

Lesson 8 Operation Water Pollution

Water Bottles

One of the problems with bottled water is the bottle that the water comes in. These bottles can cause major problems in the environment and for the person drinking from them.

Making the bottles

Every year the US makes 2.7 million tonnes of plastic into water bottles. The plastic is made from a product called PET. Making 1 kilogram of PET uses 17.5 kilograms of water. So in order to make 2.7 million tonnes of plastic there is 47 million tonnes of water used. That's enough water to fill 18 862 Olympic sized swimming pools! If you were to swim in one of those pools every day, it would take you almost 52 years to swim in the amount of water used to make water bottles in one year!! Click on [Math](#) for the calculations.

Water is not the only natural resource used to make the plastic water bottles. Oil is also used. In order to make all the water bottles for one year, the United States uses 20 million barrels of oil. That's enough oil to fuel 100 000 cars!

Storing the bottles

When water sits in the bottles some of the chemicals from the plastic begin to leach into the water. A 2006 Canadian study found that after water bottles made with PETs had been stored for six months, there was a significant amount of antimony (a toxic chemical) found in the water.

There is also some concern about bisphenol A which acts like a synthetic hormone. There is concern about bottles made from PET leaching bisphenol A into the water. This dangerous chemical is currently being researched by the Canadian government to determine just how dangerous it can be.

Disposing of the bottles

Many people in Canada recycle their used water bottles. But there are an estimated **88%** of bottles that end up in the trash instead of the recycling facility! Unfortunately the plastic bottles often end up in the landfills and often oceans. It takes sometimes thousands of years for the bottles to breakdown in landfills. In the oceans, the bottles react with the sun light and eventually break down into plastic pellets and are eaten by birds and fish. Eating the plastic kills the birds and fish. Sometimes the plastic does not break down at all. Some researches believe that plastic in oceans will stay there for thousands of years and may never break down completely.

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The 12% of plastic that is recycled is often not used to make new bottles because it is too expensive to use. The recycled plastic is used to make things like fleece jackets, fiberfill pillows, carpet and many other products.

Source:

[Bottled Water](#) a Fact Sheet from the Safe Drinking Water Foundation
People Magazine article “Banned! Top chefs just say not to serving bottled water – and yes to helping the environment”. July 16, 2007
Macleans Magazine article “Green Report: It’s so not cool” May 14, 2007
Bottled Water Basics – an EPA document on bottled water

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Water

The water that goes into water bottles is another cause for concern.

Types of Water

There are six types of water that is bottled. Each type has specific criteria it must meet in order to be labelled that type of water.

- a) Spring Water is water that comes from an underground source and that flows to the surface naturally (not pumped to the surface). It must have less than 500 parts per million TDS (total dissolved solids)
- b) Mineral Water is the same as spring water except that it has more than 500 ppm of TDS.
- c) Well Water is water that is same as spring water but is pumped to the surface.
- d) Artesian Well Water rises to the surface under its own pressure from a confined aquifer.
- e) Purified Water can come from an underground source or it can come from municipally treated water. It is also called distilled water, deionized water and reverse osmosis water.
- f) Carbonated Water is water that contains carbonation either naturally or from adding carbonation. It can come from a spring, well or community water supply.

Regulations and Standards

In Canada, bottled water is regulated under the Federal Food and Drug Act because once water is sealed, it is considered a food product. There are nine regulations for bottled water but five deal with labeling, one with prepackaged ice and **ONLY 3** with bottled water quality. The three water quality standards state that:

- a. Mineral water and spring water must be from a groundwater source and cannot contain any coliform bacteria.
- b. If the water contains coliform bacteria, more than 100 total aerobic bacteria per millilitre, and naturally occurring fluoride ions it cannot be sold
- c. Distilled water, demineralized water and carbonated water definitions.

The regulations surrounding quality are scary. According to the Environmental Protection Agency and the Food and Drug Act in the United States bottled water does not have to be disinfected or use certified operators or labs. When it comes to contaminants like E coli or Cryptosporidium, bottled water is NOT banned from using water containing these organisms and the water going into

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the bottles only has to be tested once per week. The companies producing bottled water do not even have to have filters in the water system to get rid of pathogens.

There is also the concern of water bottling plants depleting the water sources they are using to the point where the original users have nothing left and are forced to buy their water.

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Transporting Water

This aspect of bottled water is a source of huge amounts of pollution. After producing the bottles (and causing pollution), bottling the water (and causing pollution) then comes shipping the bottles across the world (and causing even more pollution).

Most often bottled water is transported by the semi truck-load. Driving the water around the country and continent causes massive amounts of exhaust which converts to an increase in the amount of greenhouse gases and Global Warming. The fuel needed for the trucks comes from the oil rig operations that are doing their part in polluting not just the air with the emissions from machinery but are also causing pollution in the process of producing oil.

When the bottled water makes its way across the ocean the pollution can be just as great. The fuel used to power the ships releases greenhouse gases. There is the chance of oil leaks and spills. And there is a new form of pollution that is ruining water habitats and ecosystems everywhere, especially the Great Lakes. Invasive species are plants and animals that are not naturally found living in the waters of the Great Lakes but have been introduced accidentally and are taking over the habitats of the naturally occurring species of plants and animals.

The tanker ships use water to compensate for the load they are carrying. The ballast water helps keep the ship at a safe depth in the ocean. The ships take on water in the harbour and then head out to sea. When approaching their destination, it was common practice to empty the ballast water at the new harbour. However, when the ship filled up with ballast water, they also brought along a few critters that are not common to the waters of the new harbour. The introduction of new species is a form of water pollution that is often overlooked. And although bottled water is not the main cause of these invasive species the fact that water is shipped over seas means that bottled water is contributing to the pollution of vast areas of water.

The amount of oil needed to make the bottle, fill it and ship it releases an estimated 250 grams of greenhouse gases per bottle of imported water. Some analysts state that when one quarter of the water in each bottle was replaced with oil that is an accurate description of the amount of oil used.

Source:

[Bottled Water](#) a Fact Sheet from the Safe Drinking Water Foundation

<https://www.invasivespeciesinfo.gov/subject/ballast-water>

http://www.epa.gov/owow/invasive_species

www.safewater.org

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Bottled v. Tap

The reason people drink bottled water is because they believe bottled water is healthier than tap water. Most often this idea is false.

Health

Incidents of drinking water contamination such as the E coli outbreak in Walkerton, Ontario and the Cryptosporidium outbreak in North Battleford, Saskatchewan have done a lot to cause people to think that their drinking water is unsafe. Large cities rarely have a problem with the water coming out of the taps. It is smaller communities and First Nations communities that have a greater chance of drinking water issues, just look at Saddle Lake, Alberta or Kashechewan, Ontario.

When incidents of drinking water contamination occur, the sales of bottled water go up because people begin to question the safety of their drinking water. Bottled water companies take the opportunity presented by an incident of contamination to create more doubt in the safety of drinking water and to promote the safety of bottled water. However, there is no health advantage to drinking bottled water. The regulations surrounding bottled water quality are insufficient. Would you drink bottled water knowing that the company can bottle water containing E coli and Cryptosporidium? Or that they only have to test their water once a week for bacteria?

People have become ill from drinking bottled water. In 1994, there was a cholera outbreak in Saipan a United States territory in the Marianas Islands. The cause was found to be contaminated bottled water and only those people who drank the bottled water became sick.

Cost

Aside from the poor regulations there is also the cost of bottled water. In 2005, Canadians spent 653 million dollars on 1.9 billion litres of bottled water. The companies producing bottled water often increase the price and people can spend 240 to over 10,000 times more for bottled water than for tap water.

Not every one in the world has access to clean, safe drinking water. The World Health Organization along with the United Nations and UNICEF estimates that it would cost 1.7 billion dollars per year (above current spending) to provide clean drinking water to every individual in the world. Improved sanitation would cost another 9.3 billion dollars. The 11 billion dollar total sounds like a lot of money but is actually only 24% of the 46 billion dollars that bottled water is worth.

www.safewater.org

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Alternatives to Bottled Water

There are many ways that the individual person can make a difference in terms of bottled water. Here are some ideas that you can consider.

- ④ By a reusable water bottle. The reusable bottles will cut down on the amount of plastic bottles going to the landfill and/or ocean every year.
- ④ Drink tap water. Most cities have safe tap water so buy a reusable water bottle and keep filling it with tap water.
- ④ If you do buy a plastic water bottle, reuse it or recycle it. Last year the California Department of Conservation estimated that nine out of ten bottles are not recycled and that there were one billion bottles ending up in the garbage. Those bottles could have been recycled into 74 million square feet of carpet or 16 million fleece sweaters!
- ④ If you drink bottled water for health reasons, consider installing a reverse osmosis water filter in your home instead. The money you spend in buying the filter will be worth the money you save every day by not buying bottled water.
- ④ If you are concerned about the tap water in your community, get together with the other residents and work with the city to improve how the water is treated.
- ④ Petition the federal government to increase funding for safe drinking water across the country and especially in rural and First Nations communities.
- ④ Work with water organizations to promote the importance of safe drinking water and the need to protect your community's water source as a way of ensuring high quality drinking water for future generations.

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