

# SKILLS EXPLORATION DAYS DESIGN CHALLENGE

## *Innovations in Water Conservation*



### Overview

Most of us start the day in a similar way: we head to the bathroom, brush our teeth, wash our hands, take a shower, and make ourselves breakfast. It's easy to forget that these normal morning activities can use over a hundred litres of water, even before lunch!

While our lifestyles have changed a great deal over the past century, one thing has remained constant; we have always needed water to survive. Early on, humans prioritized access to fresh water by building settlements and towns near lakes, rivers, and streams. As towns and cities grew, new infrastructure was built to make water access more convenient. Pipes carrying water to each building made daily activities easier and significantly improved both sanitation practices and public health. But with convenience also came waste.

On average, Canadians use approximately 215 litres of water per day<sup>1</sup> and Canada is ranked as one of the top water wasting countries<sup>2</sup>. Despite having a large portion of the world's fresh water, there are still communities across the country without clean access to this valuable resource. Globally, there are still approximately 2 billion people without safely managed drinking water<sup>3</sup>.

### Design Rationale

Canada has 1/5 of the world's fresh water. We need to become leaders in the conservation and stewardship of the planet's most vital resource. As a developed nation, we have an even greater responsibility to examine every opportunity to conserve and reuse water. Many of us take for granted our abundant access to water and have no idea how much we consume and waste in our everyday activities. By reflecting on our daily habits and adopting even a few water conservation practices, we can significantly reduce our water footprint and model responsible water management for others.

### Problem Scenario

Implementing the principles of sustainable development, your team has been selected to develop a prototype of a water conservation solution for your home, school, or community. The purpose of the prototype should be to minimize the amount of water that is wasted or provide ways to capture and filter existing water. Consider the following concerns that may apply when designing your prototype:

- Must address the need for sanitation, if necessary (potable vs non-potable water)
- Must be safe (someone cannot fall into it)
- Should be protected from extreme temperatures and the environment
- Should limit or reduce evaporation

### Success Determinants

Success will be determined by the degree to which your design solution:

- Addresses the design challenge
- Addresses an identifiable need
- Is original** (not an exact copy of something that already exists) **and as realistic as possible.**
- Utilizes the tools and materials provided in a creative and safe manner
- Aligns to the design motto: *Make it smaller, stronger, do more, be easier to use, be cheaper.*

**\*Prototype:** a model that illustrates the functionality of an idea or design. It may be life sized or scaled to a model that fits in your hand.

**\*Water Conservation:** a series of methods aimed at reducing our use of freshwater resources<sup>4</sup>

**\*Water Stewardship:** using water in a way that is socially equitable, environmentally sustainable, and economically beneficial<sup>5</sup>

# SUGGESTED RESOURCES TO GET YOU STARTED

## Design Challenge Background Information:

Sustainable Development Goals<sup>3</sup>- Clean Water and Sanitation: <https://www.un.org/sustainabledevelopment/water-and-sanitation/>

Water Scarcity: <https://www.unwater.org/water-facts/water-scarcity>

7 Countries that Waste the Most Water<sup>2</sup>: <https://earth.org/countries-that-waste-the-most-water/>

Survey of Drinking Water Plants<sup>1</sup>: <https://www150.statcan.gc.ca/n1/daily-quotidien/210817/dq210817c-eng.htm>

Why is Water Conservation Important?<sup>4</sup> <https://www.masterclass.com/articles/water-conservation-explained>

Water Stewardship Definition<sup>5</sup>: <https://www.unido.org/our-focus/safeguarding-environment/resource-efficient-and-low-carbon-industrial-production/industry-and-adaptation/water-stewardship#:~:text=Water%20stewardship%20is%20defined%20as,site%20and%20catchment%20based%20actions>

## Water Conservation:

Water Use and Conservation: <https://www.calacademy.org/educators/fresh-solutions-water-use-and-conservation>

How to Save Water: <https://www.watercalculator.org/how-to-save-water/>

100+ Water Saving Tips: <https://wateruseitwisely.com/100-ways-to-conserve-water/?view=list>

20 Ways to Conserve Water at Home: <https://www.thezebra.com/resources/home/how-to-conserve-water-at-home/#kitchen>

Self Sustainable Zero Waste Productive Home in Melbourne Demonstrates Future: <https://video.link/w/uOHzd>

Creating Innovative Water Recycling Showers for the Future: <https://about.ikea.com/en/behind-scenes/innovation-technology/2022/11/17/creating-innovative-water-recycling-showers-for-the-future>