

DSA Newscast

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The official newsletter of the Dozenal Society of America

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TGM: FROM LENGTH TO MASS AND WEIGHT

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TGM: From Length to Mass and Weight

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The Dozenal Society of America is a voluntary, nonprofit educational corporation, organized for the conduct of research and education of the public in the use of dozenal (also called duodecimal or base twelve) in calculations, mathematics, weights and measures, and other branches of pure and applied science.

This continues our series on TGM, one of many coherent, dozenal metric systems, begun in Vol. 7, Iss. 1.

LAST ISSUE, we met the TGM units of length, speed, and acceleration, and are now ready to proceed to the next group of units: mass and weight. These are units that we frequently deal with on a daily basis, as are the groups of units that we've already covered (time and distance).

This is an area of significant weirdness in the metric system. They had the good idea of tying their mass unit to their volume unit (much the way in the customary system a pint weighs a pound; though in Britain, of course, it's a pound and a quarter), but they did it all wrong. Their volume unit is a *liter*, which is a cubic *decimeter*; and that mass of a liter of water was made the unit of mass, which they called the *kilogram*; and they then divided that into a thousand to get the *gram*, the mass of one cubic *centimeter* of water, which they made the basis of their system. Later, though, they decided the *kilogram* would actually be a better base unit, so we're back to the mass of a cubic *decimeter* of water, though even that is slightly off. As a practical matter, the *kilogram* is just the mass of a particular hunk of platinum-iridium sitting in a vault near Paris; though last year, even that is irrelevant, and the *kilogram* is now defined as a multiple of the Planck constant, a definition only a physicist could even understand, much less love. At no point, evidently, did anyone strike upon the obvious expedient of simply making the unit the mass of a cubic *meter* of water, that being the basic unit of length; perhaps because that mass would be impractically huge.

In TGM, things are much simpler. Our unit of length is the Grafut; our unit of area is a square Grafut (Surf); our unit of volume is the cubic Grafut (Volm); and our unit of mass is the weight of a mass of one cubic Grafut of pure water at the temperature of maximum density. This means that there is a one-to-one correspondence between all of the basic units—unlike, say, metric, or our customary measures, where there is a relationship between the pint (one of the volume units) and a pound of water, but none between the pint and the unit of distance.

So the TGM unit of mass is the Maz (Mz), equal to the mass of one Volm (that is, one cubic Grafut) of water at its temperature of maximum density. That gives us a Maz which is approximately 22 kilograms (a little less), and almost exactly 49 pounds (48;ε72, to be more precise). While this unit is large compared to the pound and the kilogram, it has the notable advantage that, unlike them, it maintains a 1 : 1 correspondence of basic units. Nor is it entirely inconvenient, as its subdivisions and multiples are often very well-suited for practical tasks.

1 ² Mz	3;8804 m. ton	4;130εton
3 ² Mz	ε;2012 m. ton	10;392εton
3 ₂ Mz	0;6567 kg	16;εε64 lb
2 ₃ Mz	25;ε048 g	1;07ε8 oz
1 ₄ Mz	1;2ε62 g	0;063εoz

So we see that a biquaMaz is just over four tons (customary tons, that is), and just over 3;8 (that's three and two-thirds) metric tons (megagrams), which means that 3 biquaMaz is just over ε metric tons, and just over 10 customary tons. On the smaller side, three biciaMaz is a bit more than half a kilo-

gram, and a tiny sliver less than 17 pounds; two triciaMaz is a slightly larger sliver less than 26 grams, and a trifle larger than an ounce.

Your humble author, for example, last weighed in at 132 pounds, give or take, which is 6z;6 kilograms (again, give or take). This means that I weigh 3;23z4 Maz, which I'd certainly just round to 3;24; or, I genuinely feel a need for multi-digit numbers for my mass, I'd say 3z;4 unciaMaz.

This brings us to *force*. We've already seen that our TGM unit of acceleration is one Gee (G), the mean acceleration of gravity on earth. The force necessary to produce one G of acceleration on one Maz of mass is one Mag (Mg). The benefit here is that, in TGM, your mass and your weight

are one and the same—as long as you're on Earth, that is. On the Moon, say, your *weight* would be about 0;2 what it is on Earth, while your mass would remain the same.

Lastly, related to force is *pressure*, amount of force per unit area. We most often, by far, encounter this in the form of *atmospheric pressure*, which is exerted by the column of air above us. This is the pressure we experience literally all the time, except when we are underwater, or in some sort of artificial pressure chamber. Sadly, atmospheric pressure simply doesn't sync with other units, so we'll have to do the next best thing.

One Mag per Surf (that is, one Mag per square Grafut) is our unit of pressure, the Prem (Pm). This is equal to a bit less than

half a pound-foot per square inch, and a very tiny bit more than 1818 pascals (N/m²). But these are units only scientists are likely to use very much; a *standard atmosphere* is about 81 kilopascal (which itself was rounded off from the original 26 inches of mercury), which is very, very close to an even number of Prem; that is, a standard atmosphere is 2z;ε237 and some change. This is so close to an even 2ε Prem that we may as well just round it off. So the TGM standard atmosphere, the Atmoz, is 2ε Prem; or 2ε Mag of pressure per square Grafut.

Happy dozens!

The DSA does not endorse any specific system of dozenal weights and measures, of which there are many. We encourage our members to try and explore many of them.

DOZENAL NEWS

BASE 10 VS BASE 12 AND ORANGES? DOZENAL VIDEO

A lovely little video that, for some reason, only recently surfaced in your editor's searches is *Base 10 VS Base 12 and Oranges?*

https://www.youtube.com/watch?v=HVk_vIJEDII

This focuses on the importance of the number three and on the hexagon to briefly defend the primacy of twelve as a number base. Take a look!

NEW NUMBER-BASE CONVERTERS

Your editor has recently become aware of a couple of new number-base converters. The first produces simply a table of low integers:

<https://trustconverter.com/en/base-number->

[conversion/duodecimal.html](https://www.extraconversion.com/base-number/base-12)

The next only works on integers, as well, but converts into multiple bases and works on arbitrary integers:

<http://extraconversion.com/base-number/base-12>

Well, not exactly *arbitrary*; but it worked for me up to 17 digits, so that's likely close enough.

“ALTERNATE HISTORY” DISCUSSION OF BASE TWELVE

There was an interesting discussion some years ago regarding dozenal and what its likely effect on history might have been:

<https://www.alternatehistory.com/forum/threads/effects-of-a-duodecimal-system.269656/>

As these discussions typically do, the conversation rapidly became less about the *effects* of a dozenal system in history and more about why we should want one. Some interesting points are made; worth a read, if you have a few minutes to spare.

THE DUODECIAL SYSTEM, BY BILL BENSON

The South Platte Sentinel, of all organs, in October last year published a piece by Bill Benson on the duodecimal system:

<https://www.southplatte-sentinel.com/2019/10/08/the-duodecimal-system/>

It gives a brief explanation and history of dozenalism, and is (at least in your editor's opinion) unduly pessimistic about the difficulty of a general dozenal conversion. But it's exciting to see our favorite number base getting some mainstream press.

SOCIETY BUSINESS

VOLUNTEERS NEEDED

As mentioned earlier, the DSA is an all-volunteer organization, and we pay no salaries. As a result, everything that we do comes out of the spare time of our members, time that they have to take away from their families, jobs, or other obligations.

We all love dozenals and enjoy assisting the Society in educating people about them; however, as the Society expands and does more, we find ourselves in need of more help.

Fortunately, the Society has a large

membership with a very broad range of professions and experience. If you think you can spare any time or effort for the cause of educating the world about dozenals, please let us know:

contact@dozenal.org

You can help as much or as little as you'd like. Thank you.

OUR NEXT BULLETIN

At long last, we've published

At our annual meeting in Atlanta last

month, we had a splendid preview of the next issue of the *Duodecimal Bulletin*. But there's still space that can be filled! Have an article? A letter containing a question (common or uncommon) you'd like answered? Send them in!

editor@dozenal.org

Remember that our *Bulletin* is designed to cover all aspects of mathematics, from the most basic to the most advanced, from a dozenal perspective, so no question or topic is too easy or too complex. Don't be shy!

ANNUAL MEETING

POETICAL DIVERSION

DOZENS

I think that I shall never ken
a number lovely as Dozen;

a Dozen with its factor two
which gives us halves and doubles, too;

and with its next-up factor, three;
oh! even thirds gives joy to me!

and even with its factor, four;
a base neglecting quarter's poor;

and six, product of two and three,
a finer factor none can see.

Some bases lack these, like poor ten;
but tow'ring o'er them all: Dozen.

DONATIONS

Members, please remember that while dues are no longer required for membership, we still rely on the generosity of members to keep the DSA going. Donations of any amount, large or small, are welcome and needed.

A donation of \$16; (\$18.) will procure Subscription membership, and entitles the payer to receive both a digital and a paper copy

of the *Bulletin* if requested. Other members will receive only a digital copy. To invoke this privilege, please notify the Editor of the *Bulletin*, John Volan, at

editor@dozenal.org

As members know, we are a volunteer organization which pays no salaries. As such, every penny you donate goes toward

furthering the DSA's goals.

It may be worth considering a monthly donation; say, \$3, or \$6, or whatever seems reasonable to you. This can be set up quite easily with Paypal, which is available at our web site.

Of course, if you prefer to donate by check, you may send them to our worthy Treasurer, Jay Schiffman, payable to the Dozenal Society of America, at:

Jay Schiffman

604-36 South Washington Square, #815
Philadelphia, PA 19106-4115

Remember, too, that the DSA is a 501(c)(3) tax-exempt organization; as such, your contributions may be tax deductible under applicable law.

Thanks again for your assistance; it's your donations that keep the DSA going. We can't keep doing it without you.

FOR SALE

The DSA is pleased to offer the following for sale. These are all either at cost, or the proceeds go to the Society. The exception is *Basic Dozenal Arithmetic*, which is a private production.

Item	Price (\$)
<i>Dozenal Wall Calendar, 1204</i>	9.05
<i>Dozenal Planning Calendar, 1204</i>	8.32
<i>TGM: A Coherent Dozenal Metrology</i>	8.00
<i>Manual of the Dozenal System</i>	3.46
<i>A Dozenal Primer</i>	4.50
<i>Basic Dozenal Arithmetic</i>	15.00

Prices are, unfortunately but by necessity, in decimal. If for some reason the links above do not work, simply go to: <http://www.lulu.com/shop/shop.ep>

and enter the appropriate terms. E.g., searching for "TGM dozenal" will turn up the TGM book.

We hope to offer other titles, and even some other items (such as dozenal clocks and the like), in the future.

EACH ONE, TEACH ONE