much swag and goodies came with first place! The sponsors had really outdone themselves with the treats and toys, gift certificates and even a night's stay at a doggie hotel. Our favorite, however, was the trophy. They had mounted a ceramic Pug head on a plaque and decorated it with the event name, the year and the First-Place designation. We have it hanging on the wall of our dining room, right over our doggie door.

The following year, we had suffered the devastating loss of another pet, so I wasn't up for sewing costumes, but happened to run into one of the Pacific Pug Rescue's foster moms at the vet. She was making a big float and costumes to resemble Dream Girls for the Broadway theme that year but needed to “borrow” a couple black pugs to complete the look. We agreed, and she fitted them for their “dresses” and we took an afternoon to train them to stay on the float. The best part, was training them to lick peanut butter off the microphones she had set up to make it look like they were singing. Naturally, she took first place that year, and we were happy to be involved. We took the next year off, deciding to just enjoy the spectacle, but this year we are back at it. The theme is Game of Thrones “Pugs are Coming.” Luna is going to be Bran, we are reworking her wheelchair from the year she went as Oracle/Batgirl, and Leeloo is going as the three-eyed raven.