

“When the well’s dry, we know the worth of water” – Benjamin Franklin

FACTS AND STATISTICS: DID YOU KNOW?

How much water do we have?

About 70 percent of the earth is water, but only 2.5 percent of that is freshwater. Of the freshwater, 68.9 percent is in the form of glaciers and snow cover, 30.8 percent is groundwater, and about 0.3 percent is in lakes and rivers. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

What about in Canada?

- 26 percent of Canadians rely on groundwater for domestic use. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- About 60 percent of Canada’s freshwater drains north, while 85 percent of the population lives within 300 kilometres of the American border. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- Henderson Lake, in British Columbia, receiving the most annual precipitation in Canada, gets 6,655 millimetres of precipitation each year. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- The location in Canada that receives the least amount of precipitation is Eureka, Nunavut, where only 64 millimetres of precipitation fall each year. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- Canada has 563 lakes that are larger than 100 square kilometres. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- The Great Lakes contain 18 percent of the world’s freshwater. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- The longest river in Canada is the Mackenzie River (Northwest Territories, British Columbia, Alberta), which is 4,241 kilometres long. The largest lake entirely in Canada is Great Bear Lake (Northwest Territories), which has an area of 31,328 square kilometres. The deepest lake in Canada is Great Slave Lake (Northwest Territories), which has a depth of 614 metres. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

Tell me a bit about the history of water treatment facilities.

- In Canada and the United States, there are about 1,610,000 kilometres of pipeline and aqueducts, which is enough to circle the earth 40 times. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- The first water pipes in the United States were made from fire charred bored logs. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- The first municipal water filtration works was opened in Paisley, Scotland, in 1832.

- Methods to improve the taste and odour of water occurred as early as 4000 B.C., when Sanskrit and Greek people recommended charcoal filtering, exposure to sunlight, boiling and straining. (EPA: The History of Drinking Water Treatment; <http://www.epa.gov/safewater/consumer/pdf/hist.pdf>)
- In 1855, an epidemiologist named John Snow showed that cholera was a waterborne disease; he showed this by linking an outbreak in London with a contaminated well.
- In the late 1880s, Louis Pasteur demonstrated the “germ theory” of disease, which showed how microscopic organisms could transmit diseases through water.
- In 1908, chlorine was used for the first time as a primary disinfectant of drinking water in the United States. (EPA: The History of Drinking Water Treatment; <http://www.epa.gov/safewater/consumer/pdf/hist.pdf>)
- In the United States, federal regulations of drinking water quality began in 1914. (EPA: The History of Drinking Water Treatment; <http://www.epa.gov/safewater/consumer/pdf/hist.pdf>)

Here are some more interesting facts about water.

- Water is the only substance that naturally exists in three states (solid, liquid, gas) on earth.
- Water expands by 9 percent when it freezes.
- March 22 is World Water Day, as declared by the United Nations.
- One litre of water weighs about one kilogram.
- Saskatchewan’s name comes from the Plains Cree word *kisiskatchewan*, which means “the river that flows swiftly.”
- By the time you feel thirsty, your body has already lost more than one percent of its total water. (All About Water: 10 Reasons to Drink Water; <http://www.allaboutwater.org/drink-water.html>)

What do you know about rain?

- One inch of rain on an area of one kilometre by one kilometre is equivalent to 25,400 litres of water, which is equal to about 134 bathtubs of water! (USGS Water Q & A: Water Use at Home; <http://ga.water.usgs.gov/edu/qahome.html>)
- Raindrops are not shaped like teardrops. Small raindrops are spherical, and larger raindrops are shaped like hamburger buns. (USGS: Are raindrops shaped like tears? <http://ga.water.usgs.gov/edu/raindropshape.html>)

Just how important is water?

- A person can live for up to one month without food, but only about one week without water. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- 66 percent of the human body is water. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)

- 75 percent of the human brain is water. (EPA Water Facts of Life; <http://www.epa.gov/safewater/kids/waterfactsoflife.html>)
- A living tree is 75 percent water. (EPA Water Facts of Life; <http://www.epa.gov/safewater/kids/waterfactsoflife.html>)

How much does water cost? What does this have to do with human rights?

- In the United States, the average person pays 25 cents for their water each day. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- It costs over \$3.5 billion to operate the American water systems each year. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- In many developing countries, the only way to get safe drinking water is through private vendors, who charge up to ten times more than piped water would cost. In many African cities, up to 80 percent of the population gets their water this way. In Namibia, up to 20 percent of the family income is spent on water (plus, they have to pay to use the toilet). (2003 International Year of Freshwater Facts and Figures: Water and Cities; http://www.wateryear2003.org/en/ev.php-URL_ID=5970&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- African and Asian women walk an average of 6 kilometres for each trip to get water. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

How much water do I use?

The average Canadian uses about 335 litres of water each day for domestic purposes (compared with the average American who uses 380 litres, the average Italian, who uses 250 litres, and the average Swede, who uses 200 litres of water each day). (Environment Canada: Every Drop Counts; www.ec.gc.ca/water/en/info/pubs/speak/spearkerkit2002.ppt) You're probably thinking, I don't use THAT much water. Here are some statistics about where the water is used:

- Globally, 69 percent of withdrawn water is for agriculture, 23 percent is for industrial purposes and 8 percent is for domestic purposes. (2003 International Year of Freshwater Facts and Figures: The Different Water Users; http://www.wateryear2003.org/en/ev.php-URL_ID=1607&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Of residential water use in Canada, 35 percent is used for bathing and showering, 30 percent is used for flushing the toilet, 20 percent is used for laundry, 10 percent is used in the kitchen and for drinking, and 5 percent is used for cleaning. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

How could I possibly use 335 litres of water in one day?

- One flush of the toilet uses 15 to 19 litres of water, but a low-flush toilet uses only 6 litres of water per flush. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- Each year, approximately four percent of toilets in Toronto homes are replaced. If all the replaced toilets were low-flush units for ten years, the city would save about 26 million litres of water each day. This would also eliminate about \$60 million in water and sewage treatment capacity. (Great Lakes Directory: Mayors float ban on wasteful toilets; http://greatlakesdirectory.org/on/050207_great_lakes.htm)

- A five minute shower uses 100 litres of water, but a five minute shower with a reduced-flow showerhead uses less than half of this. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- One dishwasher cycle uses about 40 litres of water, and hand washing the dishes uses about 35 litres of water. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- Leaving the tap running while you wash your hands uses about 8 litres of water. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- Leaving the tap running while you brush your teeth uses about 10 litres of water. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- One load of laundry uses about 225 litres of water. A front loading washing machine uses 40 to 60 percent less water than a top loading washing machine. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

Drip, drip, drip:

- A leaky tap that drips once per second can waste 10,000 litres of water in one year. (EPA Be Hydro-logical; <http://www.epa.gov/safewater/kids/behyrdological.html>)
- A leaky toilet can waste up to 260 litres of water each day. (EPA Be Hydro-logical; <http://www.epa.gov/safewater/kids/behyrdological.html>)
- 13 percent of municipal piped water is lost in pipeline leaks. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

Summertime!

- On average, 50 to 70 percent of household water is used outdoors for watering lawns and gardens. (EPA Be Hydro-logical; <http://www.epa.gov/safewater/kids/behyrdological.html>)
- Outdoor watering uses 35 litres of water each minute. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- A lawn sprinkler that sprays 19 litres per minute will, in one hour, use more water than ten flushes of the toilet, two five minute showers, two dishwasher loads, and one load of laundry. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

What else is water used for?

- It takes 215,000 litres of water to produce one tonne of steel. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- To manufacture one complete car, including tires, 147,972 litres of water are used. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)
- Every day, more than 1.1 million litres of water are used to produce American newsprint. (EPA Water Trivia Facts; http://www.epa.gov/safewater/kids/water_trivia_facts.html)

- To produce one kilogram of paper, approximately 300 litres of water are required. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

The facts about bottled water:

- Consumption of bottled water is increasing by 12 percent each year. (2003 International Year of Freshwater Facts and Figures: Bottled Water; http://www.wateryear2003.org/en/ev.php-URL_ID=5226&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- In 1999, the average Western European drank 85 litres of bottled water (which is 46 percent of total bottled water sales), followed by the average North American, who drank 35 litres (20 percent of the total). (2003 International Year of Freshwater Facts and Figures: Bottled Water; http://www.wateryear2003.org/en/ev.php-URL_ID=5226&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Each year, over 89 billion litres of bottled water are sold. (2003 International Year of Freshwater Facts and Figures: Bottled Water; http://www.wateryear2003.org/en/ev.php-URL_ID=5226&URL_DO=DO_TOPIC&URL_SECTION=201.html)

Getting rid of the bad stuff:

- One milligram of free chlorine per litre of water can kill the *E. coli* bacteria in less than one minute, but it takes approximately 16 minutes to kill the Hepatitis A virus, 45 minutes to kill the *Giardia* parasite, and about 9600 minutes (6 to 7 days) to kill the *Cryptosporidium* parasite. (CDC Chlorine Disinfection Timetable; http://www.cdc.gov/healthyswimming/chlorine_timetable.htm)

Pollution: Out of sight, out of mind?

- Nitrogen and phosphorus are natural minerals, but 80 percent of nitrates, and 75 percent of phosphates that are found in lakes and rivers are added by humans. (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)
- Good sewage plants can only remove about half of the nitrogen and 30 percent of the phosphorus from domestic sewage. This means that between 90,718,474 and 226,796,185 kilograms of phosphates enter American waterways each year. (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)
- Eutrophication is a natural process that a lake undergoes over thousands or millions of years. During eutrophication, nutrients are added and the oxygen levels in the lake change and the ability of the lake to support organisms and ecosystems increases; during this process, it is common to see an increase in the number of plants that grow in and around the lake. Due to eutrophication, Lake Erie aged 15,000 years between 1950 and 1975, meaning that a process that would naturally take 15,000 years took only 25 years, because of the phosphorus and nitrogen that was added by humans. (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)
- American water is polluted by more than 907 million tonnes of sediment each year. (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)
- Farming accounts for the largest amounts of sediment pollution, but construction sites and strip mined areas (where there is bare earth) can lose up to 15,691 tonnes of sediment per square kilometre per year (which is 15 times higher than the normal cropland erosion rate). (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)

- Fertilizer use is more than 15 times higher than it was in 1945. Homeowners typically use 10 to 50 times more fertilizer than is required for healthy plants. (EPA Water Fact Sheets; <http://www.epa.gov/safewater/kids/wsb/pdfs/FACTS.pdf>)
- In developing countries, 70 percent of all industrial waste is dumped, untreated, into water sources. (2003 International Year of Freshwater Facts and Figures: The Different Water Users; http://www.wateryear2003.org/en/ev.php-URL_ID=1607&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- One drop of oil can make up to 25 litres of water unfit for drinking. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- One gram of 2,4-D (a common household herbicide) can pollute 10 million litres of water. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- One gram of PCBs can make up to one billion litres of water unsuitable for aquatic life. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- One gram of lead can pollute 20,000 litres, and make it unfit for drinking. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- Acid rain has a pH of 3.6, which is 100 times more acidic than normal rainwater, which has a pH of 5.6. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)

What's the diagnosis?

- Half of the world's wetlands have been lost since 1900. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- The United States loses more than 1,821 square kilometres of wetlands each year. (EPA: What's up with our nation's waters? <http://www.epa.gov/owow/monitoring/nationswaters/waters2.pdf>)
- Canada has 25 percent of the world's wetlands, and 15 to 25 percent of the Prairies are wetlands. (Environment Canada Quickfacts; http://www.ec.gc.ca/water/en/e_quickfacts.htm)
- The latest assessment of American surface waters found that, of those assessed, 39 percent of river and stream miles, 45 percent of lake, pond, and reservoir areas, and 51 percent of estuary areas were impaired. (EPA: What's up with our nation's waters? <http://www.epa.gov/owow/monitoring/nationswaters/waters2.pdf>)
- In 2000, 57 percent of Canadians were served by wastewater treatment plants, compared with 74 percent of Americans, 86.5 percent of Germans, and 99 percent of Swedes. (Environment Canada: A Sampling of Water Facts; http://www.ec.gc.ca/water/en/manage/qual/e_facts.htm)
- As of June 22, 2007, there were 90 First Nations communities across Canada under a Drinking Water Advisory. (Health Canada Drinking Water Advisories; http://www.hc-sc.gc.ca/fnih-spni/promotion/water-eau/advis-avis_concern_e.html)
- As of July 5, 2007, there were 777 Drinking Water Advisories across Canada. (Water.ca Water Advisories; <http://www.water.ca/textm.asp>)
- As of July 2007, SDWF estimates that more than 90 percent of First Nations communities in Canada have water treatment plants that cannot produce water that meets the Canadian Guidelines for Drinking Water Quality.

What kinds of health concerns are associated with water?

- 80 percent of diseases in developing countries are water-related. (United Nations; <http://www.un.org/cyberschoolbus/student/2005/theme.asp>)
- 443 million school days are lost each year as a result of water-related illnesses. And at any given time, about half of all people in developing countries are suffering from health effects related to poor water or sanitation. 35 percent of all productivity (work, school, etc.) is lost because of people becoming ill from water-related illnesses. (United Nation Development Programme; <http://hdr.undp.org/hdr2006/pdfs/report/HDR06-complete.pdf>)
- 60 percent of infant mortality is linked to infectious and parasitic diseases, most of which are water-related. (2003 International Year of Freshwater Facts and Figures: Human Health; http://www.wateryear2003.org/en/ev.php-URL_ID=1600&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Diarrheal diseases cause some 6000 deaths per day, most of which are children under the age of five. (2003 International Year of Freshwater Facts and Figures: Human Health; http://www.wateryear2003.org/en/ev.php-URL_ID=1600&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Diarrheal diseases have killed more children in the past ten years than all those killed by armed conflict since World War Two. (2003 International Year of Freshwater Facts and Figures: Human Health; http://www.wateryear2003.org/en/ev.php-URL_ID=1600&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Up to 90 percent of all wastewater in developing countries is discharged directly into rivers and streams, without any treatment. (United Nations; <http://www.un.org/cyberschoolbus/student/2005/theme.asp>)
- In China, India and Indonesia, twice as many people die from diarrheal diseases than from HIV/AIDS. (2003 International Year of Freshwater Facts and Figures: Human Health; http://www.wateryear2003.org/en/ev.php-URL_ID=1600&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Unsafe drinking water causes an estimated 90 deaths and 90,000 illnesses in Canada each year. (Sierra Legal: Feds fail in Canada's Drinking Water Report Card; http://www.sierralegal.org/m_archive/pr06_10_06.html)

The Safe Drinking Water Foundation has educational programs that can supplement the information found in this fact sheet. Operation Water Drop looks at the chemical contaminants that are found in water; it is designed for a science class. Operation Water Flow looks at how water is used, where it comes from and how much it costs; it has lessons that are designed for Social Studies, Math, Biology, Chemistry and Science classes. Operation Water Spirit presents a First Nations perspective of water and the surrounding issues; it is designed for Native Studies or Social Studies classes. Operation Water Health looks at common health issues surrounding drinking water in Canada and around the world and is designed for a Health, Science and Social Studies collaboration. Operation Water Pollution focuses on how water pollution occurs and how it is cleaned up and has been designed for a Science and Social Studies collaboration. To access more information on these and other educational activities, as well as additional fact sheets, visit the Safe Drinking Water Foundation website at www.safewater.org.

Resources:

Centers for Disease Control and Prevention. March 2007. Chlorine Disinfection Time Table. www.cdc.gov/healthyswimming/chlorine_timetable.htm.

David Suzuki Foundation. July 2004. Water: Good to the last drop. http://www.davidsuzuki.org/WOL/Challenge/Newsletter/july2004_water/.

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<http://www.epa.gov/owow/monitoring/nationswaters/waters2.pdf>.

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United States Geological Survey: Water Science for Schools. August 2005. Water Q&A: Water use at home. <http://ga.water.usgs.gov/edu/qahome.html>.