Fresh Solutions: Design Thinking Challenge

Teacher's Guide

Are your students ready to tackle a water conservation issue at home or in their school? The following guide will help you facilitate a structured design challenge in your classroom related to water use at home, at school, or in the community.

Grade levels: 6-8

Total activity time: 60 minutes

Materials needed:

- Water Topic Design Challenge Spectrum
- Student Guides

Introduction

This Water Solutions Design Challenge is the final activity in the **Flipside Science: *Fresh Solutions: Water Use and Conservation*** unit. Before implementing this design challenge in your classroom, it is recommended you start with the preceding activities in the unit:

1. **Your Hidden Water Footprint: Defining a Problem to Find a Solution**
2. **Exploring Our Growing Need for Water**
3. **Rapid Brainstorming: How Can We Conserve Our Water Resources?**
4. **Sustainable Water Solutions: Weighing the Pros and Cons**

If you are using this design challenge independently of the unit, your students can become more familiar with water use and conservation issues and some proposed solutions by watching the videos in **Flipside Science: *Fresh Solutions: Water Use and Conservation*:**

1. *How Do We Meet the Growing Need for Water?*
2. *Desalination: From Sea to Sink*
3. *Water-Wise Farms: How to Grow More Crop Per Drop*
4. *Waste Water Recycling: Putting Greywater to Good Use*
5. *Recharging Aquifers: Replenishing our Groundwater Resources*

Using This Design Thinking Guide

'Design thinking' is a structured method that can be used to create a product, or to develop and implement solutions to a problem. Through the design thinking process, students can "*learn to sharpen the focus of problems by precisely specifying criteria and constraints of successful solutions, taking into account not only what needs the problem is intended to meet, but also the larger context within which the problem is defined, including limits to possible solutions*" (Engineering Design in the NGSS for Middle School).
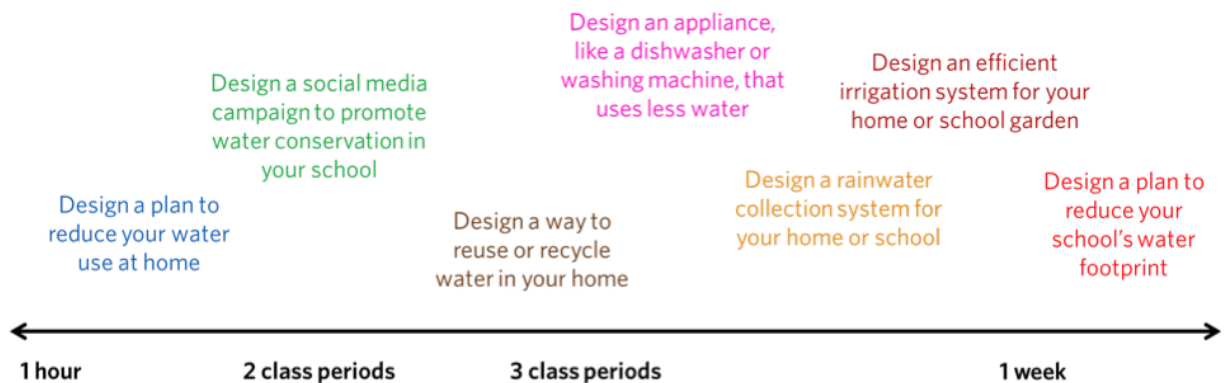
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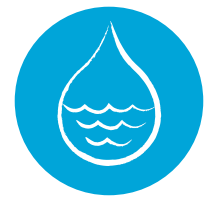
The goal of this design challenge is for students to **practice** design thinking and how to structure a design process. Honing one's skills in the design thinking process takes a lot of practice!

The **Design Challenge Levels** outlined in the **Student Guide** are adapted from ***Design for Change's design thinking toolkit.*** Each level can be printed off and given to students as a handout as they work through the challenge. Encourage students to keep track of their ideas and progress in a design notebook or on a blog.

How to Choose a Water Topic for your Design Challenge

Encourage your students to brainstorm together water use and conservation issues that they would feel empowered to tackle either at home, at school, or in their broader community. You can make this a whole class discussion, small group brainstorm, or individual homework. Check out examples of design challenge water topics on the **Water Topic Design Challenge Spectrum** that vary from one day challenges to week-long challenges:

Water Topic Design Challenge Spectrum

Design an appliance, like a dishwasher or washing machine, that uses less water

Design a social media campaign to promote water conservation in your school

Design an efficient irrigation system for your home or school garden

Design a plan to reduce your water use at home

Design a way to reuse or recycle water in your home

Design a rainwater collection system for your home or school

Design a plan to reduce your school's water footprint

| 1 hour | 2 class periods | 3 class periods | 1 week |

Students should work through the challenge in groups. Choosing a challenge that incorporates the *whole class* can not only help your students build teamwork skills, but can bring comradery to your classroom as your students empower not only each other, but youth outside of their own communities through the sharing of their designs.

Need some inspiration?

Watch stories of successful design thinking challenges in the classroom *(from the Teaching Channel)*:

- **STEM Design Challenge: Edible cars**
- **Roller Coaster Physics: STEM in Action**
- **Scooter Design Challenge: Newton's 3rd Law in Action**
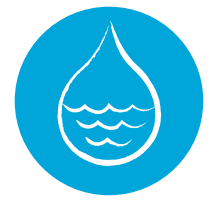
Or, read these stories:

- **Creative Thinking in the Classroom: Learning through a design challenge**
- **Global Teacher Prize blog: Kiran Bir Sethi: Empowering Students with Design Thinking**
- **KQED News: How to Apply Design Thinking in Class, Step By Step**

Additional resources

- **Edutopia: SMART Goal Setting With Your Students by Maurice Elias**
- **Edutopia: *Blogging* in the 21st Century by Michelle Lampinen**
- **Education Week: How Blogging Can Improve Student Writing by Ben Curran**

About Flipside Science

Flipside Science is a youth-powered series that tackles complex environmental topics and empowers viewers to make a difference. This engaging and upbeat collection of videos, hosted by Academy youth, explores how local communities are addressing environmental problems with solutions ranging from vertical farming to greywater recycling.

Head to **Flipside Science** to find the complete list of videos and activities in this series.

Fresh Solutions: Water Use and Conservation

Your Hidden Water Footprint:
Defining a Problem to Find a Solution

Sustainable Water Solutions:
Weighing the Pros and Cons

Exploring Our Growing Need for Water

Fresh Solutions:
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Rapid Brainstorming:
How Can We Conserve Our Water Resources?