

# Offbeat math: Sizing up a world of 7 billion people

By Ian Johnson and Duk Han Lee, [CBC News](#)

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The UN's forecasters have estimated that Oct. 31 is the day world's population passes the 7 billion mark. Seven-thousand-million is a staggering number, and CBC News had some fun compiling this list to help put the idea of that many people into perspective.

*(Please note, when dealing with a crowd of 7 billion people of varying age, sex, height, appetite, fitness level, and shoe size, the endeavour is far from an exact science. These calculations are based on best estimates and averages.)*

## Take a deep breath

We all need air, but how much of it do 7 billion people consume?

People breathe at different rates, depending on their age, sex, fitness level and what they're doing at the time. In broad strokes, though, the average person **breathes about 8 litres of air every minute** while at rest, or about **11,520 litres a day**.

So the world's population inhales at least **80,640,000,000,000 (80.6 trillion) litres of air** a day, and converts more than **3,850,000,000,000 (3.85 trillion) litres of oxygen** to carbon dioxide.

A University of California study determined that the average person breathes about 52 litres a minute when running, so if the entire world went jogging together for an hour we'd breathe about **21,840,000,000,000 (21.8 trillion) litres** of air.

One hectare of average forest creates about enough oxygen to support 19 people, according to the U.S. Forest Service. Using that as the benchmark, the world's population needs **at least 368,421,052 hectares of forested land** to provide us with the air we need – an area roughly **650 times the size of PEI** and **5 times the size of Manitoba**.

### THE AVERAGE PERSON BREATHEs ABOUT:



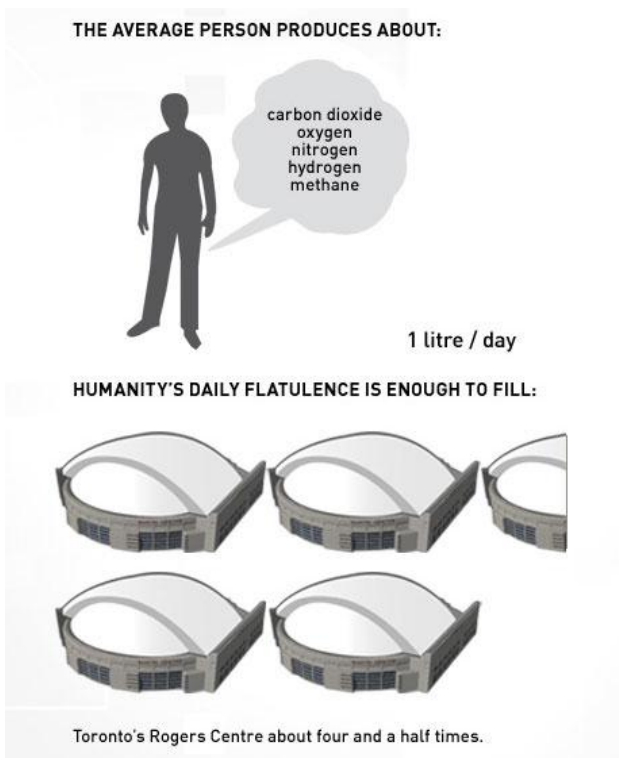
## Food, water and gas

Part of humanity over-eats, others don't get nearly enough food. But the average human ideally needs around 2,200 calories a day, or **15,400,000,000,000 (15.4 trillion) calories** for the human population.

If you wanted to "supersize" the world, the necessary calorie count works out to about **28,518,518,519 McDonald's Big Macs** a day.

No matter what people may claim, everyone is a little gassy (particularly after eating things like fast food). According to the U.S. Department of Health and Human Services, the average person passes gas anywhere from 14 to 23 times a day, producing a daily average of about a litre of flatulence (made up of carbon dioxide, oxygen, nitrogen, hydrogen, and methane). Humanity's **daily cloud of 7 billion litres of gas** is enough to fill Toronto's Rogers Centre (formerly known as the SkyDome) about four and a half times. Try blaming that on the dog.

The average person should drink about 2.5 litres of water a day, according to studies by the U.S. Institute of Medicine. If everyone got the drinking water they needed, the world's population would consume about **17.5 billion litres a day**, or the equivalent of about **7,000 Olympic-sized swimming pools**. It would take the proposed Keystone XL pipeline expansion in Western Canada, which is designed to carry around 500,000 barrels of oil a day, about **220 days** to transport that much water.



Given that the average person passes about 2 litres of urine a day, the world would subsequently relieve itself of about **5,110,000,000,000 (5.1 trillion) litres a year**. That's equivalent to the amount of water that flows over Niagara Falls in about **two and a half hours** when the falls are at their peak.

## Being social

It takes about one second to say "hello" to someone. Assuming you wanted to greet the world's entire population of 7 billion one at a time, it would take you roughly **222 years** of working the crowd non-stop.

A gigabyte works out to the equivalent of about 100,000 short emails. An entry-level home internet plan from Bell includes 2 gigabytes of internet use a month plus a \$2.50-per-gigabyte charge for any extra bandwidth used. If you wanted to e-mail a "hello" to everyone on Earth individually from that basic internet account, it would cost you \$26.95 for the monthly internet plan, plus about **\$174,995** for the extra bandwidth you'd need.

## Follow the money:

According to the Forbes list of the world's billionaires for 2011, the world's richest man was Carlos Slim Helu from Mexico, with a net worth estimated at **\$74 billion US**. He could afford to treat every person on Earth to lunch at Tim Hortons – a sandwich and extra-large coffee, plus a box of 20 Timbits to take home for later.

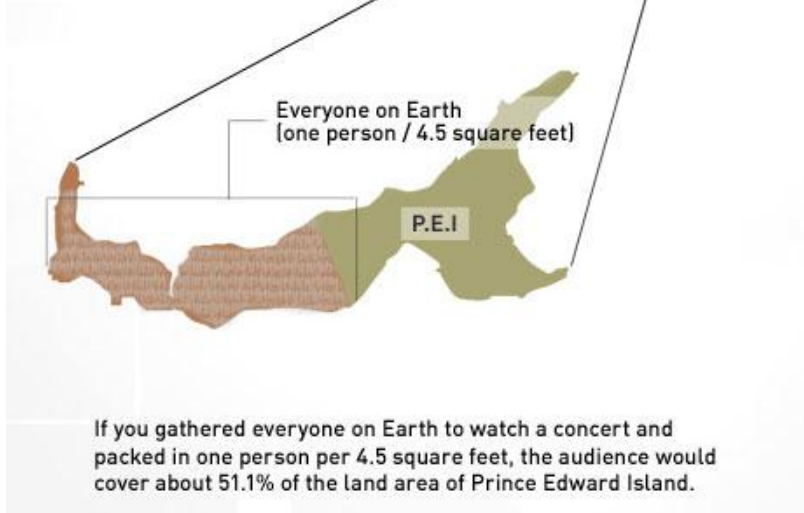
If the U.S. military budget for 2011 was shared out to the world's population, each person would get roughly \$100. Based on average annual income, that's about **two months' salary** for people in places such as Malawi and Somalia, according to the International Monetary Fund, or a bit less than the average North American spends in a day.

## A really, really big show:

If you gathered everyone on Earth to watch a concert and packed 'em in at one person per 4.5 square feet — a dense crowd, based on the basic crowd-calculation rule worked out by University of California professor Herbert Jacobs — the general-admission audience would cover about **2,926.5 square kilometres**. That's about **51.7%** of the land area of PEI. (Of note, one of the biggest PEI concerts of the year was Elton John's two-night appearance at Credit Union Place in Summerside — 5,400 tickets were sold per show.)

If you flew everyone in for the concert, it would take **28 million flights** using Boeing's new 787-8 Dreamliner.

If they all flew to the mainland and came over the Confederation Bridge in Toyota Corollas, the top-selling car in the world, at 4 people per car the line of bumper-to-bumper traffic would stretch roughly **9.6 million kilometers**, or go around the earth at the equator more than **240 times**. (And it would be very difficult to find your car after the show.)



## Human chain

If everyone on Earth joined hands to form a human chain, it would stretch about **7 million kilometres**. The chain would circle the Earth at the equator about **175 times**, stretch to the moon and back about **nine times**, and reach about **one-fifth of the way to Mars** when it's at its closest point to Earth.

And that chain is growing. At a global birth rate of 19.15 per 1,000 population, about **4.4 babies** are born every second.

