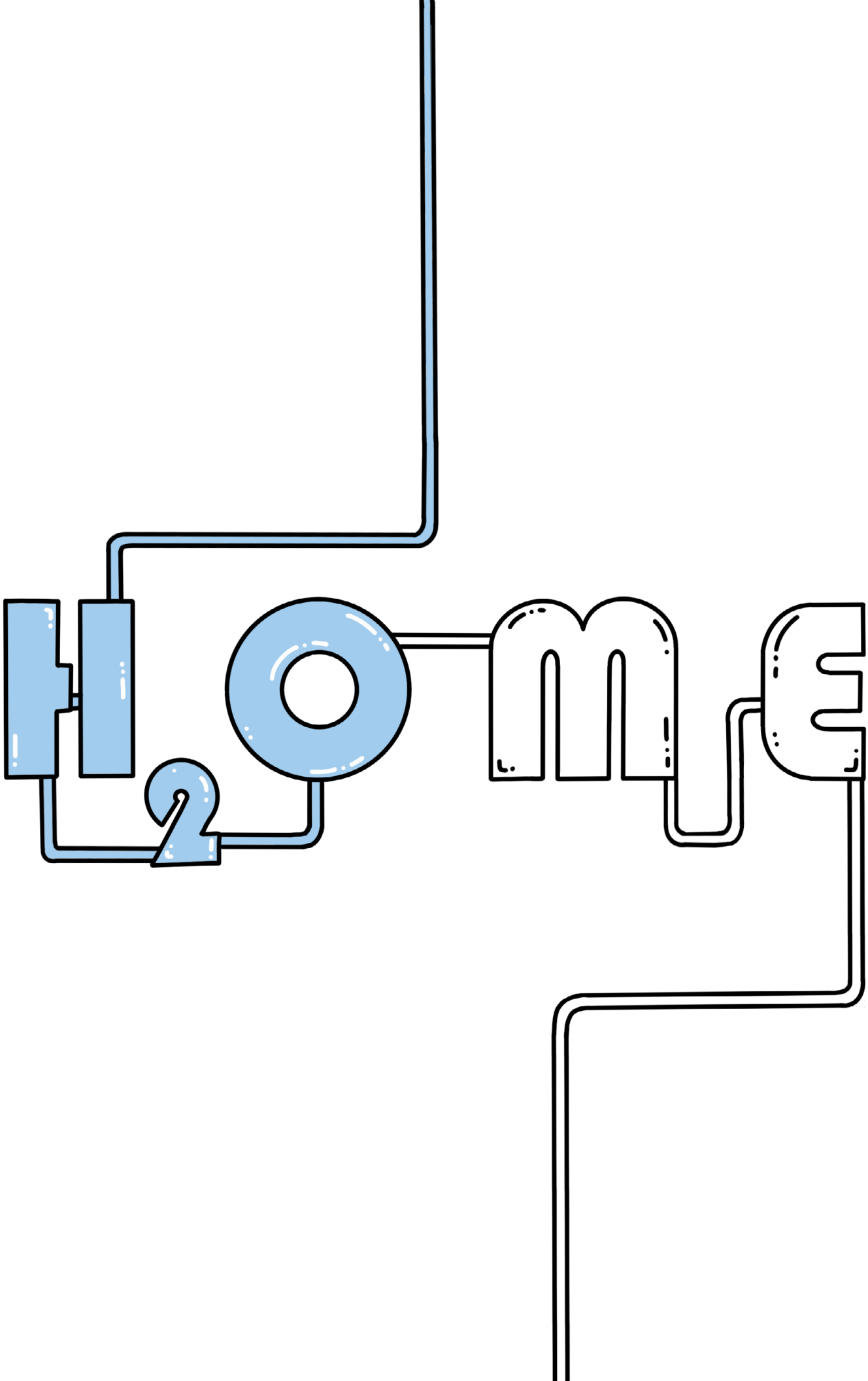
H2OME

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H_2OME 2020
Created for Carneige Mellon University and
Carnegie Museum of Natural History

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Learning In Museums, Spring 2020
Carnegie Mellon University

INTRODUCTION

Hello!

Welcome to H_2OME! This activity booklet was designed and created for the Carnegie Museum of Natural History with love and respect to an extremely relevant and regional topic of the Anthropocene - our local water system. Our hope is to help every Pittsburgher learn more about their home and regional water story. How much water do you use on a daily basis? Where does the water come from? Do you know where your wastewater goes? And what ways can YOU help improve and maintain our current water resources?

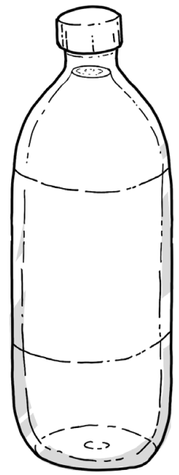
H_2OME includes a variety of activities that provide many individual and collaborative learning opportunities to you, your friends, and your family. We hope you have fun coloring, working, and building cities to learn more about your water story!

Thank you to Marti Louw and the staff at the Carnegie Museum of Natural History for their help and contributions to the research that created H_2OME!

Enjoy!

Daniel, Don & Selena
Designers and Writers

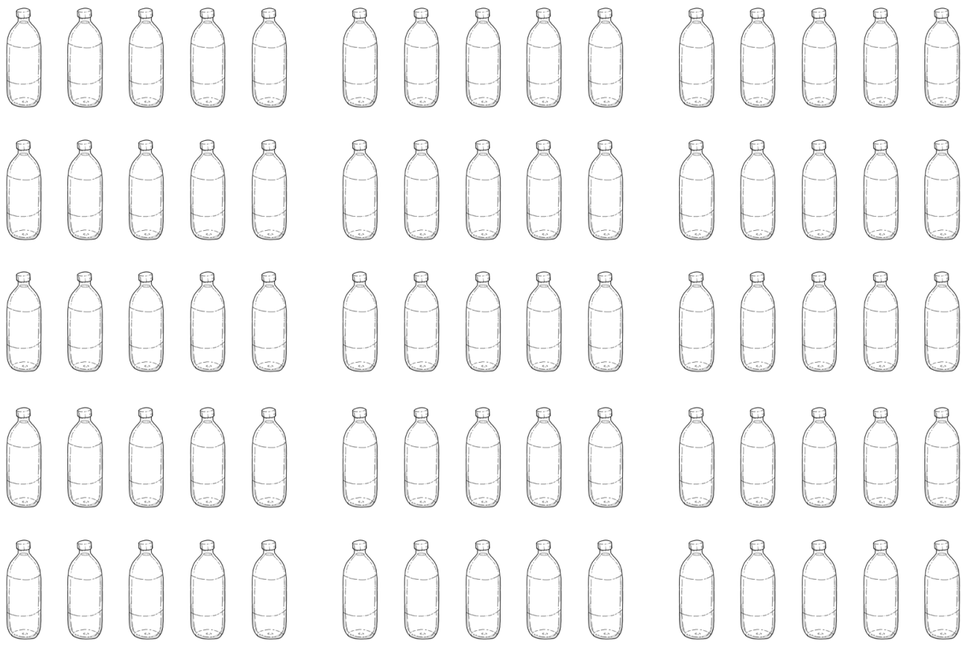
BOTTLING YOUR WATER



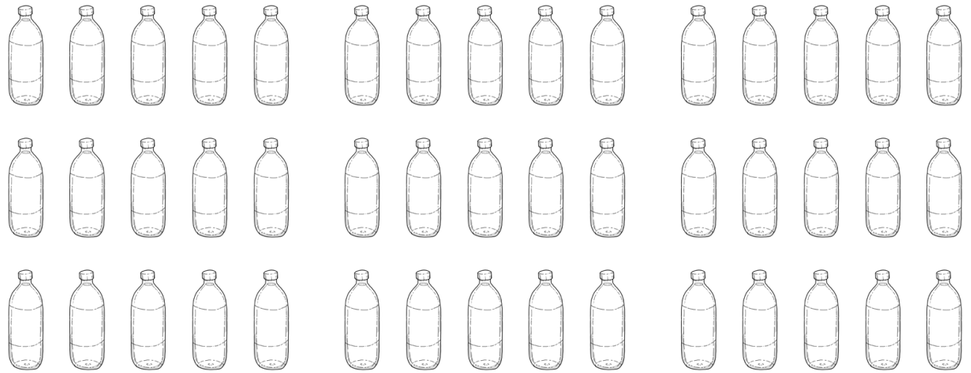
A typical bottle of water is 500 mL or 16.9 oz!

In this section, learn about water usage at home, in the form of bottles of water! First, try to answer these 3 questions before moving on to the next page! Mark off or color in the number of water bottles as your answer.

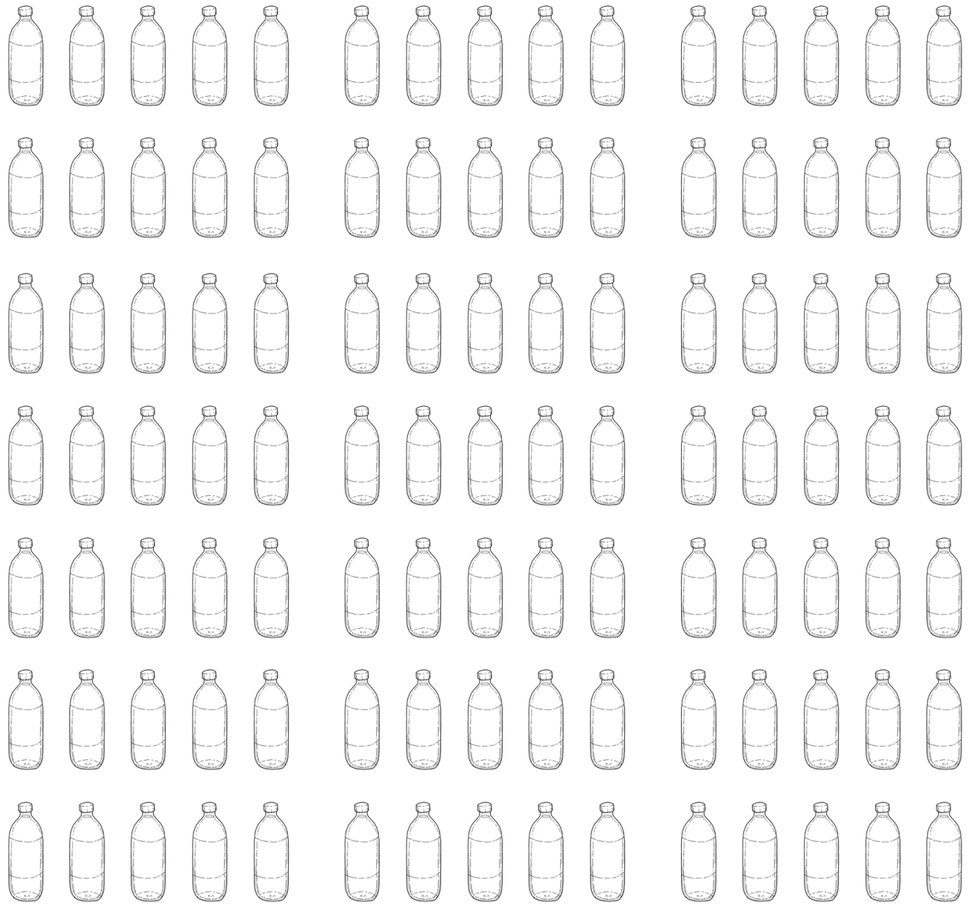
1. How much water do you think is used during a **5 minute shower**?



2. How much water do you think **one toilet flush** will use?



3. How much water do you think **one dishwasher load** will use?



COMPARE & CONTRAST

Check out the diagrams to see how much water you might use on average for each water-related activity around your home.

1 Bottle of Water

Plastic bottles of water can take about three times as much water to produce than they can actually hold!

about 3 water bottles (or 0.79 gallons)

One Toilet Flush

Older Toilet (pre-1992)

about 27 water bottles (or 3.5 gallons)

High Efficiency Toilet

about 10 water bottles (or 1.3 gallons)

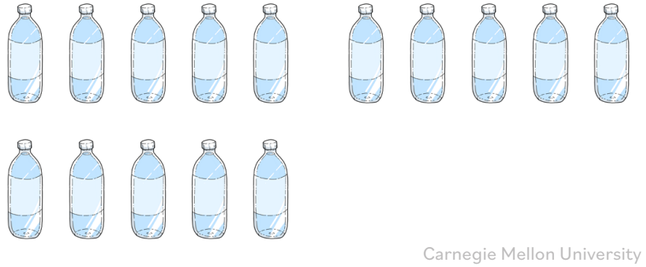
Brushing your Teeth

If the faucet was on for 30 seconds

about 4 water bottles (or half a gallon)

If the faucet was on for 2 full minutes

about 15 water bottles (or 2 gallons)



One Dishwasher Load

Older Model Dishwasher

about 99 water bottles (or 13 gallons)

ENERGY STAR® Dishwasher

about 42 water bottles (or 5.5 gallons)

Taking a Shower

5 minute shower

about 98 water bottles (or 12.5 gallons)

10 minute shower

about 189 water bottles (or 25 gallons)

WHAT ABOUT YOU?

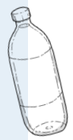
Work with your family and friends to keep track of how much water everyone has used in the bathroom. For each calculation on the next page, fill in the blue boxes using the conversions in the Bathroom Water Cheat Sheet.

BATHROOM WATER USE CHEAT SHEET

Toilet Flush

1 flush (pre 1992 toilet) ----------> **27** water bottles per flush

1 flush (with a newer or High Efficiency Toilet) -------> **10** water bottles per flush



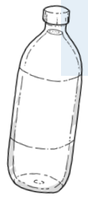
Taking a Shower

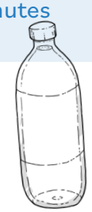
1 minute in the shower ----------> **19** water bottles per minute of showering

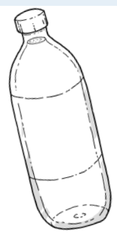
Brushing your Teeth

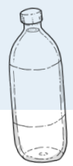
Brushed with the faucet on for 30 seconds -------> **4** water bottles per brushing

Brushed with the faucet on for 2 minutes -------> **15** water bottles per brushing









Check out these resources to learn more about home water usage and your water footprint.

home-water-works.org

watercalculator.org

Toilet

How many times was the toilet flushed today?

		total flushes
x		water bottles per flush
		total water bottles

Taking a Shower

How much total time (minutes) did your household spend in the shower?

		total minutes
x		water bottles per minute of showering
		total water bottles

Brushing Teeth

How many times did your household brush teeth with the faucet on for 30 seconds?

		total brushing
x		water bottles per brushing
		total water bottles

How many times did your household brush teeth with the faucet on for 2 minutes?

		total brushing
x		water bottles per brushing
		total water bottles

Add up the total number of water bottles! How much water did your household use in the bathroom today?

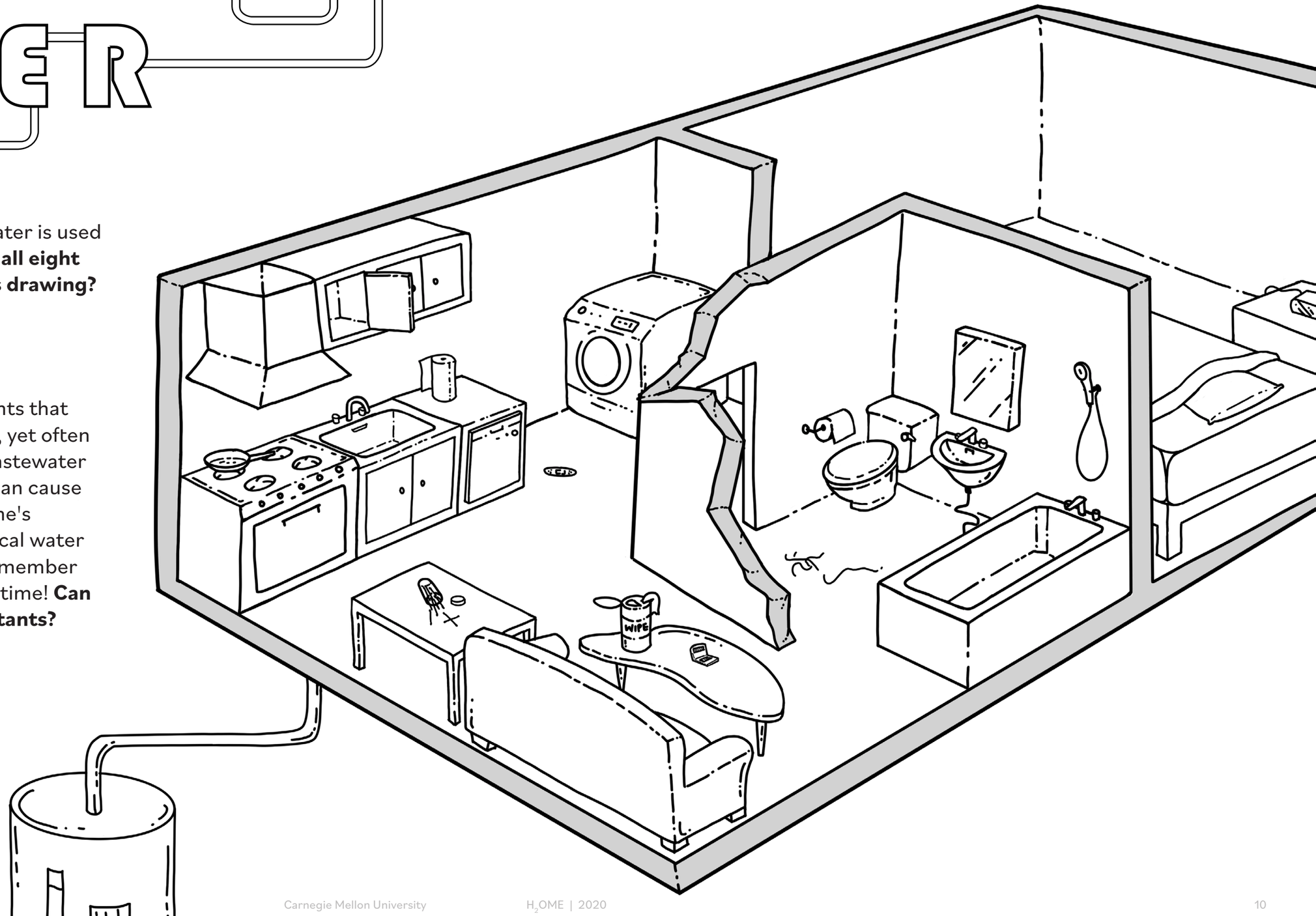
	total water bottles

FIND THE WATER

There are a lot of places where water is used in the typical home. **Can you find all eight appliances that use water in this drawing? Color them in!**

There are many domestic pollutants that shouldn't go into our wastewater, yet often do. These commonly enter the wastewater system via toilets and sinks, and can cause blockages or damage to your home's plumbing system as well as the local water resources in Pittsburgh. Try to remember to dispose of these properly next time! **Can you find all seven common pollutants? Color them in!**

Need a hint on what to look for? Turn the page and check out the list of water appliances and water pollutants on page 11.



WASTEWATER POLLUTANTS

paper towels

Paper towels do not have the same characteristics as toilet paper and do not disintegrate easily down the sewer line.

wipes

Wipes are not decomposable like toilet paper, and can lead to blockages in the sewage system.

cotton swabs

Cotton Swabs don't break down quickly, and can block drains.

hair

Hair can form giant balls which create massive blockages and also trap unwanted odors in your plumbing.

cooking grease

When fat solidifies, it becomes hard as a rock, blocking the system.

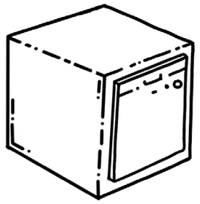
gum

Gum can act like glue, and gets stuck in the pipes, causing blockages.

bandages

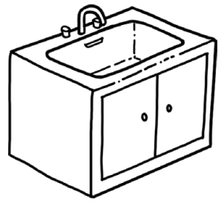
Bandages are primarily made from non-biodegradable plastic, and won't break down in water.

WATER APPLIANCES



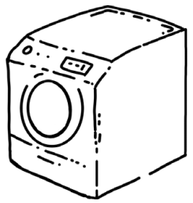
dishwasher

showerhead

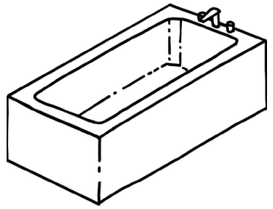


kitchen sink

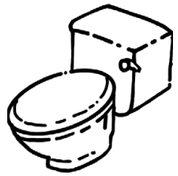
bathroom sink



washing machine

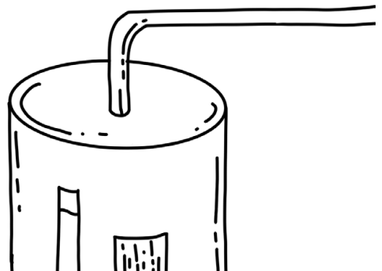


bathtub



toilet

hot water heater



TRY IT OUT AT HOME!

Take pictures of the appliances that use water in your home. Note them or draw them here. How many do you have? Do you know what they all do? What do you use the most?

Now that you know about some common pollutants that go into our wastewater systems, try to collect all of the pollutants you can find in your home! What do they look like? Why do you think they are bad for our water system? Talk with your family or friends to see how you can treat your wastewater better in the future.

Share pictures of your own water sources and water pollutants on social media with the hashtag **#H2OME.CMNH**

FLUSH IT!

CMNH EDITION

Find your way through the maze to see the geographical path that wastewater travels, from the Carnegie Museum of Natural History (CMNH) to ALCOSAN.

Our wastewater often travels a long and complicated path before reaching its final destination at ALCOSAN, where it is treated and cleaned before it is returned to the region's waterways. Because Pittsburgh sits at the junction of three rivers, protecting our waterways is fundamental to our daily lives.

Did you know?

Wastewater from the CMNH travels **67,583.73 feet (12.80 miles)** through the sewer network before reaching the ALCOSAN treatment facility.

It takes anywhere between **9 hours - 19 hours** to reach the treatment plant!

CMNH's flush passes through pipes in these communities:

Marshall-Shadeland
South Side Flats
Hazelwood
Central Business District
Chateau
South Oakland
Central Oakland
North Oakland
Squirrel Hill South
Greenfield

What is "Flush It!"?

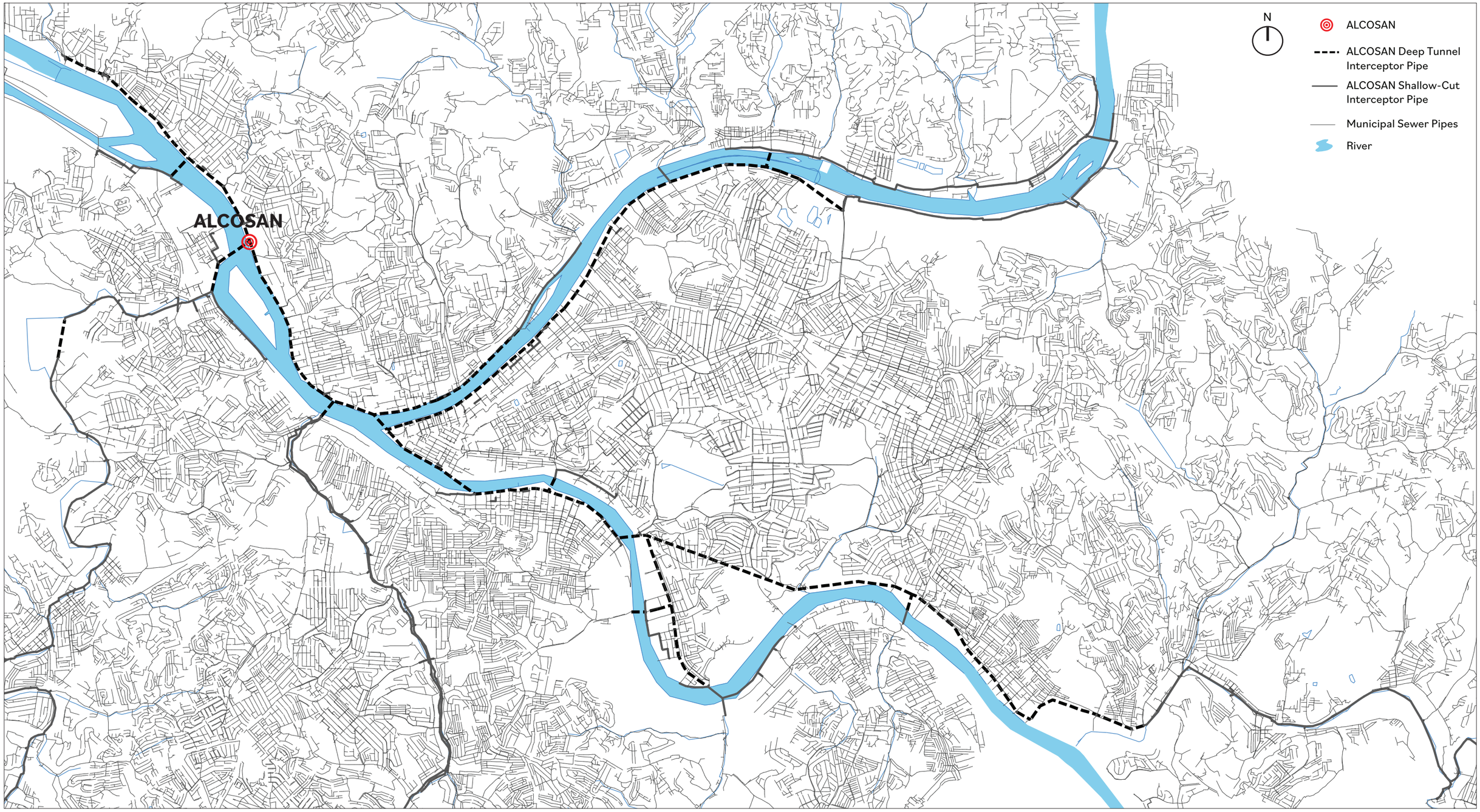
Flush It! is an interactive demo for users to explore how far and where the wastewater from a specific address goes before getting to the ALCOSAN treatment facility.

flush-it.civicmapper.com

TRY IT YOURSELF!

This map shows the sewer infrastructure network in the ALCOSAN service area. With your family or friends, use the Flush It! online tool to see the path of your wastewater; from your home, to ALCOSAN. Use a coloring utensil to trace the path here!

flush-it.civicmapper.com



WATER BEYOND SIGHT

ACROSS - Green Infrastructure

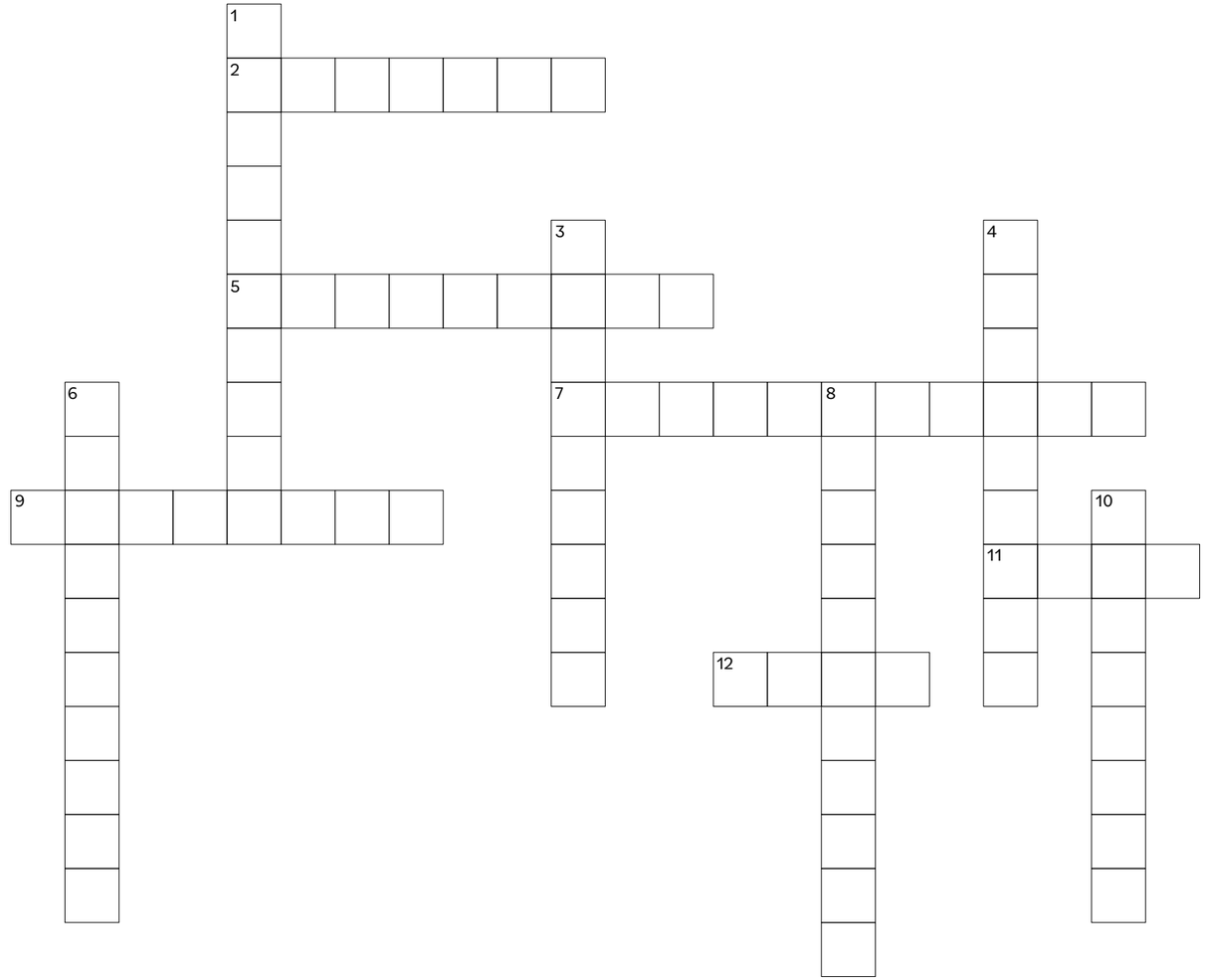
1. This green infrastructure collects rainwater from the roof of homes and captures it for later use.
3. A _____ pavement is one that catches and filters rain and water from runoff.
4. This green infrastructure covers the top of a building with vegetation to primarily absorb rainwater.
6. This green infrastructure features an area, usually placed near homes, with vegetation that collects and soaks water into the ground.
8. This green infrastructure strategy incorporates vegetation and other stormwater management elements in places where cars run or pedestrians walk. They are designed to capture rainwater at its source, and often involve bioswales, rain gardens, and permeable pavement.
10. This green infrastructure is a shallow, open channel that reduces water runoff by infiltration.

DOWN - Pittsburgh Water Infrastructure

2. The name of the sewage treatment plant that filters the wastewater from your bathtub, toilet, and sinks.
5. The name of the river that runs from Pittsburgh to New York and flows alongside Pittsburgh's sports stadiums like Heinz Field and PNC Park.
7. The name of the river that usually is a shade of brown and provides hydroelectric power to cities along its banks.
9. The _____ Park Reservoirs supply 20 million gallons of water per day and remains the only open-air reservoir in the city.
11. The name of the river that is formed by the convergence of two rivers in Pittsburgh but has been ranked one of the most polluted rivers in the United States.
12. Initials of the service that handles Pittsburgh's water treatment and sewer systems.

There are many hidden systems within our water resources, from underwater water and sewer lines, to infrastructure designed to manage our stormwater. Water serves as an integral part of our everyday lives, and it is critical that we learn about our local water story. Use the words below to complete the crossword puzzle.

PWSA	ALCOSAN	OHIO
RAIN GARDEN	GREEN ROOF	ALLEGHENY
MONONGAHELA	PERMEABLE	RAIN BARREL
HIGHLAND	BIOSWALE	GREEN STREET



LEARN MORE ABOUT PITTSBURGH'S WATER STORY

ALCOSAN provides wastewater treatment services 24 hours a day, seven days a week.

alcosan.org

3 Rivers Wet Weather (3RWW) is a nonprofit environmental organization created to address the Pittsburgh's wet weather overflow problem.

3riverswetweather.org

Pittsburgh Water and Sewer Authority (PWSA) is responsible for water treatment and delivery systems in the city of Pittsburgh

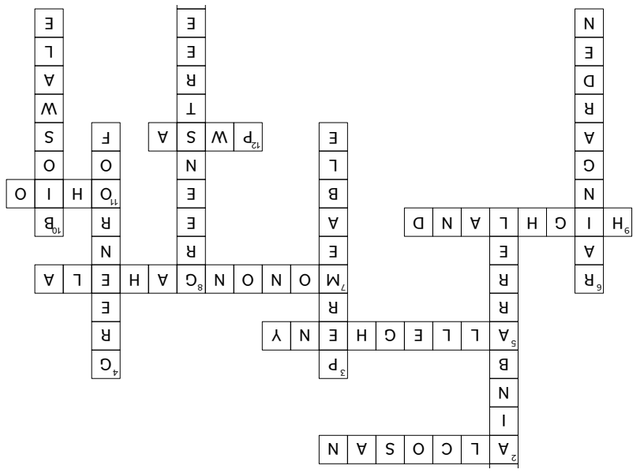
pgh2o.com

Pittsburgh Collaboratory is a platform where community and science meet to improve and sustain regional water resources, incorporate science into decision making, respond to community needs, and cultivate future water leaders.

water.pitt.edu

KEEP YOUR EYES OPEN!

Pittsburgh is full of water infrastructure! All you need to do is look; next time you take a walk or go on a drive somewhere, keep your eyes open and look for things like green infrastructure elements or hints of water/ sewer lines.



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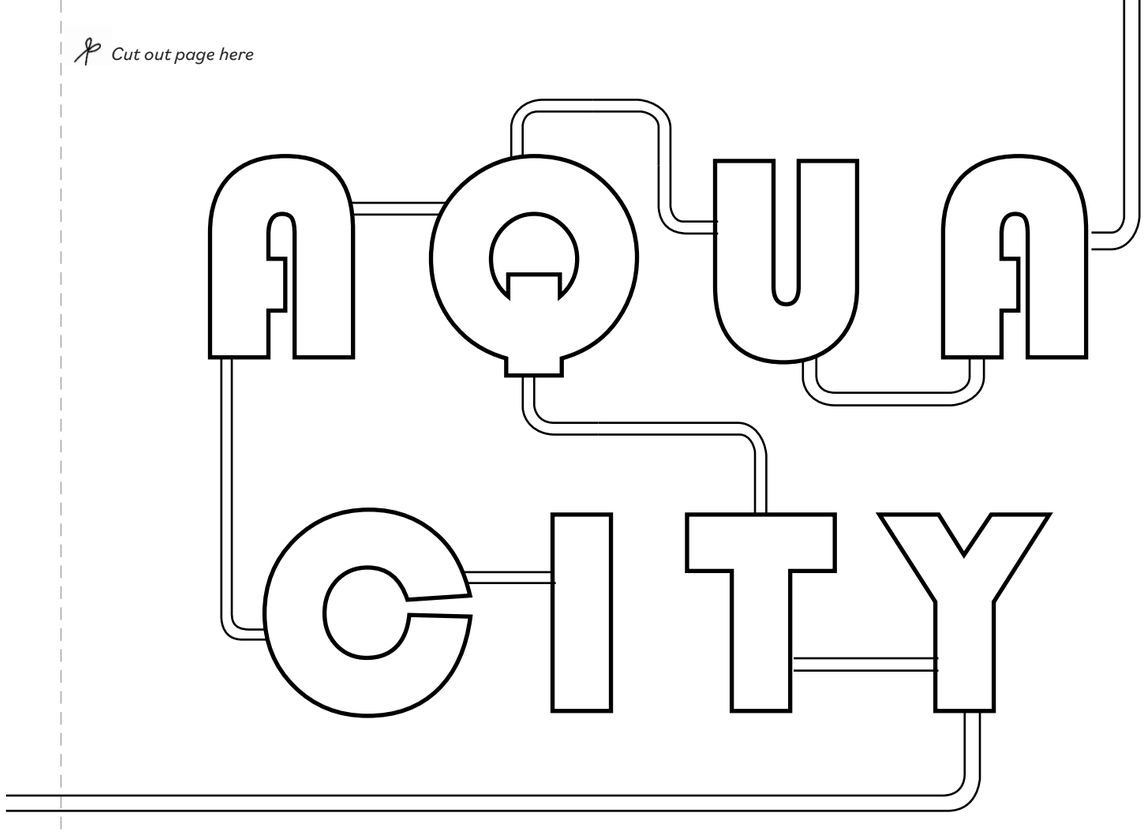

You've been voted as the mayor of Aqua City! Your first task is to help design and develop two empty blocks in the city center. As the new mayor, part of your duty should be to improve the way water is handled in the city. Try to be more water-conscious and water-sustainable, and use this activity to learn about the cause and effect of home and city infrastructure.

Feel free to color and decorate the Aqua City components as you see fit!

Cut out page here

INSTRUCTIONS

1. Cut out pages 20-27.

2. Decorate and cut out the individual infrastructure components that will be used to customize the new blocks. Additionally, decorate and cut out the individual building components where people will live and roam in your city.

3. On the map (pages 29 and 30), arrange the buildings and infrastructure components on the two empty blocks of the map. Pick and choose the elements that you'd like to include as new mayor. Don't forget that Aqua City should be water sustainable, so try to choose infrastructure components that will make your city beautiful as well as aqua-friendly. Check out the Aqua City Index to see what each infrastructure component can do for your city.

4. Finally, check how environmentally friendly your city's water-planning is by calculating your points using the Score Sheet. A higher score means your city is more water-conscious and water-sustainable!

5. Show us how you did by taking a picture of your city and sharing it on social media with **#H2OME.CMNH**

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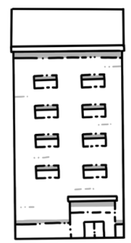
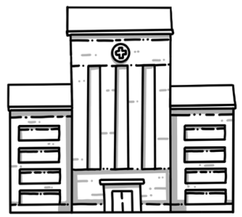
AQUA CITY INDEX

Included in your Aqua City Kit:

House (x7)



Apartment Building (x3)



Hospital (x1)

Grocery Store (x1)

Library (x1)

Rain Barrel (x6)

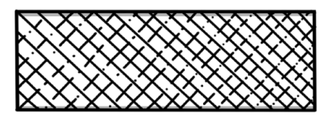
Attach any number of Rain Barrels to any building to collect rainwater.

Lawn Sprinker (x5)

Place a Lawn Sprinkler near any house or apartment building to keep the grass watered and green.

Rain Garden (x5)

Place a Rain Garden near any building to collect and absorb surrounding stormwater.



Permeable Street Paving (x2)

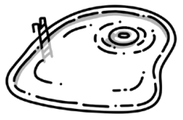
Place a Permeable Street Paving on top of any existing street to improve its water retention and runoff quality.

Flower Garden (x5)

Place any number of Flower Gardens near any buildings.

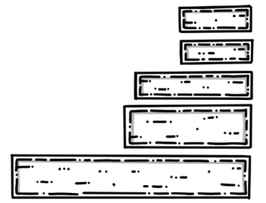
Bioswale (x4)

Use a Bioswale near a street or sidewalk to collect and filter stormwater from paved areas.



Pool (x6)

Place a Pool near a house or apartment building to provide a recreational water activity.



Green Roof (x6)

Replace the roof of the grocery store, hospital, or an apartment building with a Green Roof to absorb rainwater. Make sure you use the right size roof for each building!

Fountain (x4)

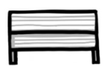
Place a Fountain anywhere to create a city water attraction.

Fish Pond (x3)

Place a Fish Pond anywhere to create a city water attraction.

Car (x7)

Place a Car on any street. Be aware that cars can create pollution in stormwater runoff!



Bench (x8)

Place a Bench anywhere to provide a great outdoor sitting area.

SCORE SHEET

Use the Score Sheet to calcuate the score of your city. How did you do? What are ways you can improve your score? Feel free to rebuild your city, then recalculate your score. A higher score means your city is more water-conscious and water-sustainable!

Component	***Points***		***Your Quantity***		***Points Subtotal***
Bioswale	2	X		=	
Permeable Street Pavement	2	X		=	
Rain Garden	1	X		=	
Green Roof	1	X		=	
Rain Barrel	1	X		=	
Flower Garden	0	X		=	
Bench	0	X		=	
Car	-1	X		=	
Fish Pond	-1	X		=	
Lawn Sprinkler	- 1	X		=	
Pool	- 1	X		=	
Fountain	- 2	X		=	

TOTAL SCORE

Cut out individual components from this page!

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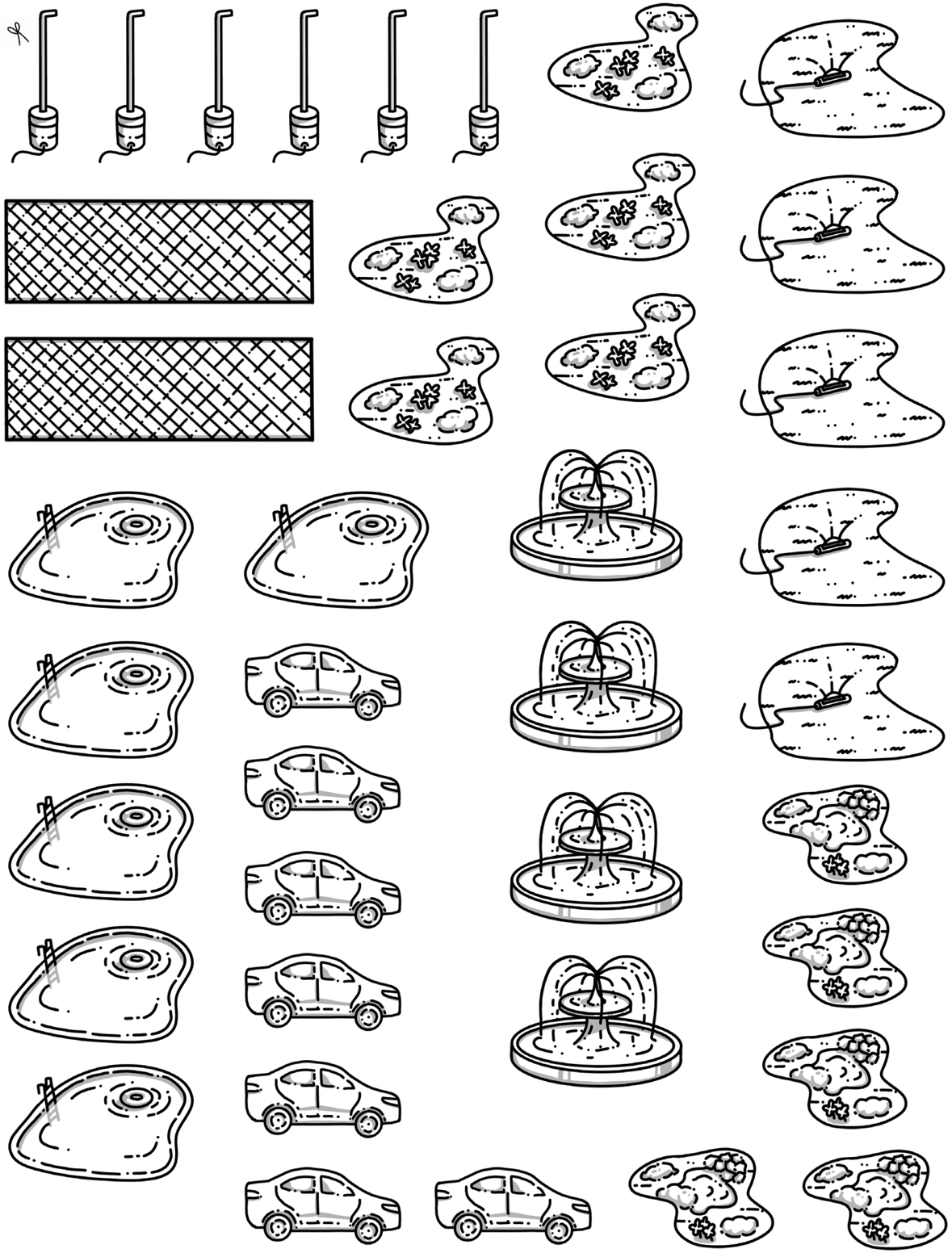

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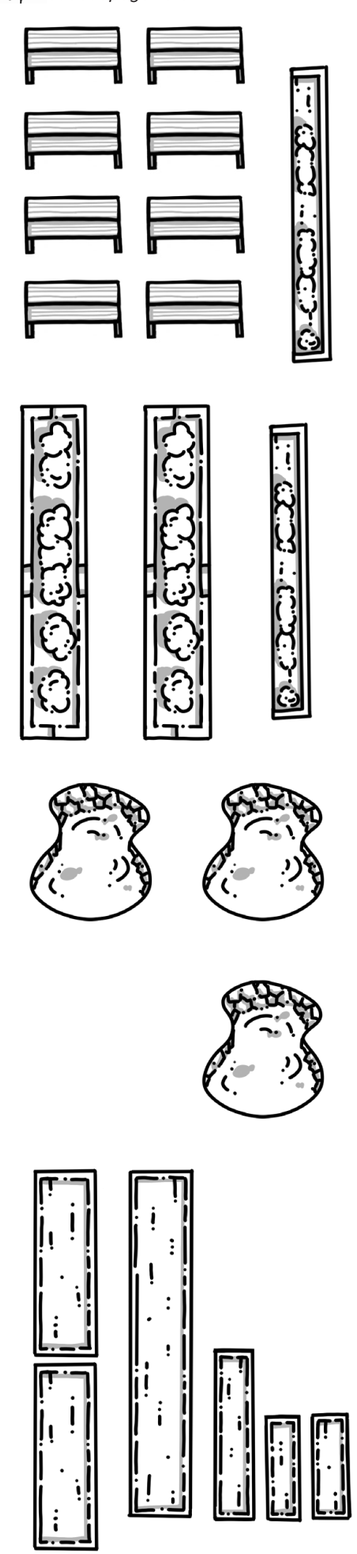
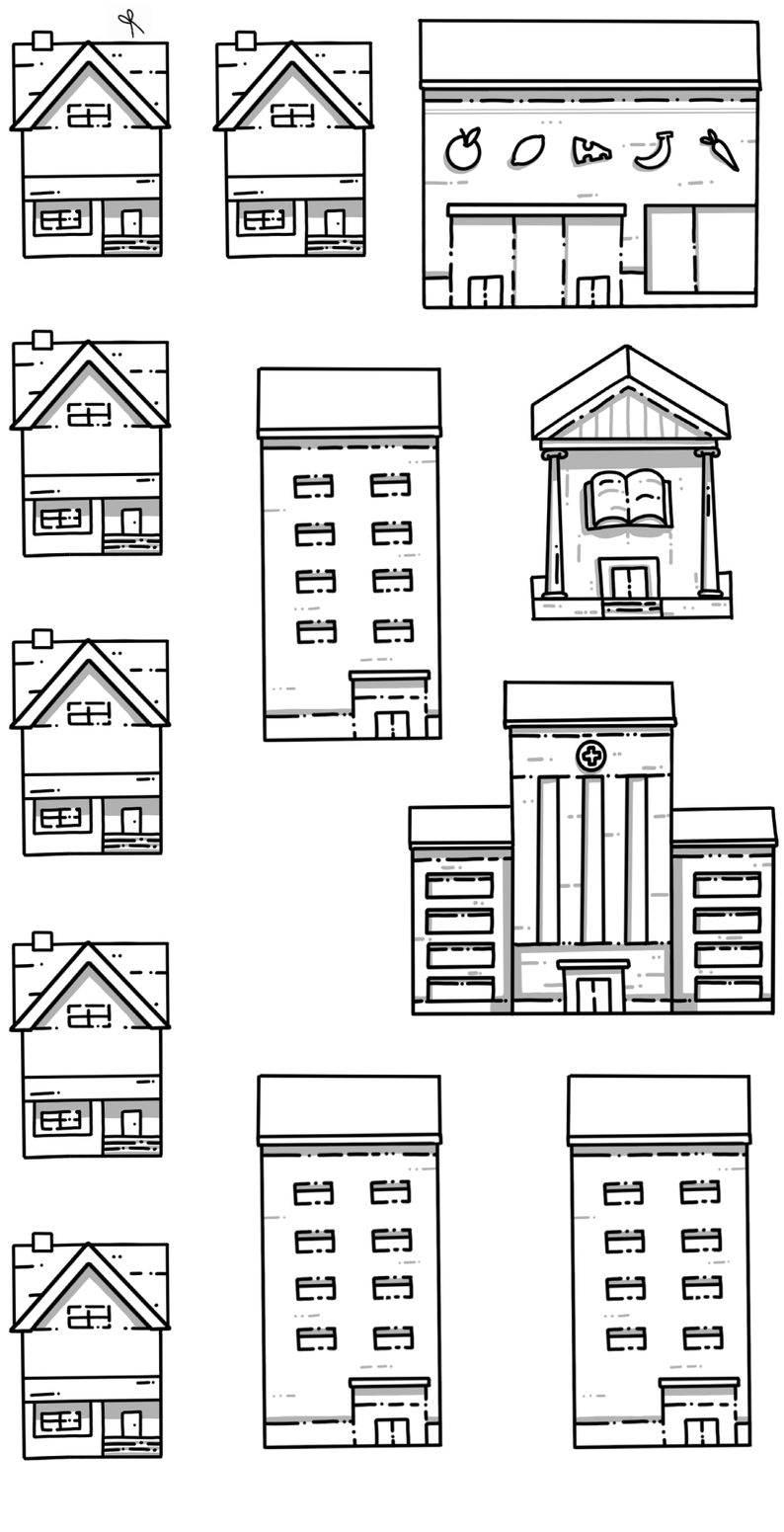


Cut out individual components from this page!



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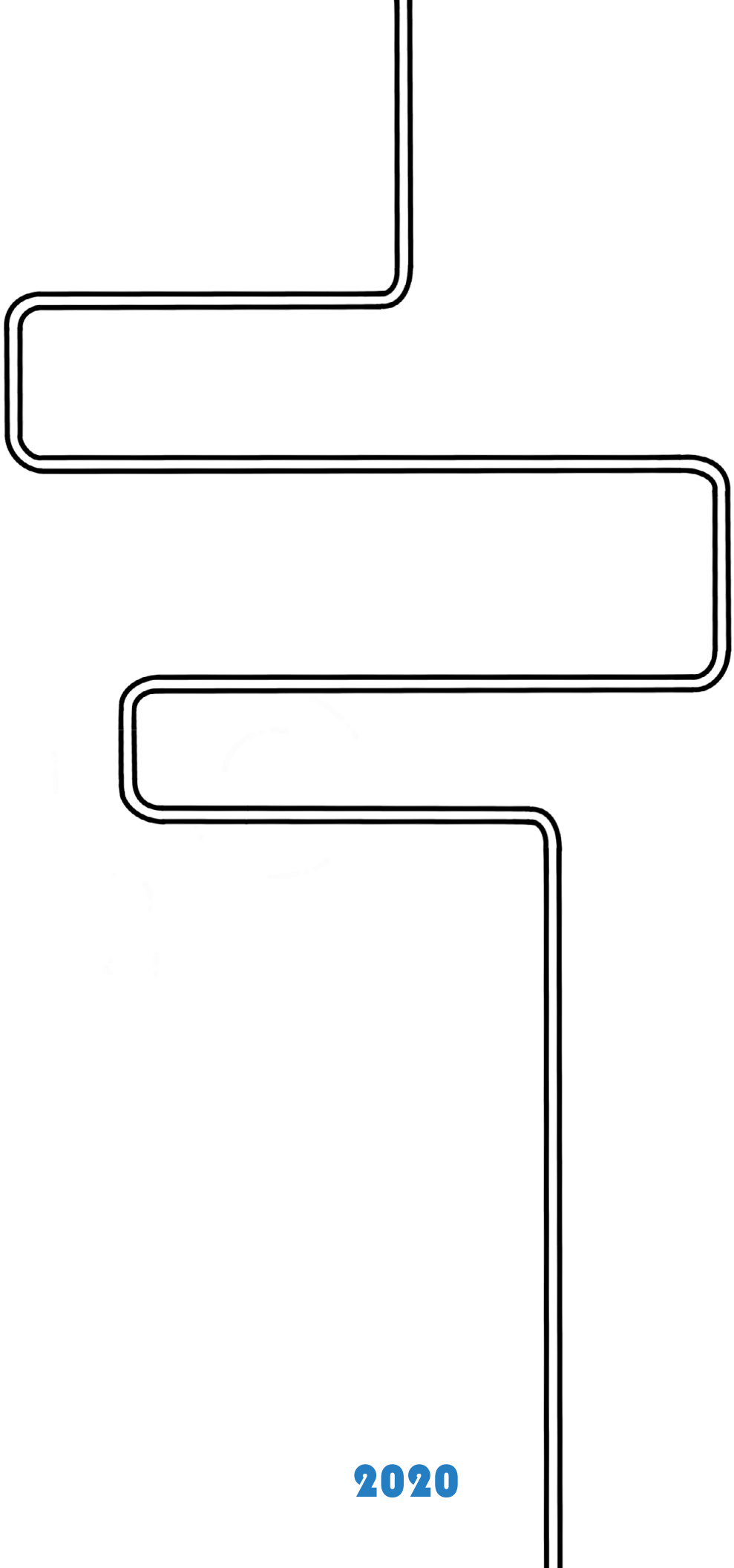

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