The Gem Vault

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Specific Gravity is your pal and you will stop making excuses

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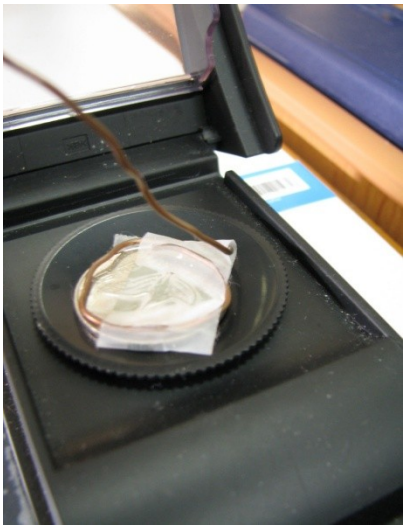
OK it's just about enough. Stop thinking that you don't need specific gravity, or that it's too difficult to take the measurements and make the calculations, or that it is too expensive, or that it's a hassle. It is one of the easiest, cheapest, most fun tests that you can do as part of gem identification. You will do it, and you will like it young woman (man)!

Buy a scale. OK, that part is not easy or cheap- but you don't have to break the bank to get a good scale. Buy the most accurate, highest capacity scale that you can afford. I like my Tanita 1230 portable because I have bashed it around for years in my carry-on bag and it is still dead-on. But buy what you can afford and make SG part of your skill set. It will make you a better hobbyist or a better gemologist.

First, let's put together the parts list for this project. Can you afford a bottle of water? You invested in a quality scale so maybe not? That's alright. Steal an empty bottle from the trash on any street corner in any town or city. Cut it down to size. The finished height depends on the rest of the lengths (like the wire) so just sit and watch for a second.

Get a thin wire from the bread twist-tie. Strip off the paper/ plastic flat piece that surrounds it. Get a thick-ish wire from your garage, or from a piece of heavy scrap three-conductor wire that your electrician didn't clean up off the floor from his last project at your house. If all else fails, go to WalMart and pay 9 cents for a cut-to length piece of it. You need maybe 7 inches. Strip the jacket off of it.



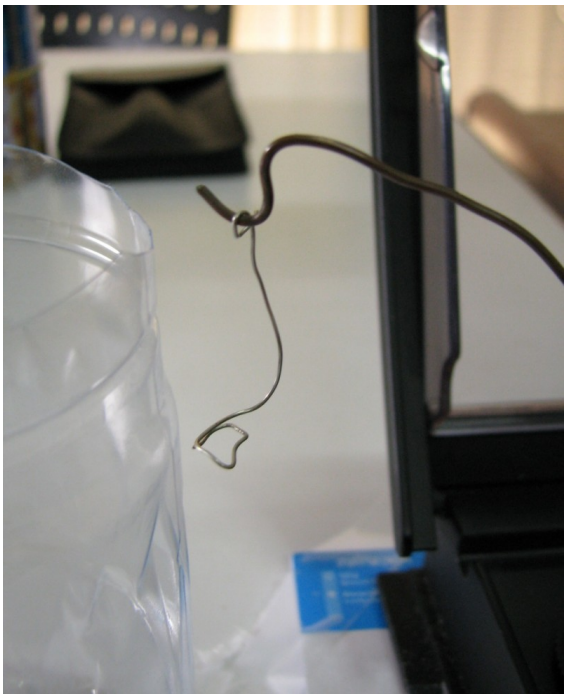
Both wires should be single conductor- none of that multiple conductor stuff is allowed. In other words, if you strip the jacket or coating and find a million little thin wires inside, that is not the stuff you need. Make it go away, and get single-conductor.

Get a quarter. I use a 500-won coin from Korea, but a quarter will work. If you are on the Euro, gosh- I don't know. Experiment with your country's coinage. It will be a fairly big, kind of heavy coin. It will need to be heavy enough to stabilize the wires and keep your device from toppling when you put the gemstone on the bottom loop of the breadwire, but not so heavy that it maxes out your scale. Get some scotch tape. Get some water. That's all.

Parts List:

1. very thin single conductor wire from the inside of a bread twisty tie (mine is 0.48 mm diameter)
2. water bottle- single-serving style like 16 ounces (cut approximately in half)
3. thick (mine is 1.12mm diameter) single conductor wire (maybe 7 inches or so…cut it shorter if needed)
4. quarter or other kind of heavy coin like 500 won or maybe two American nickels taped together
5. water (any kind will work fine…not saltwater!)
6. scotch tape

You will make two loops in the bread-tie wire. Maybe it will start at two inches long, and end up at 70% of that after you have the loops. Just muddle your way through at first and you will very, very quickly understand what adjustments need to be made to the length of the wire and the size of the loops. Most any questions that you have about this project will be answered with the pictures and by doing the procedure once.



The bread-tie wire will get lost. Count on it. It is best to make the bottom loop so that it can be "clicked" onto the vertical shaft of the bigger wire when not in use. In other words, the top little loop of the bread wire will always remain in place on the gooseneck of the thick wire. Always. When you are finished using the thing and you're ready to put it in storage, just push the bottom loop onto the shaft of the big wire so that the shaft passes inside the bottom loop. It will stay there until the next time you use it. OH, and just put it inside the emptied out water bottle that you cut in half.

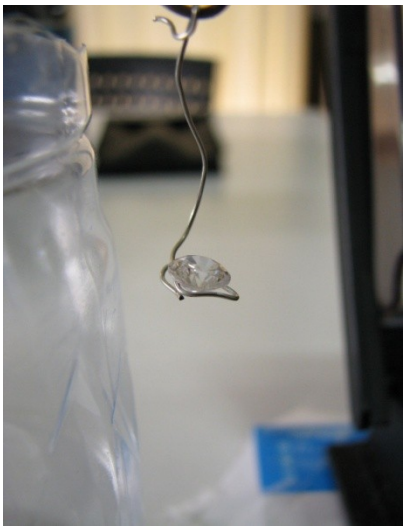
Here is an important note for those of you who live with families. This cut-up, empty bottle of water with wires inside looks like trash. I suggest as soon as you finish making yours, you gather everyone together for a family meeting and explain that if someone sees it sitting around and throws it out, there will be consequences that include… <taking away foo-foo, snuggly bear, allowance, car keys,…insert age-appropriate punishment here>.

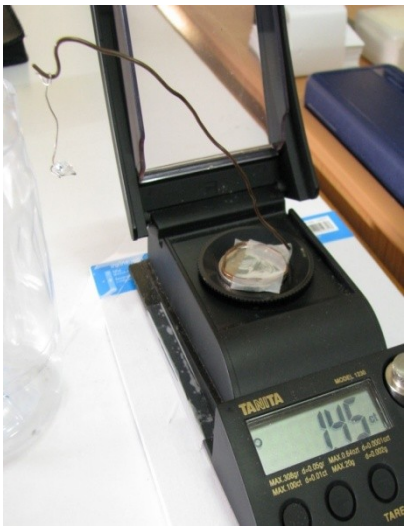
The thick wire has the previously mentioned gooseneck at the top, and at the bottom it is just wrapped into a circle. That circle is taped onto your quarter or other coin. In some cases, with heavy stones, it will be hard to make your device balance with only a quarter. Just add an extra coin.

This is the point that you wish you had a scale with more capacity. Let this be a lesson to those of you who have not bought your scale yet. Of course a scale with low capacity is cheap- it is not as useful! Unless you are dealing diamonds that are big and white, or fine corundum, it is better to give up a little accuracy in favor of more capacity.

Did I tell you already to buy as much scale as you can afford? I thought so. You will likely only buy it once, so go the extra mile. Think of the money that you are saving by making your own specific gravity device instead of paying $75 to $300 that you would pay for the optional SG attachment for your scale!!!

Your device is finished. You have taped the bottom circle of the thick wire to the coin, and made the gooseneck on the top of the thick wire. You have the little bread-tie wire dangling from the gooseneck. Can the bottom loop of the bread-tie wire hold a stone? No? Bend it a little. Shape it, form it, and make that monster live.





Tare the scale with the SG device on it, but without the gemstone. Now you are ready to take your first measurement. Do this:

Yes! Just put the stone in the bottom loop of that small wire. Remember, you tared the scale before doing this so it read “0.00″ with the SG device on the platform.

Now look at the reading:

It says that the stone weighs 1.45. This is exactly what it would weigh if you did not have the SG device on the scale, and you tared the scale, and then put the stone on the platform. It is the stone’s weight in air. It is the normal, everyday weight of that stone. Get it? I thought you would. It doesn’t get a whole lot harder so if you are with me at this point you will be fine.

Now fill your beaker (cut water bottle) with water. Take a look:

Do you see how we could just move the water over, and the little wire would be dangling into the container and the lower loop of that wire would be submerged? Well, that is exactly what we are going to do! Yes, this really is simple. But here is the deal, the trick, the scam, the gink, the secret- after you move the water over, and dangle the little wire into the water so the bottom loop is underwater- tare the scale again. Yes, tare it again. The portion of the wire that is underwater will change your reading.

At this point, the big wire is NOT touching the beaker. The big wire is NOT touching the water. The little wire is NOT touching the side of the beaker. The bottom loop of the wire is totally underwater with room to spare (for the stone). Hit TARE. Get that zero dot zero zero reading. Now with a tweezers take your stone and place it on the lower loop of the thin wire- under the water.

The stone is underwater, and just before we put the stone on the bottom loop we hit TARE so we now have our other measurement- the second and final number- which is the weight in water. It is 1.21.

Quick- what is this stone????

Just do this: **weight in air / (weight in air – weight in water)**

Let's get the parentheses out of the way first: (1.45-1.21) is the same as (0.24).

Now our formula looks like this: weight in air / 0.24

and since we already know that the weight in air is 1.45, let's just say 1.45/.24 which is 6.041666 or round it to 6.042.

Anyone with a guess? If you said CZ, that's a good guess.

If you said it couldn't be CZ because the SG is 5.60 to 6.00, I would say you have not been playing this gem identification game very long. We always have to allow a little bit of flex in our numbers- and I can say for sure that CZ is the only colorless stone in this range.

Also remember that the more accurate your scale the more accurate your result. And sometimes a bubble or two will get trapped between the stone and the small wire, so it doesn't hurt to bump it with your tweezers both before and after you set the stone in place on the bottom loop of the wire, submerged. Some folks say a clean stone is important, and I say that it can't hurt to have it clean. Maybe that makes bubbles less likely to stick to a stone?

You will play around with your homebrew instrument and make your own adaptations and learn the tolerances necessary for your setup. The point is to get to work doing these measurements because they are very valuable and quick and easy to do. After you have checked even two or three stones, you will wonder what took you so long to get started. It's really that quick and easy.

Thank you for coming to the Gem Vault today; I really appreciate you! And keep in mind that if you have a question about this post then probably others do as well, so please feel free to leave a comment and ask for clarification. Also, if you have a better way of doing the same thing, don't hesitate to share that with everyone as well.