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# Picture this: visuals put large numbers in perspective

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Sat Jun 19 - 4:54 AM



It's hard to imagine large numbers.

Back in prehistoric times, they had terms for one, two, three and many. That's it. Three was more than enough back then.

But soon people found that they needed to count to higher amounts, and in a giant leap for mankind,

number systems were created to keep track of one's wealth. Three was not enough when it came to what you owned or were owed.

And while we can easily write down larger and larger numbers to suit our needs, the larger numbers become, the harder it is to imagine them. A million doesn't seem a lot different from a billion, especially if you only have 50 cents in your pocket.

But I think that everyone needs to be able to put large numbers in perspective in order to make sense of the world.

Let's take, for example, the oil disaster growing in the Gulf of Mexico. BP originally claimed only 5,000 barrels of oil were leaking into the gulf per day, while more reasonable estimates suggests 40,000 barrels are pouring into the water.

But do these numbers mean anything to you?

Let's pick something large that we can all relate to. How about an Olympic-sized swimming pool? A quick search of the Internet shows that such a pool holds about 2.5 million litres (or 2,500 cubic metres) of water. Each barrel of oil is about 159 litres, so 40,000 barrels is over 6.3 million litres, filling two and a half Olympic-sized pools. That gives you some idea of how much oil is flowing out into our beloved oceans each day.

And it's been almost 50 days since the crisis started, which adds up to over 318 million litres, or 127 pools full of the gunk — enough to blanket the Halifax Public Gardens five metres high.

Perhaps that amount doesn't sound horribly large to you — after all, the Atlantic Ocean is pretty big. The real problem is how much of the ocean the oil spill covers.

Can we use a bit of math to also imagine this?

A reasonable estimate for the thickness of the oil slick is about 0.002 millimetres, or 0.000002 metres. So it's pretty thin. But we have a huge volume of oil, namely 318 million litres (or 318,000 cubic metres). This means that the oil slick would cover about 318,000 divided by 0.000002, which equals 159 billion square metres.

In other words, it would more than cover Lake Superior, the biggest of the Great Lakes.

OK, that's frightening enough. But let's turn our attention closer to home and think about the amount of money that the Canadian government is going to spend on the G20 meeting. It's now up to \$1.2 billion.

What does \$1.2 billion look like?

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I have a little trouble imagining it, so I thought about stacking 60 million \$20 bills (\$1.2 billion is 1,200,000,000 divided by 20, which equals 60 million \$20 bills). I couldn't find the actual thickness of a Canadian \$20 bill, but an American \$20 bill is about 0.11 millimetres (0.00011 metres) thick. Assuming the Canadian \$20 bill is about as thick as its U.S. counterpart, a stack of 60 million \$20 bills would be about 6.6 kilometres high.

I hope the politicians have a really large wallet to carry it around in.

And, of course, this stack gets thrown into our national debt, which stands at about half a trillion dollars, an even bigger number to contemplate. With a population of about 34 million people, that works out to an average debt of \$500 billion divided by 34,000,000, which equals \$14,706 for each and every one of us.

That number makes sense to me, although I don't like it.

Now consider Greece's financial situation. With a debt of about \$405 billion, I see that it is less than ours. But Greece has a smaller population, only about 11.2 million people. So the debt load per person in Greece is about \$36,000, a much bigger problem for a much smaller nation.

In a bit of irony, I found a lot of my data for this article online from Google. The name Google is a deliberate misspelling of the term googol, the name of the very, very, very large number of 1 followed by 100 zeros.

Numbers, numbers everywhere, we just need to take the time to think.

Jason I. Brown is a professor of mathematics at Dalhousie University in Halifax. His research that used mathematics to uncover how the Beatles played the opening chord of A Hard Day's Night has garnered worldwide attention. He is also the author Our Days Are Numbered: How Mathematics Orders Our Lives.

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