

Down The Drain!

Team 3958

Cailin Clare Fitzgerald and Molly Pels



Down the Drain Presentation Outline

- Introduction
- Research Problems Facing Cities
- Select Problem
- Research Problem
- Select Solution
- Implement Solution
- Share Solution

Team #3958 Green Mountain Gears



Research about Problems Facing Cities

- Expert Interview
- Local News Reports
- Letter from School
- Direct Observation at School
- International News Reports

Research-Expert Interview

- Mark Behr (architect and member of DRB)
 - Major issue is predicting the future, which is hard
 - South Burlington did good job with roads but water is another problem (lead pipes in schools)
 - Schools were constructed in 1950's and they need renovation because the infrastructure (wires, plumbing, insulation, floors) need maintenance
 - <https://www.sbschools.net/cms/lib/VT01819219/Centricity/Domain/4/April%202011%20Presentation.pdf>



Research-Local News

Sewage into Lake Champlain

7.1M gallons of partially treated sewage released into Lake Champlain

The 7,138,000 gallons of sewage and stormwater was released from the Burlington Main Plant into Lake Champlain.



Updated: 3:53 PM EDT Apr 18, 2018

Brad Evans
Digital Media Manager



Another 1.1M gallons of partially treated sewage released into Lake Champlain

Another 1.1 million gallons of partially treated sewage was released into Lake Champlain this week.



Updated: 5:09 PM EDT Jun 6, 2018

Brad Evans
Digital Media Manager



Burlington beaches close again due to sewage spill

Published 4:08 p.m. ET June 20, 2018 | Updated 4:43 p.m. ET June 20, 2018



(Photo: JOEL BANNER BAIRD/FREE PRESS)



Blanchard and Blodgett beaches in Burlington were closed to swimming and fishing Wednesday afternoon after tests showed potentially harmful levels of the bacteria *E. coli* in nearby sections of Lake Champlain, according to the city's [Department of Public Works](#).

The beaches will remain off-limits until further notice, department officials said in a news release. Levels of the bacteria typically peak shortly after storm events and then plunge 48 hours later.

Share your feedback to help improve our site experience!

MORE STORIES

Burlington's only bowling alley is in a church
Dec. 5, 2019, 9:05 a.m.

Governor appoints judge to...

Research Sewage into Lake

- <https://www.mynbc5.com/article/71m-gallons-of-partially-treated-sewage-released-into-lake-champlain/19853080> April 18, 2018
- <https://www.mynbc5.com/article/another-11m-gallons-of-partially-treated-sewage-released-into-lake-champlain/21088619> June 6, 2018
- <https://www.burlingtonfreepress.com/story/news/2018/06/20/sewage-spill-closes-burlington-beaches-again/719122002/> June 20, 2018
- <https://www.mynbc5.com/article/3m-gallons-of-partially-treated-sewage-released-into-lake-champlain/22109649#> July 22, 2018

Research-my school

- Several faucets in my school were closed because of unsafe levels of lead

The Orchard School

2 Baldwin Avenue
South Burlington, VT
Mark Trifilio, Principal

telephone (802) 652-7300
fax (802) 658-9037

December 2, 2019

Dear Parents and Guardians:

The State of Vermont passed a new law in 2019 that requires all schools and child care providers to test their drinking water for lead. Samples of water from every tap at Orchard School that is reasonably expected to be used for drinking or cooking were collected and sent to the Vermont Department of Health Laboratory for analysis.

Results for Orchard School: One or more of the taps had a lead level AT OR ABOVE the 4 parts per billion (ppb) action level.

We take our responsibility to provide a safe and healthy environment for the children and staff seriously. Any tap that tested at or above 4 ppb was immediately taken out of service for drinking or cooking. We are working on fixes to permanently lower levels of lead in the water.

Lead exposure poses a special risk to children because they absorb lead into their systems more easily than adults do. Lead can slow down growth, impair development and learning, and can cause behavior problems. While the major source of lead poisoning in Vermont children is paint, lead in plumbing pipes and fixtures can add to a person's overall exposure. Drinking water in schools and homes may contain lead from old pipes, plumbing fixtures (such as fountains and faucets), or the solder that joins pipe sections together.

More Information

- For questions about the water testing process, or about the law and its requirements, dial 2-1-1.
- You can view school and child care results, remediation and any follow-up testing at leadresults.vermont.gov.
- For more information, visit:
 - Schools: healthvermont.gov/school-drinking-water
 - Child Care Programs: healthvermont.gov/childcare-drinking-water
- If you have questions or concerns about our facility and the actions we are taking, please contact Principal, Mark Trifilio (652-7300) or Director of Operations & Financial Management, Gary Marekres (652-7052).

To learn more about lead hazards and lead poisoning prevention, visit healthvermont.gov/lead.

If you want to test your home drinking water for lead, contact the Health Department Laboratory to order a \$12 first draw lead test kit. Call 802-338-4736 or 800-660-9997 (toll free in Vermont).

Sincerely,
Mark Trifilio
Principal

Research-Direct Observation

- I witnessed the school janitor enter my classroom and ask who clogged a boys toilet and flooded the boys bathroom



Research- International News-Fatberg clogs in Longon



#3958 Green Mountain Gears

Research-Water Supply Problems

- Lead levels
 - <https://www.healthvermont.gov/environment/school/lead-drinking-water-schools>
 - <https://www.cnn.com/2016/03/04/us/flint-water-crisis-fast-facts/index.html>
 - Micro-plastics
 - <https://www.cbsnews.com/news/microplastics-in-drinking-water-united-nations-world-health-organization-study/>
 - Trace amounts of medicines
 - <https://www.webmd.com/a-to-z-guides/features/drugs-in-our-drinking-water#1>
 - <https://www.youtube.com/watch?v=RE7OK9sMDvo> CBS News Report
 - <https://www.youtube.com/watch?v=ozwNEsuGOTM> Michigan Engineering Report
 - Sewage over-flows into lake
 - <https://mychamplain.net/combined-sewage-overflow-tracking-champlain-basin>
 - Phosphorus flows after rain into lake cause algae blooms
 - <https://www.lcbp.org/water-environment/water-quality/nutrients/>
 - Alligators in the sewers
 - <https://www.livescience.com/33322-alligators-crocodiles-new-york-city-sewers.html>
 - Putting things into the public water supply pipes that don't belong
 - <https://www.washingtonpost.com/news/morning-mix/wp/2017/09/13/its-longer-than-two-football-fields-weighs-more-than-11-buses-and-is-clogging-the-london-sewer/>
- Running out of water
- <https://www.usnews.com/news/cities/slideshows/10-cities-most-at-risk-of-running-out-of-water?slide=12>

Problem

- The “wrong” things are entering the water supply

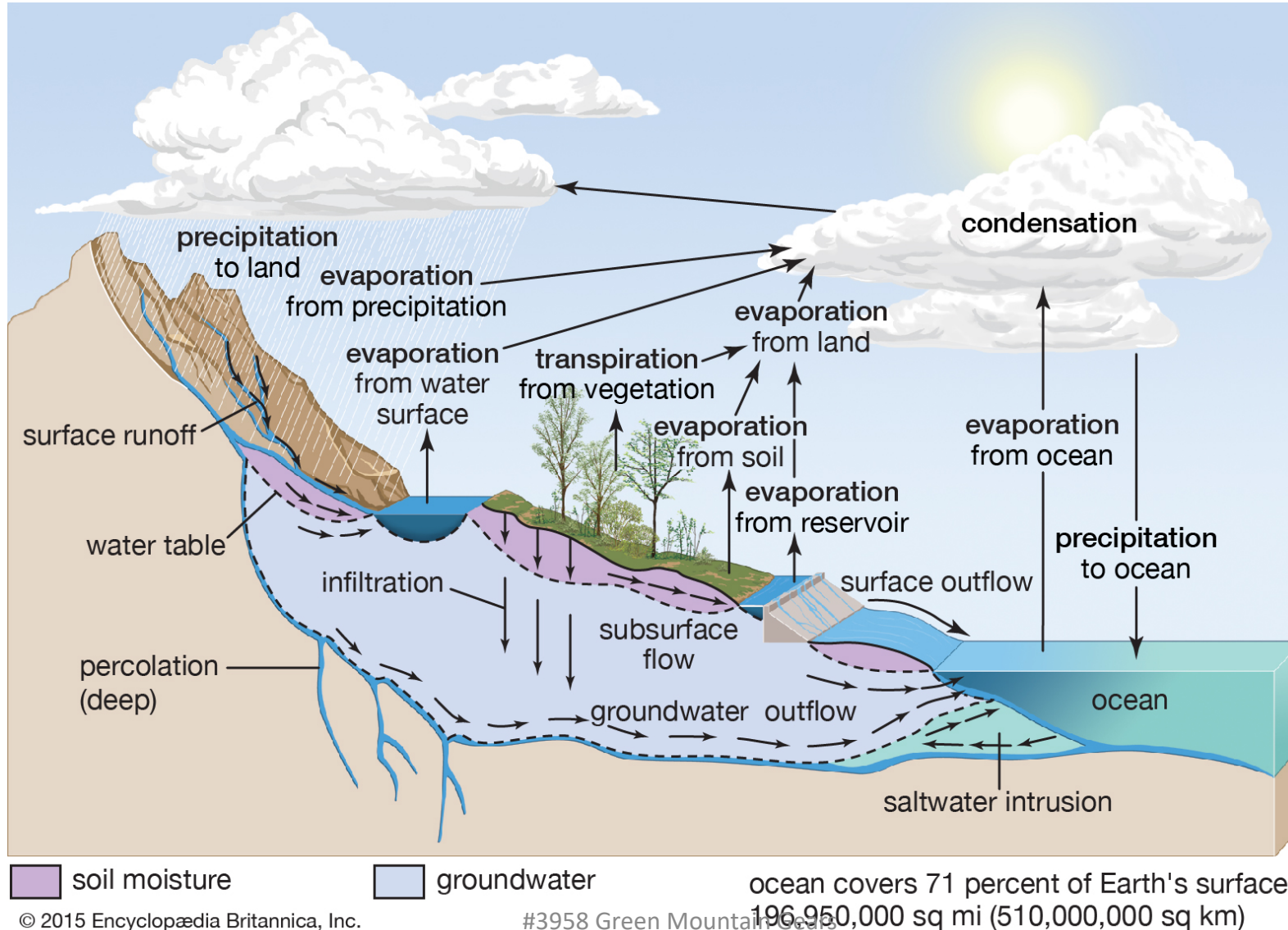
Research into Problem: Wrong things in Water

- Water Cycle
- Water Treatment
- Waste Water Treatment
- CSO's

Problem Research- History of Public Water Supply

- <https://tataandhoward.com/2015/05/history-of-water-distribution-and-treatment/>
- <https://www.angieslist.com/articles/history-drinking-water-fluid-timeline.htm>

Problem Research-Water Cycle

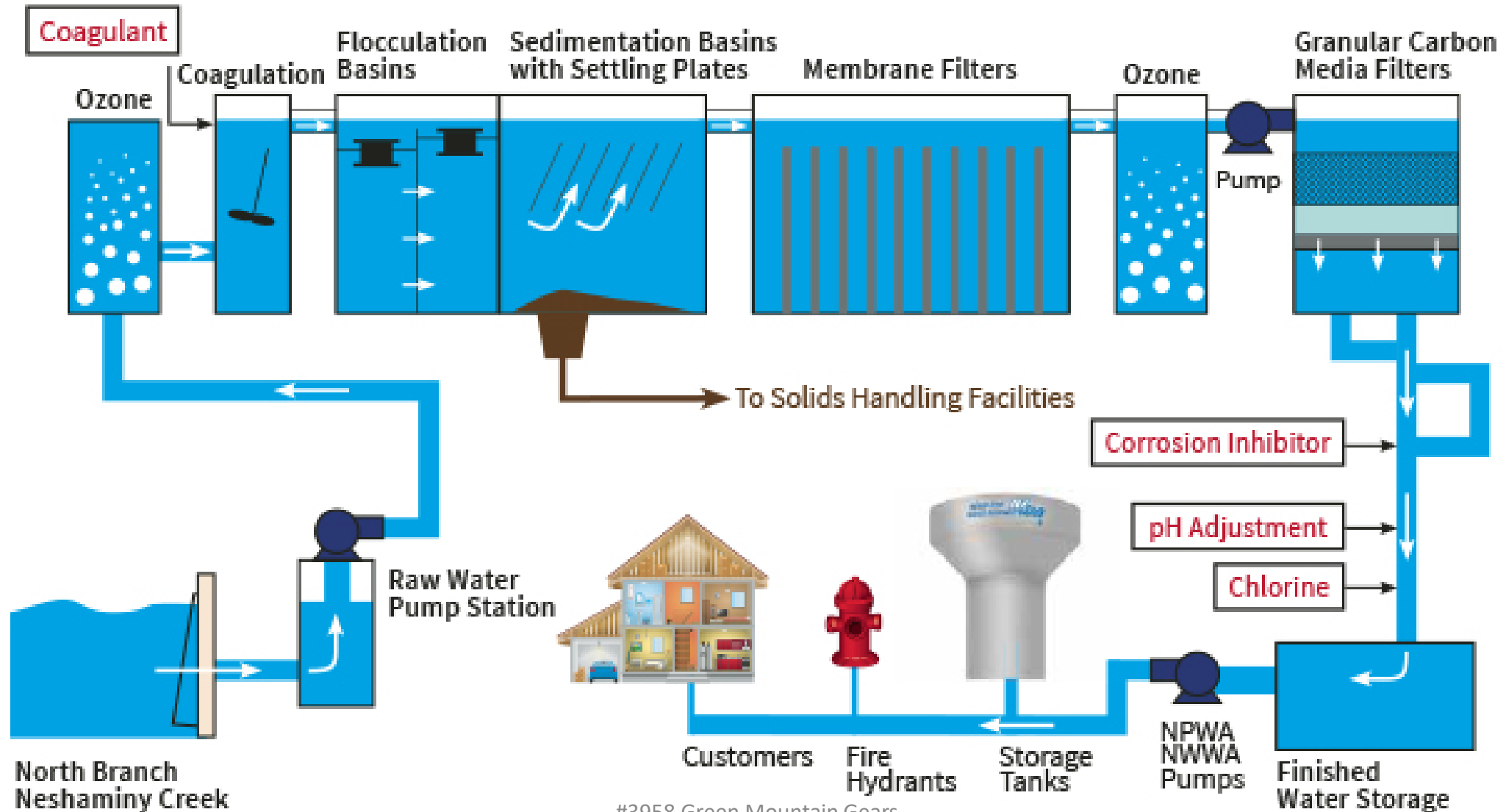


Problem Research- Water Cycle

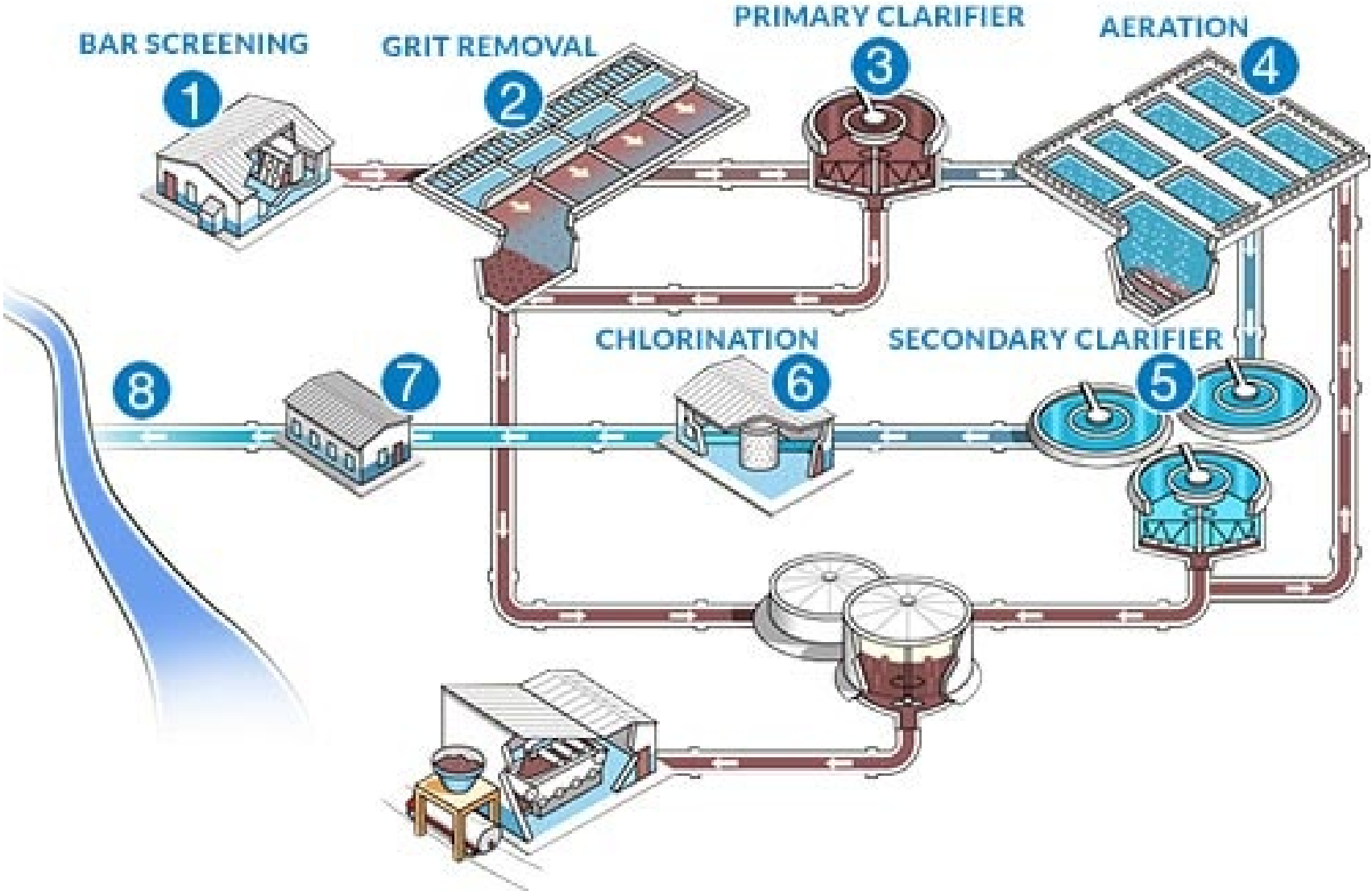
- <https://www.khanacademy.org/science/high-school-biology/hs-ecology/hs-biogeochemical-cycles/v/the-water-cycle>
- Water Treatment Plant
 - https://www.youtube.com/watch?v=0_ZcCqqpS2o
- Waste Water Treatment Plant
 - <https://www.youtube.com/watch?v=FvPakzqM3h8>
- CSO's
 - https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-04-12_CS0_Presentation.pdf

Problem Research-Water Treatment

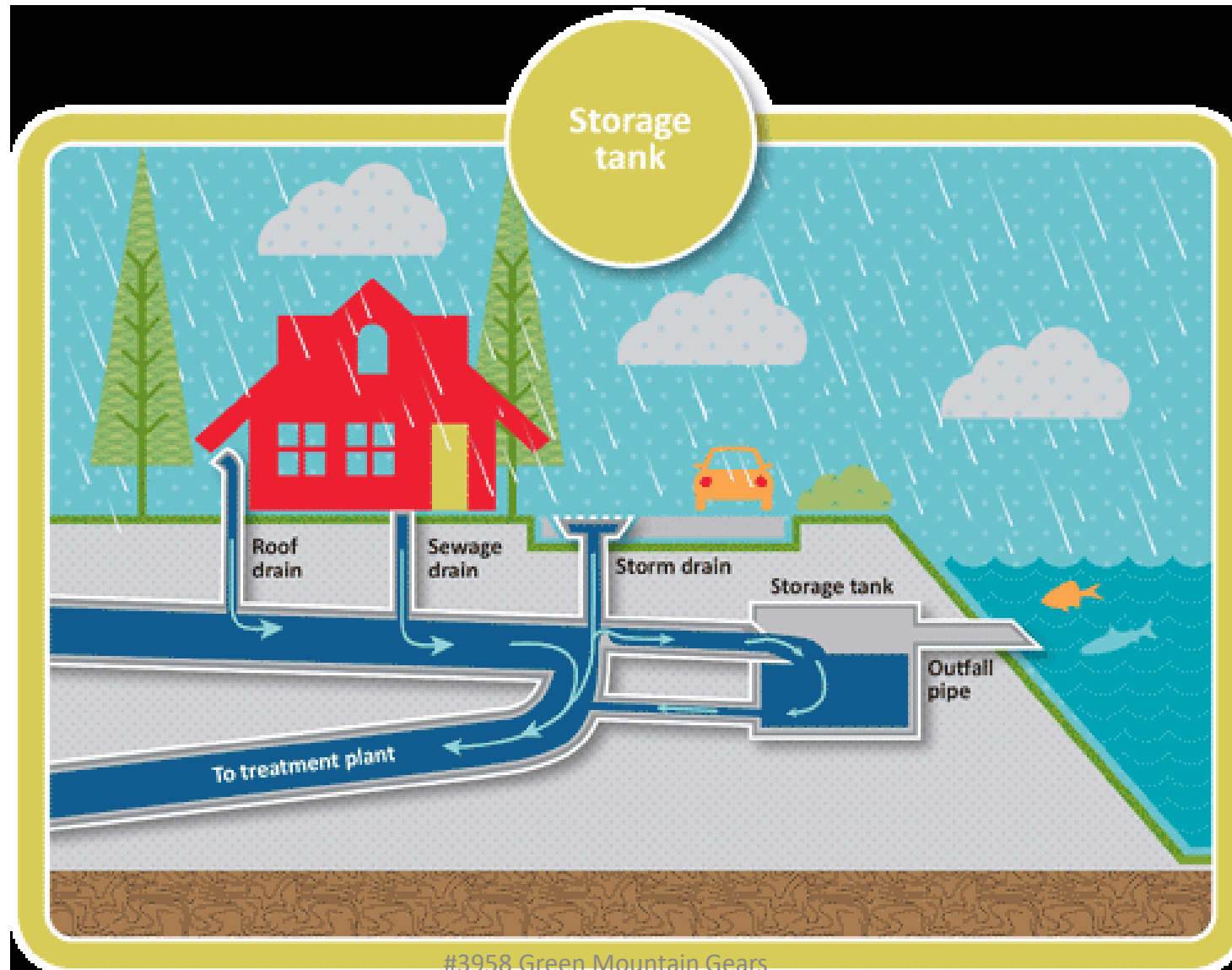
WATER TREATMENT PROCESS



Problem Research-Waste Water Treatment



Problem Research-Combined Sewage Outfall



Problem: the “wrong” things are entering the water system

- Problem: the “wrong” things enter the water supply
- Cause 1: People don’t know what should or should not be flushed down the drain
- Cause 2: People don’t care whether or not the drains gets clogged

Three Project Solutions

- Stop raw sewage-have separate pipes for storm water or increase the amount of waste the pipes can handle
- Reduce plastics and medicines in water by distillation (solar heated) of water before adding back to environment
- Stop clogs-only flush the “right” things down the drain “fatberg”- video game of stuff not to flush

Solution Research

- Causes
- Alternative Solution
- Our Solution
- Reasons we think our solution is best

Other Solutions- Signs to Teach People About Safe Flushing



Solution-Ours is Better! Jane McGonigal



THE WALL STREET JOURNAL.
WSJ.com

LIFE & CULTURE

JANUARY 22, 2011

Be a Gamer, Save the World

Videogames make players feel like their best selves. Why not give them real problems to solve?

By JANE MCGONIGAL



ZUMA Press

Could games like 'Guitar Hero' help cure cancer and end poverty?

We often think of immersive computer and videogames—like "FarmVille," "Guitar Hero" and "World of Warcraft"—as "escapist," a kind of passive retreat from reality. Many critics consider such games a mind-numbing waste of time, if not a corrupting influence. But the truth about games is very nearly the opposite. In today's society, they consistently fulfill genuine human needs that

Solution-Ours is Better!

Games and Apps change behaviors-MyAir

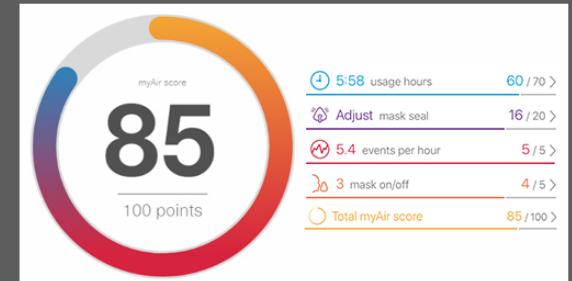


Steve Frank, Cailin's grandfather
Uses the MyAir app

Your sleep reports

The first thing you'll see when you log in to myAir each morning is your myAir score, which provides a snapshot of your therapy from the night before. You can explore each of the four contributing factors that make up your score and track your therapy with charts that show how you did in that category for the last 30 days.

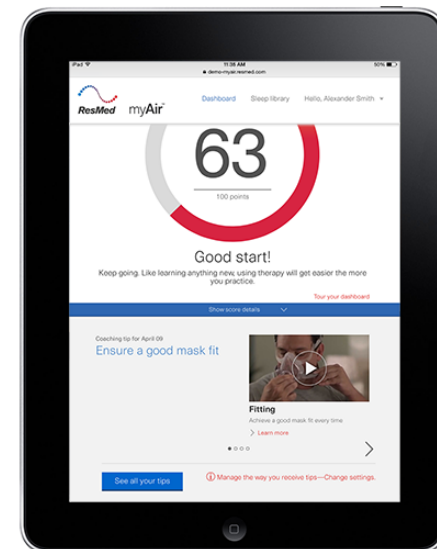
Additionally, a report summarizing your therapy can be downloaded to keep for your records or share with your doctor.



Coaching and reinforcement

Starting CPAP therapy can be a challenge. But with myAir, you have a partner as you work toward a healthier, happier life. Delivered via email or text, personalized coaching and reinforcement messages can help you get the most out of your sleep therapy.

- You'll receive tailored coaching and tips on how to make therapy more comfortable.
- Praise messages will be sent when you meet certain therapy milestones.
- Encouragement messages will be sent to encourage you to keep up the good work.



Solution-Why ours is better!Gamify

- Give Immediate Feedback
- Allow many repetitions
- Make Fun!
- Jane McGonigal,
 - <https://www.youtube.com/watch?v=dE1DuBesGYM>
 - <https://www.youtube.com/watch?v=yLUdxqYmDdc>
- Health Care Apps
 - <https://medicalfuturist.com/top-examples-of-gamification-in-healthcare/>
- Fitness Apps
- Medication Reminders

Things that should not be flushed...

- Cooking oil
- Needles (syringe)
- Feminine hygiene products
- Diapers
- Paper towels
- Legos
- animals

Our Solution

- Solution: Get people to play video game to learn what should or should not go down drain
- Solution: Get people to learn about how water is connected from playing video game

Down the Drain!

- Coded in Scratch so we could learn more about coding and share with friends
- Players must catch or avoid things that fall toward toilet
- Players get points if they choose correctly-visual display and sound
- Players get strikes if they do not choose correctly-visual display and sound
- At the end of each level, player watch an educational animation
 - Level 1-water cycle
 - Level 2-water treatment
 - Level 3-waste water treatment
 - Level 4-CSO's

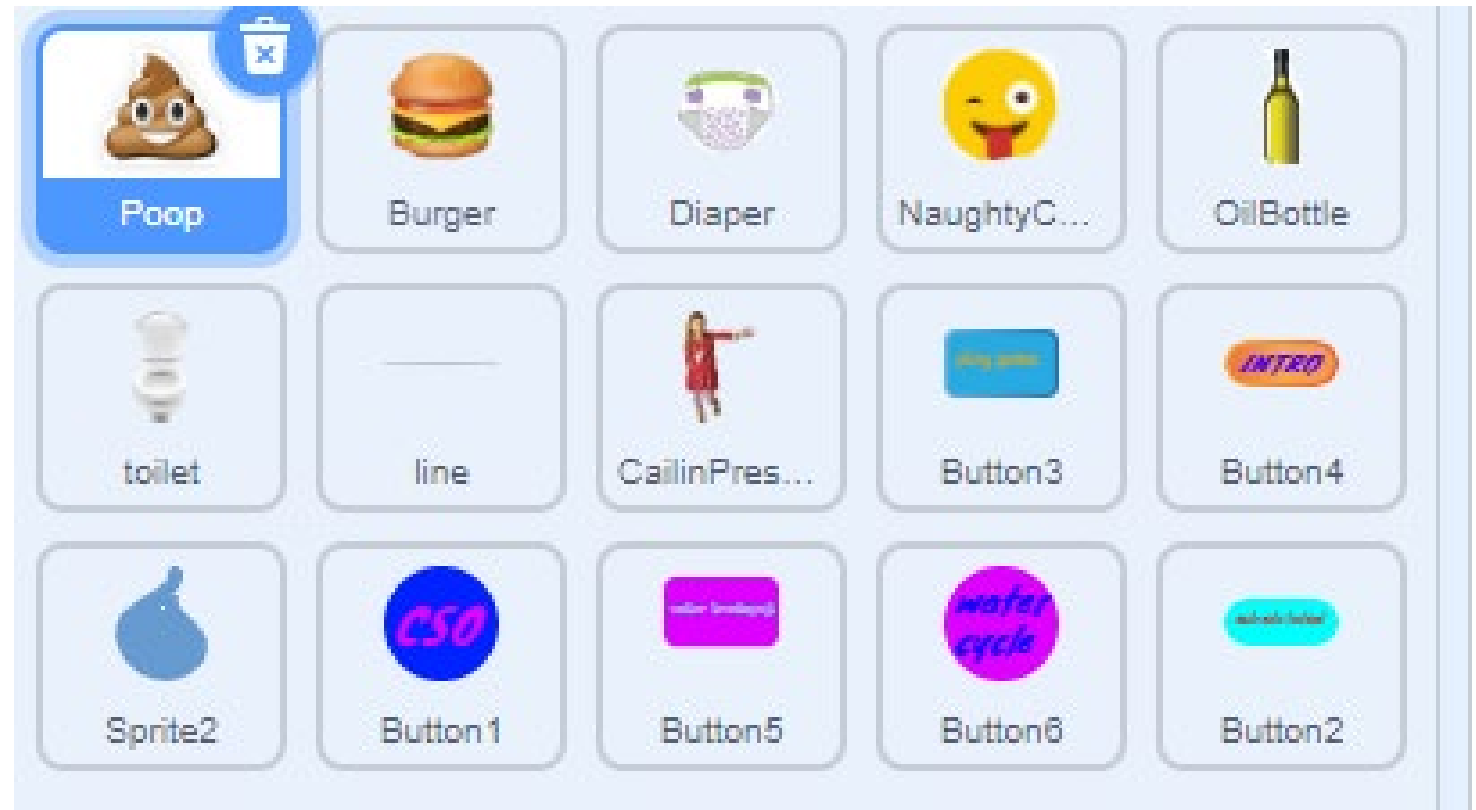


Implementation Plan for Solution

- Create Story
- Create/Program characters->Test and Revise
- Create/Program Backdrops->Test and Revise
- Record, Integrate Sound Effects-> Test and Revise
- Compose, Record and Integrate theme song-> Test and Revise
- Beta Testing with FTC Team #9721
- Sharing-Launch on Scratch Website, social media
- Evaluation

Implementation Plan-Create Characters

- Some graphics copied from internet
- Some graphics from photos
- Some graphics from stock
- Some custom made in editor



Implementation Plan-Create Backdrops

Level 1
use the arrows to move the toilet to get the poop!

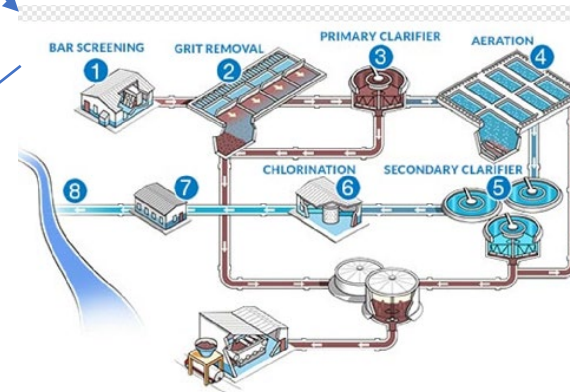
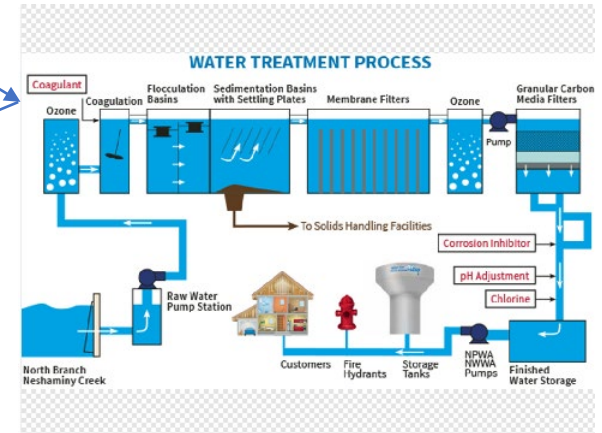
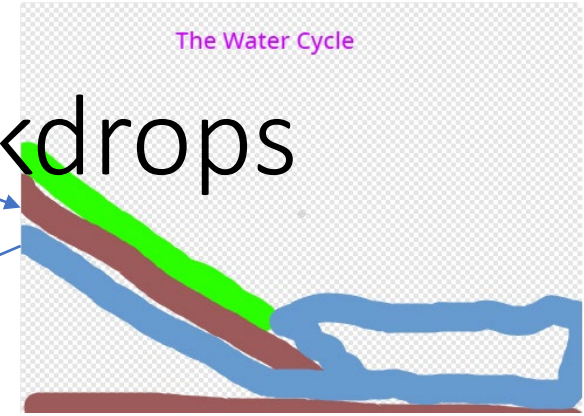
Level 2
get the poop and avoid the diapers

Level 3
burgers go in your belly not down the toilet

Level 4
Oil is to boil NOT go in the toilet

Down the Drain!
The game about what
should and should not go in the toilet

By cailin fitzgerald and molly pets.



- Some graphics copied from internet
- Some graphics from photos
- Some graphics from stock
- Some custom made in editor

Implementation-Program Character Behaviors



```
when I receive dropPoop
  set currentDrop to 1
  go to NaughtyChild
  show
  forever
    change y by -2
    if touching toilet ? then
      start sound splash
      change score by 1
      set currentDrop to 0
      broadcast message1
      hide
    if touching line ? then
      say Strike for 1 seconds
      broadcast message1
      start sound mistake
      set currentDrop to 0
      change strikes by 1
      hide
  
```

```
when clicked
  hide

when I receive gameover
  hide

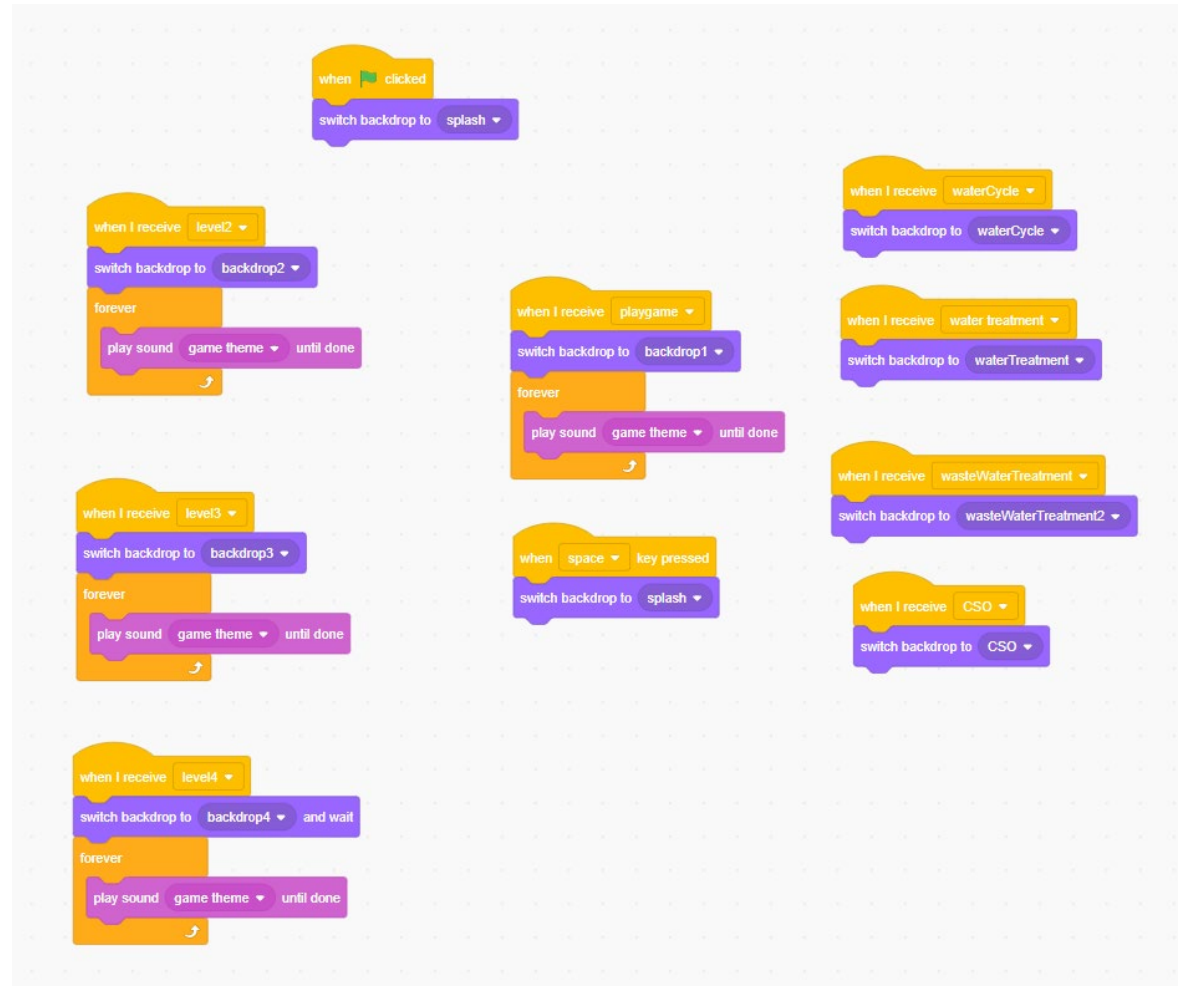
when I receive waterCycle
  stop other scripts in sprite

when I receive water treatment
  stop other scripts in sprite

when I receive wasteWaterTreatment
  stop other scripts in sprite

when I receive CSO
  stop other scripts in sprite
  
```


Implementation-Program Backdrops



Implementation- Composing/Recording Theme Music



Implementation- Recording/Coding Sound Effects



Implementation- Beta Testing with FTC Team 9721



Implementation-Launch->Down the Drain!

- Coded in Scratch so we could learn more about coding and share with friends
- Players must catch or avoid things that fall toward toilet
- Players gets points if they choose correctly-visual display and sound
- Players get strikes if they do not choose correctly-visual display and sound
- At the end of each level, player watch an educational animation
 - Level 1-water cycle
 - Level 2-water treatment
 - Level 3-waste water treatment
 - Level 4-CSO's



Share Solution

- Beta Testing with FTC Team 9721
- Beta Testing with Family Members

Character-Naughty Child

- Moves side to side repeatedly
- Drops different things at each level
- Drops random things at each level
- Selected an emoji so as to to make the villain look like anyone who might play the game



Character-toilet

- Player moves side to side



Character-line

- Marks when an object does not enter toilet



Character-poop

- Falls from naughty child
- Adds strike if it hits floor (makes ehh sound effect)
- Add points if it lands in toilet(makes splash sound effect)
- Taken from emoji to be less offensive



Character-diaper

- Falls from naughty child
- Adds strike if it hits floor (makes “good job” sound effect)
- Add points if it lands in toilet (make “di di di di di duh” sound effect)



Character-burger

- Falls from naughty child
- Adds strike if it hits floor (makes “good job” sound effect)
- Add points if it lands in toilet(makes “di di di di di duh” sound effect)



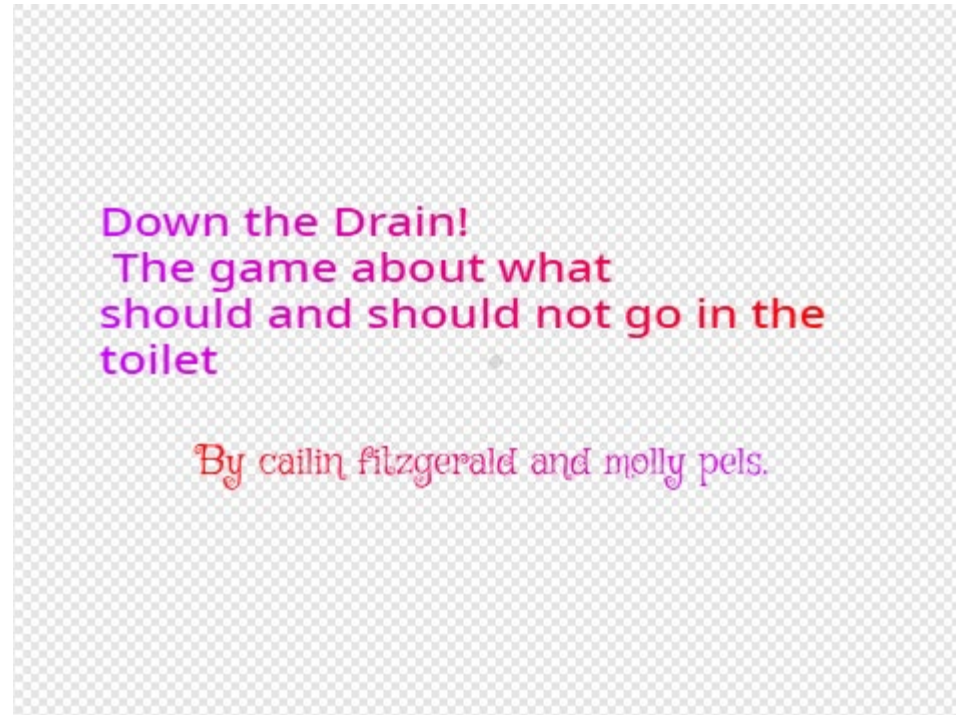
Character-oil bottle

- Falls from naughty child
- Adds strike if it hits floor (makes “good job” sound effect)
- Add points if it lands in toilet(makes “di di di di di duh” sound effect)



Splash page

- Appears at the start of game



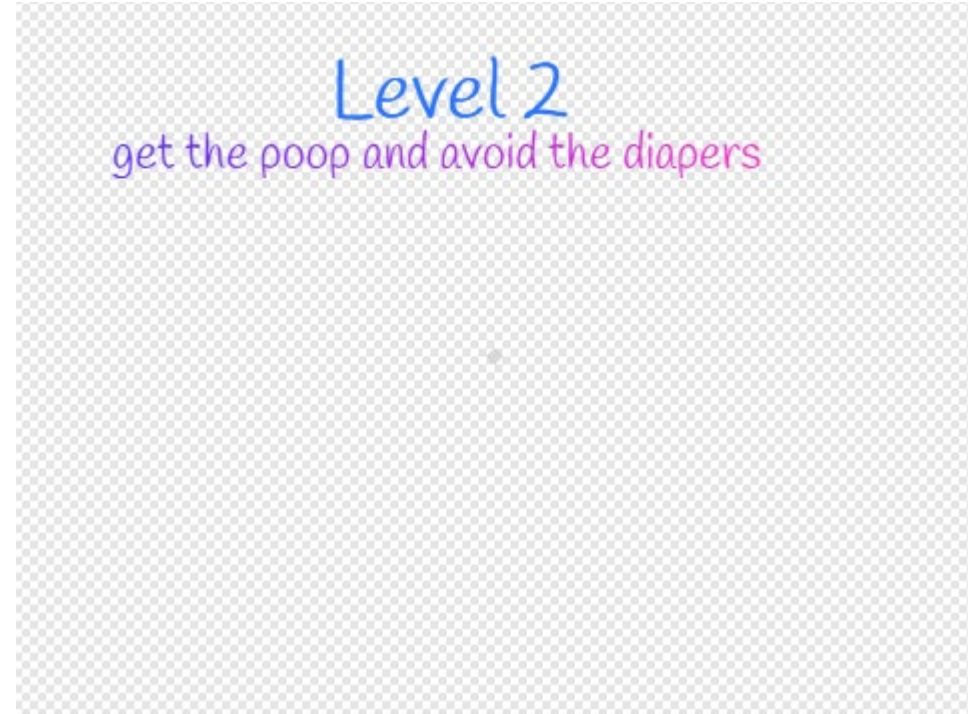
Level 1

- Gives instructions for what to do with poop
- Plays watercycle



Level-2

Gives instructions for what to do with diaper plays water treatment



Level-3

Gives instructions for what to do with burger plays waste water treatment

A rectangular area with a light gray and white checkered background. It contains two lines of handwritten text in blue ink. The first line reads "Level 3" and the second line reads "burgers go in your belly not down the toilet".

Level 3
burgers go in your belly not down the toilet

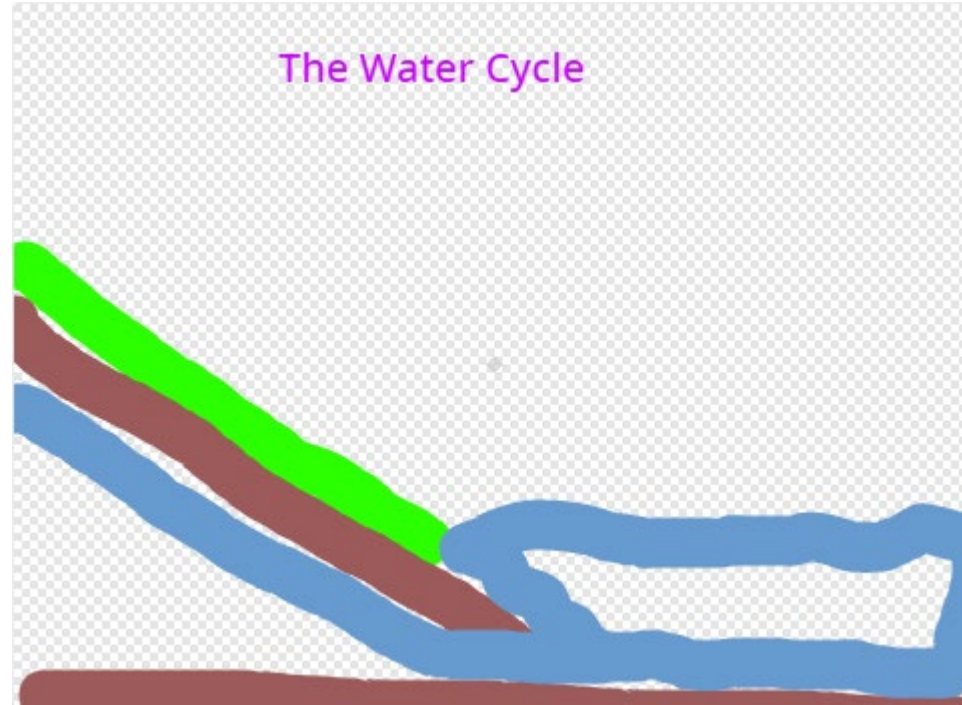
Level-4

Gives instructions for what to do with oil bottle plays cso



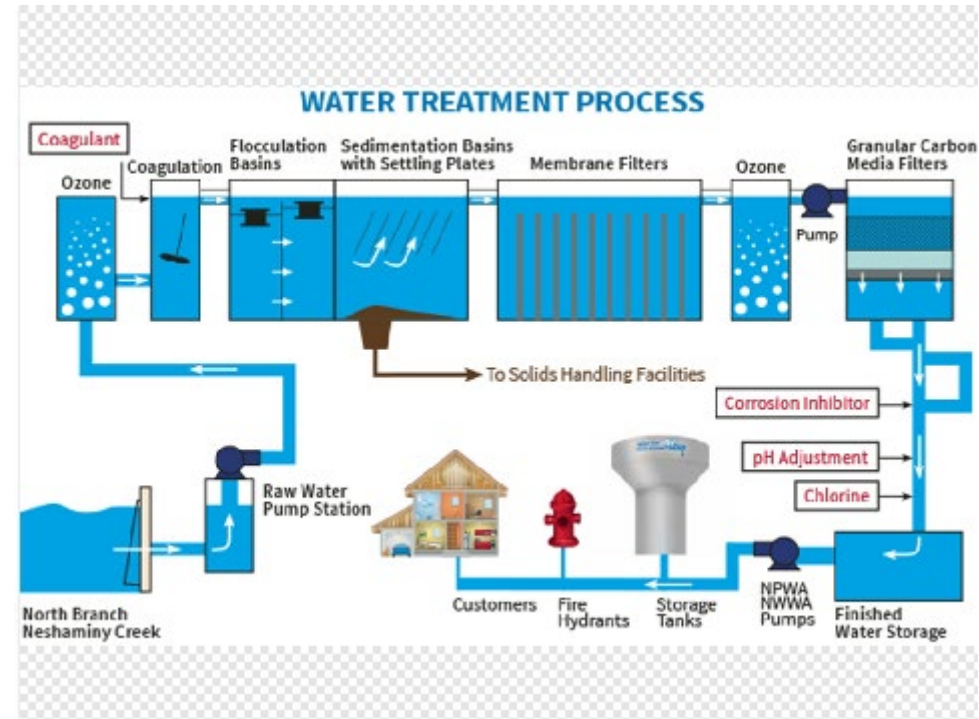
Water Cycle

Gives instructions for what to do with oil bottle plays



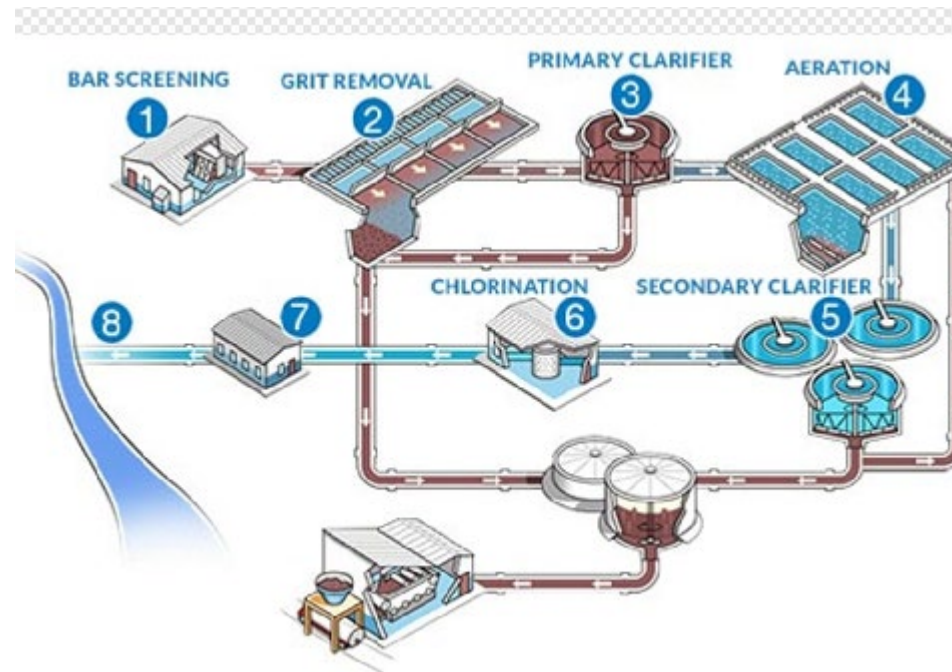
Water Treatment

Gives instructions for what to do with oil bottle plays cso



Waste Water Treatment

Gives instructions for what to do with oil bottle plays cso



CSO

A cso is when there's a storm sewage flows in to are water supply(lake Champlain)

