

LOTTs *of* Fun Water Activities

LOTT  Alliance
*Cleaning and restoring
water for our community*

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Down the Drain: A LOTT of Water

Why care about water?

Water is needed by all life on earth. People, plants, and animals all need water to live. We need water to drink, bathe, and grow food. We enjoy water all around us in the form of rivers, lakes, and Puget Sound.

How much water do we use?

Believe it or not, each person uses up to 100 gallons of water every day for drinking, cooking, bathing, flushing toilets, laundry, washing cars, and watering lawns. The water we use comes from **groundwater**. Groundwater is trapped in rock and sand layers and underground lakes and rivers called **aquifers**. We use wells to pump groundwater to the surface.

What is wastewater?

All the water we use in our homes that goes down the drain is **wastewater**. This includes water from baths, showers, sinks, dishwashers, washing machines, and toilets.

Where does our wastewater go?

Wastewater from homes goes one of two places:

If your home has a **septic tank**, the wastewater is piped into a large tank buried in your yard. Inside the tank, solid material sinks to the bottom and the liquid flows out into an underground layer of rocks called a **drainfield**. Water in the drainfield slowly filters through the soil to be cleaned naturally.

If your home connects to a **sewer system**, the wastewater flows into a series of pipes under the street. The sewer pipes carry the wastewater from homes and businesses to a **treatment plant** for cleaning.

Why must the wastewater be cleaned?

By the time the wastewater reaches the treatment plant, this dirty water is somewhat green in color. It usually looks and smells pretty bad. Most of it (about 99.5%) is water. A very small amount (about 0.5%) is actual waste.

Wastewater contains pollutants like bacteria, soaps, and chemicals. If the water was not cleaned or **treated** it could pollute our groundwater, lakes, rivers, and Puget Sound and make people very sick. Polluted water is also harmful to wildlife and the environment.



Who cleans the wastewater in our community?

The LOTT Alliance cleans wastewater collected from the sewer systems of Lacey, Olympia, and Tumwater. Most of the wastewater is treated at the **Budd Inlet Treatment Plant** in Downtown Olympia.

Who is LOTT?

The initials L-O-T-T stand for Lacey, Olympia, Tumwater, and Thurston County – the four partners in the **LOTT Alliance**.

What does the LOTT Alliance do?

The LOTT Alliance runs the Budd Inlet Treatment Plant and two Reclaimed Water Plants. By treating the wastewater generated in our communities, LOTT has an important responsibility to help protect our health, our water, and our environment. The LOTT Alliance takes care of, plans for, and builds wastewater treatment facilities that are needed as our communities grow.

Who runs the LOTT Alliance?

Each of the four partners selects one member as their representative to a group of leaders called a **Board of Directors**. LOTT's Board of Directors makes important decisions about how much LOTT charges its customers, how it will spend its money, what improvements are needed, and when new projects should begin.

The 123's of Wastewater Treatment



What does "treatment" mean?

The process of cleaning wastewater is called **treatment**. In nature, water is slowly cleaned as it is absorbed by plants, filtered down through the soil, and cleaned by microscopic bugs called **bacteria**. Nature's way of cleaning water takes months or even years.

Because we create so much wastewater every day, we need a faster way to clean it. A wastewater treatment plant can clean water in less than one day.

What happens to wastewater at the Plant?

Wastewater goes through many stages of cleaning at the Budd Inlet Treatment Plant:

Primary Treatment: Screening & Sinking

Step 1: Taking Out the Trash

Wastewater flows through a **metal screen** with many holes. The holes are big enough to let water through, but small enough to screen out trash like rags and sticks.

Step 2: Goodbye Grit

Next, the wastewater flows through a **grit chamber** where sand and other heavy stuff sinks to the bottom.

Step 3: Sink or Skim?

The wastewater is slowed down as it moves through the **primary clarifiers** so the tiny particles left in the cloudy water can either float to the top (**scum**) or sink to the bottom (**sludge**). This leaves the water in between much cleaner. The scum is skimmed off, the sludge is pumped out, and the cleaner water in the middle is ready for **secondary treatment**.

Secondary Treatment: Helpful Bugs at Work

During secondary treatment, nitrogen and other pollutants are removed from the wastewater using bacteria that are naturally present in the wastewater flow.

Step 4: Mixing Things Up

Secondary treatment begins in the **aeration basin**. This basin is like a cafeteria for an army of hungry bacteria that eat the waste and break down pollutants in wastewater. These hardworking bugs need oxygen to breathe so plenty of air is added in a process called **aeration**. This bubbly, buggy mixture is called **mixed liquor**.

Step 5: It's a Gas!

The mixed liquor flows into the **anoxic basins**. Back in the aeration basin the bugs were given oxygen – but not in the anoxic basins. Anoxic means "no air." The bugs are forced to get their oxygen from nitrogen compounds in the mixed liquor. As the bugs use the oxygen, the nitrogen is released as a harmless gas that is part of the air we breathe.

Step 6: Settling Things Down

Mixed liquor from the second anoxic basin flows into the **secondary clarifier**. The bugs, fat and heavy from eating, sink to the bottom of the clarifier leaving cleaner, clearer water at the top. The clean water flows out of the top of the clarifier. The bugs at the bottom are pumped back to the anoxic basin to continue their cleanup work.

Step 7: Bye Bye Bacteria

The last part of the treatment process is called **disinfection**. During this stage, the water flows through special channels filled with bright **ultra-violet (UV) lights** that stop disease-carrying bacteria from multiplying.

Step 8: Let It Flow!

By the time the cleaned water or **final effluent** leaves the Plant, it has been disinfected and almost all of the solid particles and pollutants have been removed. Most of the final effluent is released into Budd Inlet. The rest is sent to LOTT's **Budd Inlet Reclaimed Water Plant** for even more cleaning. This extra cleaning is called **Tertiary Treatment**.



Class A Reclaimed Water is a valuable resource for our communities.

Tertiary Treatment: Ready for Reuse

At the Budd Inlet Reclaimed Water Plant, the final effluent moves through a sand filter for additional cleaning. After the water is filtered and disinfected with chlorine, this reclaimed water is clean, safe, and ready to be used again for almost everything but drinking. Each day, LOTT's Budd Inlet Reclaimed Water Plant in Downtown Olympia makes up to one million gallons of **Class A Reclaimed Water** – the highest rating for reclaimed water in the state of Washington.

LOTT also makes Class A Reclaimed Water in Lacey at the Martin Way Reclaimed Water Plant. From there, the reclaimed water travels through a **purple pipeline** to the Hawks Prairie Reclaimed Water Ponds. In the future, LOTT will produce reclaimed water for use in all three cities: Lacey, Olympia, and Tumwater. The water can be used for things like flushing, washing, and irrigation

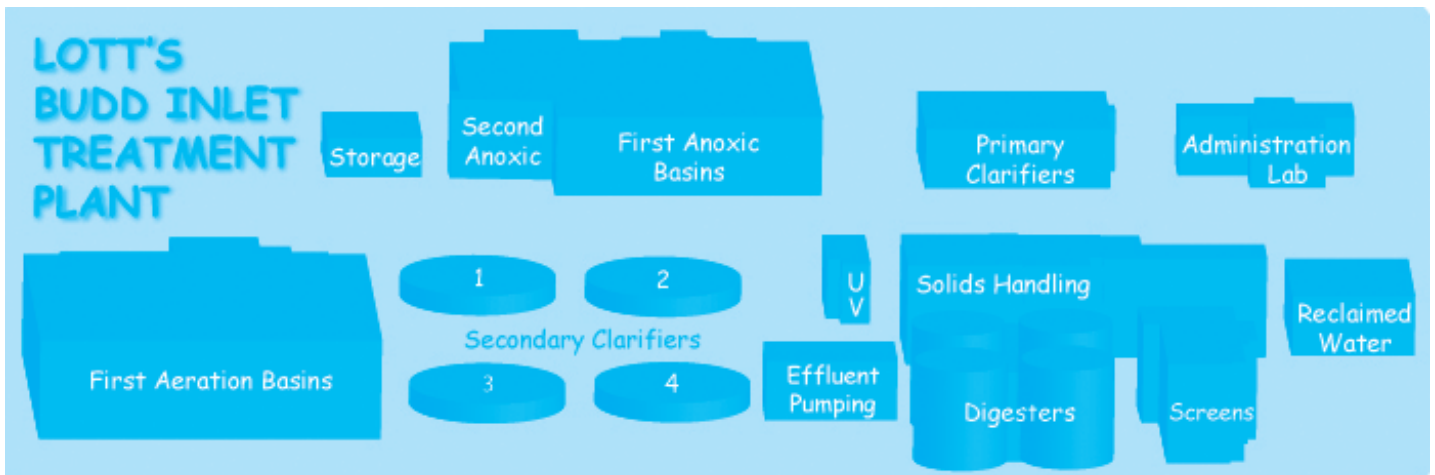
(watering grass, trees, and shrubs). Reclaimed water is sometimes used to recharge or “add water to” ground-water, lakes, streams, or wetlands.

Solids Treatment: Recycling Times Two

Sludge, the semi-solid material that settles out during the treatment process, is sent to a special area in the Plant for treatment. Liquid is removed and the sludge is thickened before it is pumped into **digesters**. In the digesters, the sludge is heated and mixed for at least 15 days to reduce the amount of harmful bacteria. The sludge is then transferred to a centrifuge where it spins so fast that excess water is removed. The dewatered solids that are left behind are called **biosolids**.

Biosolids are nutrient-rich, making it good for use as fertilizer and compost. Biosolids from the Plant are trucked to other parts of the state and composted or used as fertilizer for non-food crops such as hay.

Biosolids aren't the only thing that is recycled from solids handling. In the digesters, **methane** gas is produced as the sludge breaks down. The gas is collected and used as energy to help heat buildings at the Treatment Plant and the sludge in the digesters!



Are You Using Water Wisely?



Why is water conservation important?

Water conservation means saving the water we have by using it wisely. With so much water around us, it might seem like there is no need to save it. Saving water is important for several reasons:

- **Water is a limited resource.** Little of Earth's water is available to be used as drinking water. If all the world's water could fit in a gallon jug, the freshwater available to us would only equal about one tablespoon!
- **Fish and wildlife need water too.** Most of the drinking water in Thurston County comes from groundwater. Groundwater also feeds many of our lakes and streams. Conserving water can save more water for fish and wildlife.
- **Conserving water saves money.** Most of us pay a water utility to store and pipe drinking water to our homes and businesses. By using less water, the utility doesn't have to spend as much money to make their system bigger. This means we pay less on monthly water bills.

Thurston County gets about 51 inches of rain every year. That's a lot of water! But only about two inches falls in July and August when our lawns and gardens need it most.

High demand for water in the summer means local water utilities have to work harder to get the water to us. This adds to their costs which can increase our water bills.

Save water in the bathroom:

Did you know? More water is used in the bathroom than any other room of your house!

- **Take showers instead of baths.** A tub bath can use up to 30 gallons of water. A 5-minute shower uses about 10 gallons. The shorter the shower, the less water you use.
- If you must take a bath, **use only the amount of water needed to get good and clean.**
- Toilets use the most water in your home – up to 27 gallons per day, per person. **Flush the toilet only when necessary and don't use the toilet as a garbage can.**
- **Turn off the water when washing your face and hands, and while brushing your teeth.** You could save up to 6 gallons of water per day!
- Dripping and leaky faucets can waste hundreds of gallons of water each year. **If you notice a leak, tell an adult right away so they can fix it.**
- Don't Be a Drip! **Make sure to turn your faucets all the way off to avoid wasting water.**

Save water in the kitchen:

- **Run the dishwasher only when it's completely full and use the short cycle** – it uses less water.
- When washing dishes in the sink, **fill one side with hot soapy water for cleaning and the other side with cool water for rinsing.** You'll send less water down the drain.
- Kitchen faucets can use up to 3.5 gallons of water per minute. **Avoid running warm water from the tap to get cool water for drinking.** Instead, keep a pitcher of water in the refrigerator so it's always cool when you need it.

Save water in the laundry room:

- Washing machines can use up to 15 gallons of water per person, per day. **Wash full loads when possible and match the water level to the size of each load.**
- Buy smart and save! **Buy a water-efficient washing machine and save about 15 gallons per load.** LOTT customers may be eligible for a \$100 rebate for choosing a "water efficient" model.

WaterWise Crossword



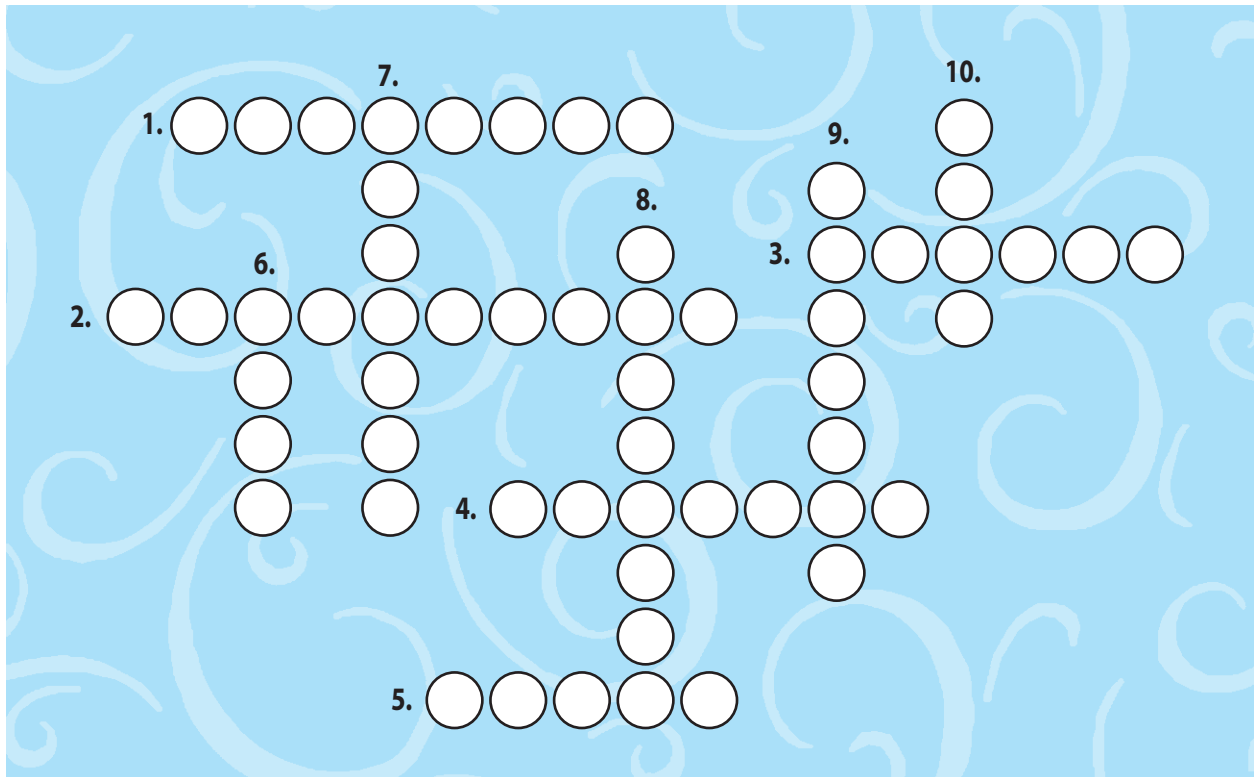
Word Key			
showers	water	save	faucets
toilet	rain	resource	utility
	conserve	dishwasher	

Across:

- _____ water by using it wisely.
- Only run the _____ when its full.
- Don't use the _____ as a garbage can.
- Check _____ for leaks.
- Don't let the _____ run when you brush your teeth.

Down:

- Using less water can help you _____ money on your water bill.
- Short _____ use less water.
- Water is a limited _____.
- A water _____ stores and pipes water to homes and businesses.
- We get about 51 inches of _____ each year in Thurston County.



“Laugh Out Loud” LOTT Libs!

How To Play:

Without reading the sentences aloud, ask a friend or group of friends for the type of word needed and fill in the blanks. When all the blanks are filled in, read your goofy sentences for all to hear!

Remember These Helpful Tips...

NOUN: a person, place or thing (fork, baseball, airplane)

PLURAL: more than one (try adding an “s” to the end)

VERB: an action word (kick, eat, swim)



Wastewater is the _____ that goes down the drain when we brush our teeth.
LIQUID

_____ carry wastewater to the _____. Once it
PLURAL NOUN PLACE *

arrives, the wastewater moves through _____ where it is cleaned with
PLURAL NOUN

_____ and _____. The _____ cleans
PLURAL NOUN PLURAL NOUN PLACE (* from line 2)

up to _____ gallons of wastewater every day. The treated water, also called
NUMBER

_____ is pumped into the _____. You can conserve water
NOUN NOUN

by taking fewer _____, fixing dripping or leaky _____,
PLURAL NOUN PLURAL NOUN

and turning off the water when you _____ your _____.
VERB PLURAL NOUN

Another tip to remember is: never use your toilet as a _____.
NOUN

Treatment Trivia



Tub baths can use three times as much water as a shower!

1. In which room of the house is the most water used?

- a. bedroom
- b. kitchen
- c. bathroom
- d. living room

2. True or False? Hungry bugs break down waste and eat pollutants during wastewater treatment.

T F

3. UV light is used to disinfect treated wastewater and stop bacteria from:

- a. diving
- b. reading
- c. floating
- d. hiding
- e. multiplying

4. True or False? Nature cleans wastewater faster than a treatment plant.

T F

5. What kind of filter is used to make Class A Reclaimed Water at the Budd Inlet Reclaimed Water Plant?

- a. coffee filter
- b. oil filter
- c. carbon filter
- d. sand filter
- e. spam filter

6. What color are the pipes that carry Class A Reclaimed Water?

- a. grey
- b. green
- c. purple
- d. orange
- e. rainbow

Draw something you saw on your tour of the Budd Inlet Treatment Plant:

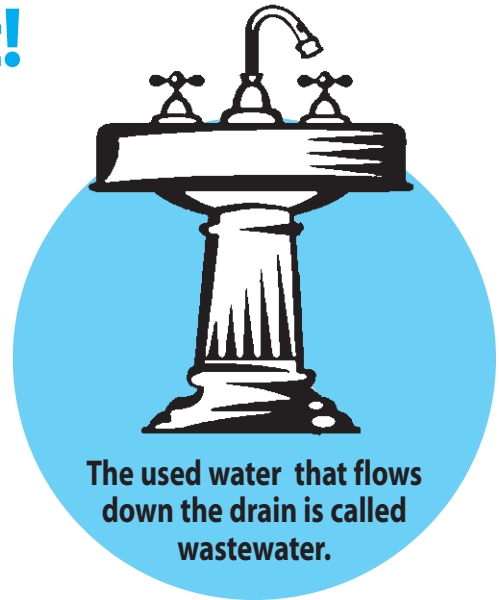
A large, empty rectangular box with a white background, intended for a drawing. It is surrounded by a light blue border with a subtle pattern of water droplets and waves.

Be an Effluent Expert!

How To Play:

Use a vocabulary word from this list to complete the sentences below:

aeration	anoxic	bacteria
effluent	nature	stages
sludge	treatment	ultra-violet
	sewer	

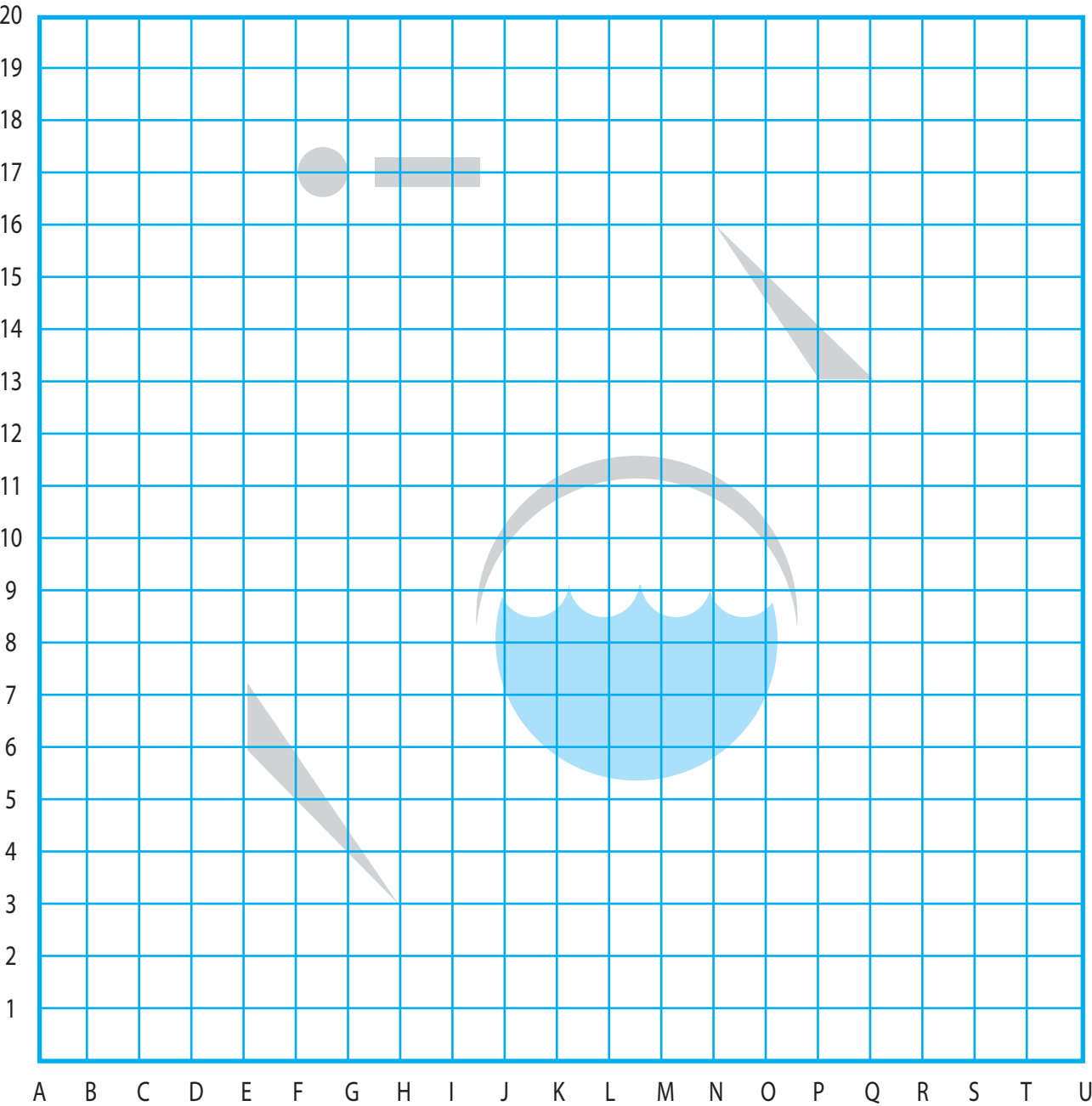


1. Wastewater travels to the treatment plant through the _____ system.
2. The process of cleaning wastewater is called _____.
3. At the Budd Inlet Treatment Plant, wastewater goes through many _____ of cleaning.
4. A wastewater treatment plant cleans wastewater faster than _____.
5. Hungry _____ help remove pollutants from wastewater.
6. In the primary settling tank, scum floats to the top and _____ sinks to the bottom.
7. Adding oxygen to the wastewater is called _____.
8. _____ means "no air".
9. Bright _____ light stops bacteria from multiplying.
10. The treated water is called _____.

Pinpoint Picture

How To Play: Put a dot on the point where the numbered and lettered lines meet. Connect each dot to the next – in order – to “pinpoint” a task at home where making small changes can conserve a lot of water.

- | | | | | | | |
|--------|---------|---------|--------|----------|----------|----------|
| 1. G-4 | 3. E-18 | 5. N-16 | 8. H-3 | 10. Q-13 | 13. P-12 | 15. I-4 |
| 2. E-6 | 4. N-18 | 6. E-16 | 9. Q-3 | 11. I-13 | 14. P-4 | 16. I-11 |
| | | 7. H-13 | | 12. I-12 | | |



Reclaimed Water Word Search

How To Play: Search for the words in the list below. Look up, down, backwards, and diagonally.

G	R	O	U	N	D	W	A	T	E	R	R	E	C	H	A	R	G	E
R	E	C	K	U	U	F	E	R	H	O	Y	T	E	S	B	Y	Z	L
E	E	D	K	P	S	U	S	T	A	I	N	A	B	L	E	J	M	O
I	W	C	Z	Z	T	T	F	B	L	L	N	V	R	D	S	V	T	T
R	D	S	B	D	S	S	E	F	B	A	H	Y	J	B	B	R	G	T
I	F	A	G	D	U	T	Y	Z	E	Q	N	C	D	G	U	E	R	A
A	R	T	M	P	P	O	P	F	E	V	B	D	J	Y	D	R	F	L
R	E	E	A	S	P	H	A	C	B	J	I	Y	S	N	D	S	W	L
P	S	L	W	Q	R	S	D	F	N	O	I	T	A	G	I	R	R	I
S	K	L	L	G	E	E	S	V	G	Y	N	K	R	Z	N	D	F	A
K	W	I	D	E	S	S	N	M	T	U	J	E	F	D	L	R	G	N
W	W	T	T	L	S	S	T	T	F	H	T	J	D	G	E	R	G	C
A	N	E	I	B	I	F	E	Z	S	A	D	H	F	S	T	R	D	E
H	Q	P	P	I	O	L	F	W	W	A	T	E	R	P	O	N	D	S
F	G	L	Y	S	N	F	R	D	Z	B	Y	U	K	H	D	A	S	E
V	B	A	N	N	J	H	E	F	R	Y	U	I	O	P	M	H	G	F
R	E	N	C	E	M	M	A	R	T	I	N	W	A	Y	D	A	S	D
R	G	T	H	S	I	D	S	E	T	U	O	K	M	J	H	N	K	D
H	S	E	F	A	D	S	R	E	P	L	I	R	D	Y	S	K	E	M
D	F	T	L	A	S	B	U	Z	E	U	M	C	L	A	S	S	A	P
A	F	C	S	F	H	I	N	S	D	F	G	J	I	N	Y	F	D	A
A	E	A	D	F	T	N	A	L	P	T	N	E	M	T	A	E	R	T
R	T	W	A	T	E	R	C	O	N	S	E	R	V	A	T	I	O	N
P	Z	E	N	I	L	E	P	I	P	E	L	P	R	U	P	T	Y	D

reclaimed water
wetlands
LOTT Alliance
sustainable

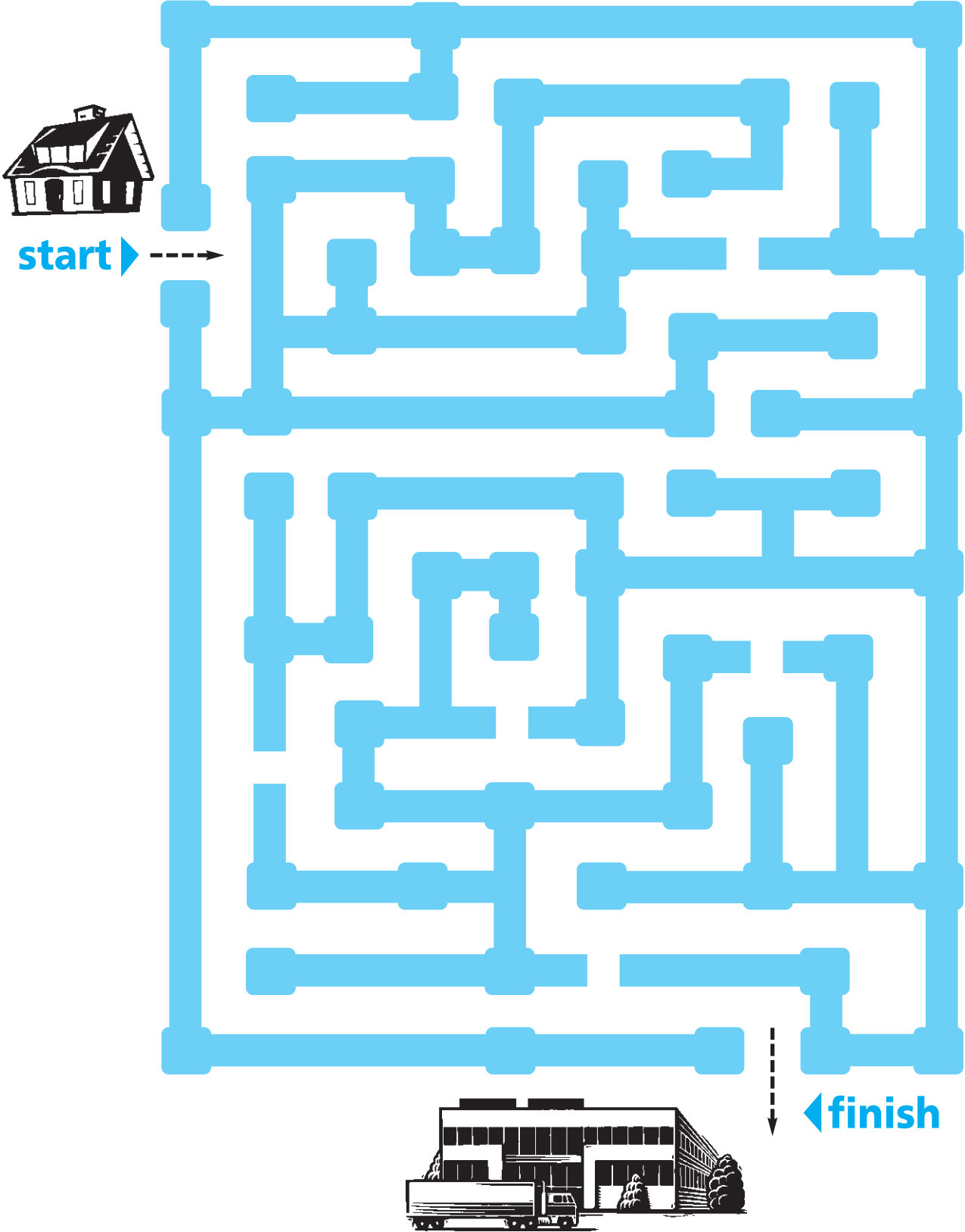
Class A
purple pipe
irrigation
dust suppression

Budd Inlet
treatment plant
groundwater recharge
Hawks Prairie

Martin Way
water ponds
water conservation
satellite plant

Pipeline Puzzler

How To Play: Find a path to get the wastewater flowing from the house to the treatment plant.



Answer Key

Page 5 WaterWise Crossword

- | | | |
|---------------|-------------|------------|
| 1. conserve | 5. water | 9. utility |
| 2. dishwasher | 6. save | 10. rain |
| 3. toilet | 7. showers | |
| 4. faucets | 8. resource | |

Page 7 Treatment Trivia

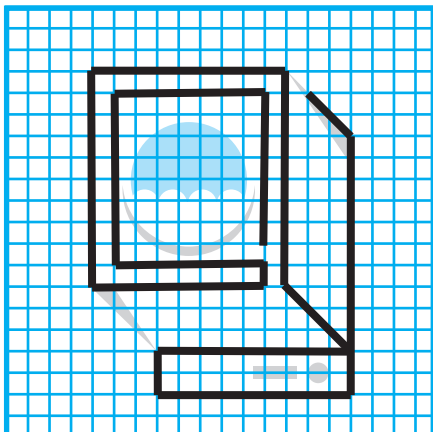
- | | |
|------------------|------------------|
| 1. c/bathroom | 4. False |
| 2. True | 5. d/sand filter |
| 3. e/multiplying | 6. c/purple |

Page 8 Be an Effluent Expert

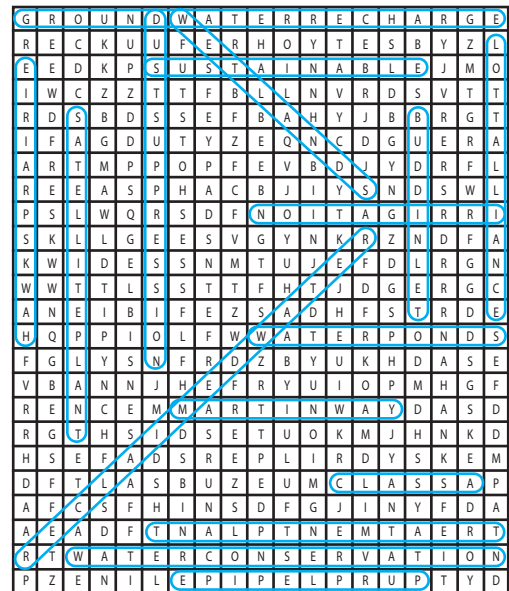
- | | | |
|--------------|-------------|-----------------|
| 1. sewer | 5. bacteria | 9. ultra-violet |
| 2. treatment | 6. sludge | 10. effluent |
| 3. stages | 7. aeration | |
| 4. nature | 8. anoxic | |

Page 9 Pinpoint Picture

Answer: A Washing Machine!



Page 10 Reclaimed Water Word Search





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