WELCOME!

While we gather... click the annotate button on your Zoom toolbar, then click "text." Click on this slide and type in your answer to the following question:

What is one lesson or activity you remember enjoying at school?

www.wichita.edu/workinwater

You've got your own page!
www.wichita.edu/workinwater

Work in Water Experience

Work in Water Internship

1. Hands-on Lesson
2. Field Trip!

WORKING WITH HIGH SCHOOLERS

Don’t panic!

Apply topics to their lives

Be yourself

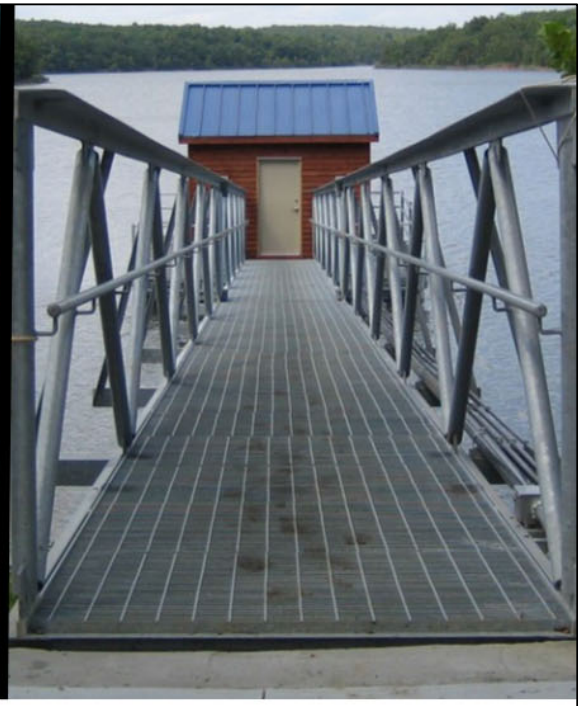
Treat them as adults

Be sensitive to differences

Ask open-ended questions

Wait >5 seconds for answers

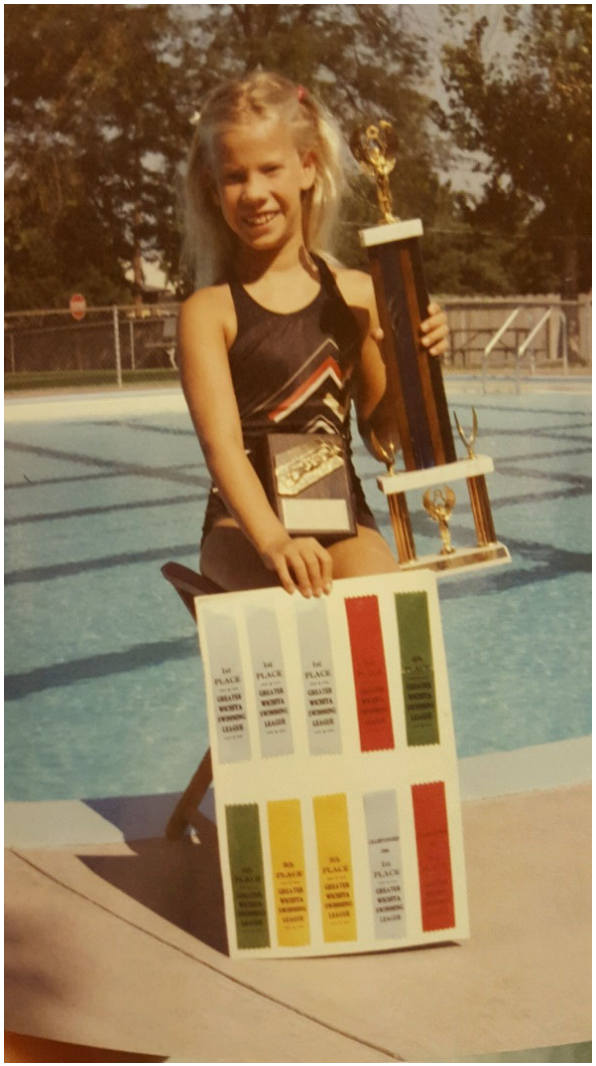
Have fun together



WATER WORKSHOP

WORK in WATER

advancing water careers in Kansas



Me.

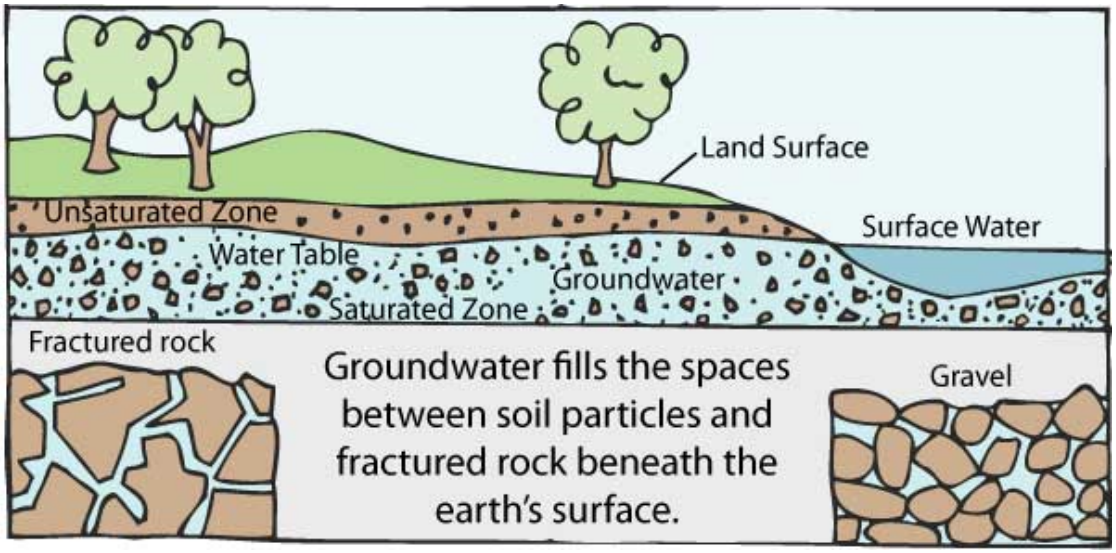

You?


USGS
science for a changing world
You may think that every drop of rain that falls from the sky, or each glass of water that you drink, is brand new, but it has always been here and is a part of The Water Cycle.
The Water Cycle
SUBLIMATION
ICE AND SNOW
SNOWMELT
VOLCANIC STEAM
PRECIPITATION
ATMOSPHERE
CONDENSATION
EVAPOTRANSPIRATION
EVAPORATION
RUNOFF
RIVERS
FOG AND DEW
ANIMALS
STREAMFLOW
SEEPAGE
RUNOFF
EVAPOTRANSPIRATION
THE OCEANS
SPRING
RUNOFF
LAKES
INFILTRATION
SEEPAGE
PLANT UPTAKE
GROUNDWATER RECHARGE
GROUNDWATER FLOW
GROUNDWATER STORAGE
UN WATER
World Water Day
United Nations International Year of Water Cooperation
U.S. Department of the Interior
U.S. Geological Survey
Stefanie Neno, Jim Morgan, Gabriele Zanolli, Food and Agriculture Organization of the United Nations
Howard Perlman, Gerard Gonthier, U.S. Geological Survey
General Information Pro
http://ga.water.usgs.gov/edu/watercycle-k

DRINKING WATER SOURCES

Surface Water

Groundwater



CA State Water Resources Control Board

WATERSHEDS

Everyone lives in watershed

Watersheds drains into a receiving body of water

Receiving bodies can be streams, ponds, lakes, rivers or oceans

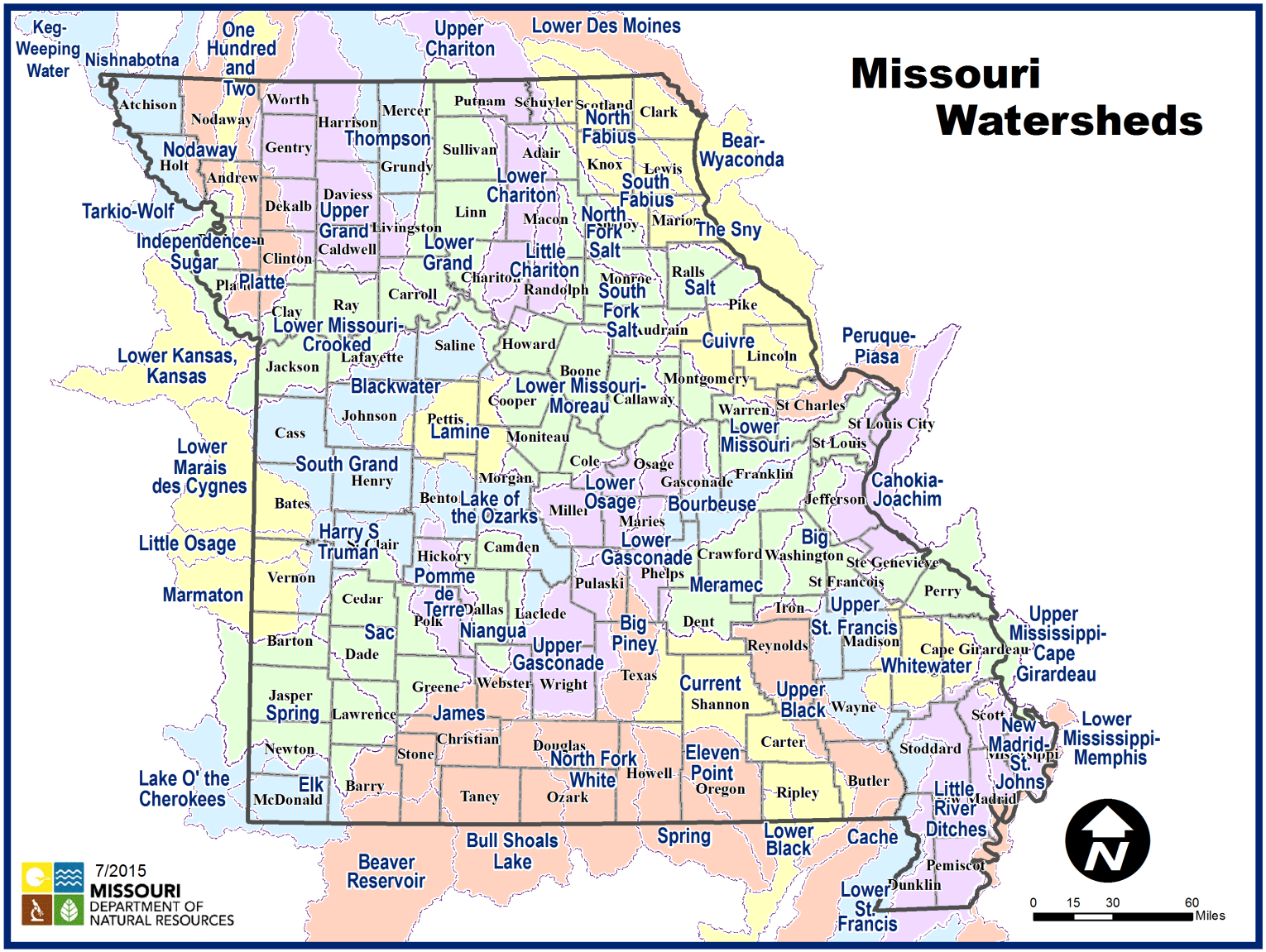
Mississippi River Basin

Watersheds.org

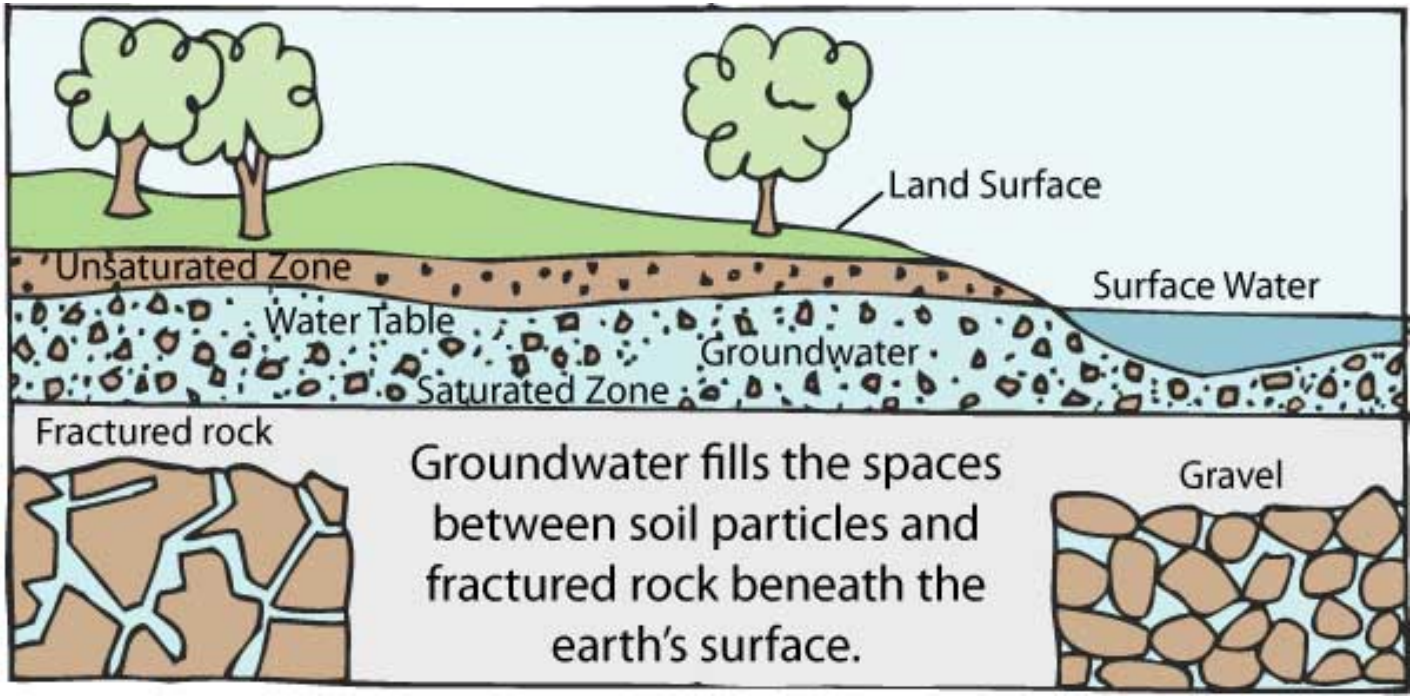
66 WATERSHEDS

115,000 MILES STREAMS & RIVERS

3,080 LAKES

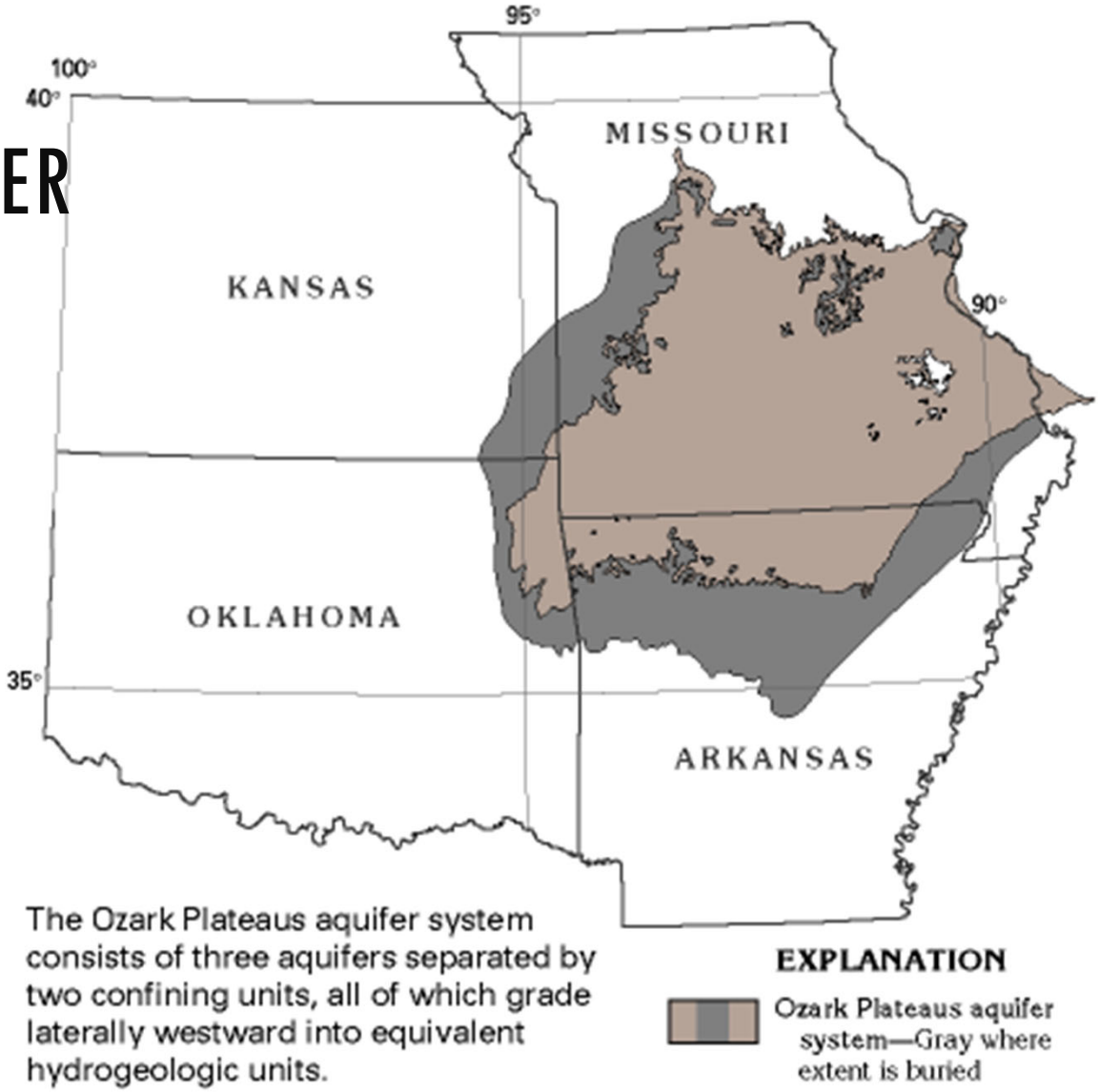


GROUNDWATER



MISSOURI GROUNDWATER

OZARK PLATEAUS AQUIFER



The Ozark Plateaus aquifer system consists of three aquifers separated by two confining units, all of which grade laterally westward into equivalent hydrogeologic units.

YOUR DRINKING WATER SOURCE?

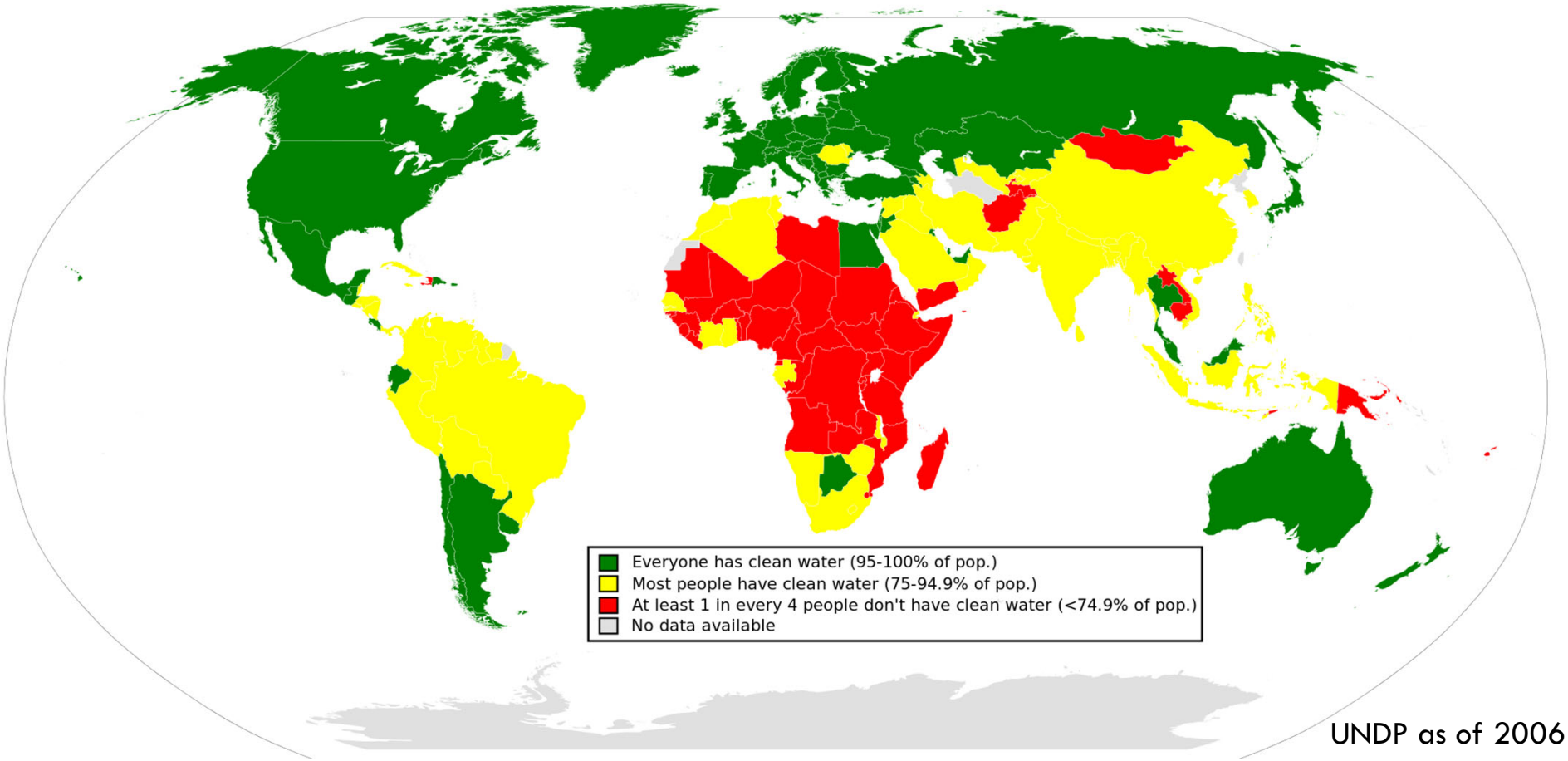
MISSOURI RIVER ALLUVIAL AQUIFER

1. Right click on the picture.
2. Choose “change picture” from the pop up menu
3. Insert picture of your drinking water source
4. Click on the words “El Dorado Lake” on the left side of the picture – change to the name of your source water.

(DELETE THIS BOX)

When you go to slideshow it should only show the question and then the answer (name of source and picture) after another click.

WORLDWIDE WATER QUALITY



UNDP as of 2006

WATER HEALTH CHALLENGES

1 in 8 people lack a safe source of water

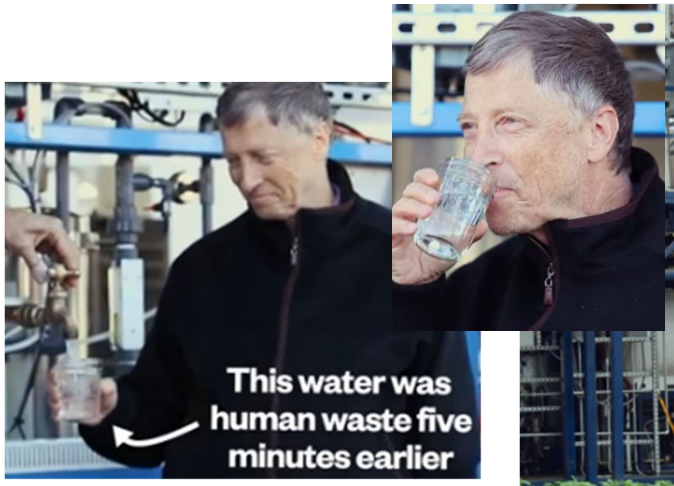
Half of all hospital beds in the world are full of people who are sick from dirty water

The average distance women travel to collect water in Africa & Asia is ~4 miles

3.4 million people die each year from a water-related disease

Water facts from United Nations water.org

INNOVATION – YOU ARE THE FUTURE



The **Omni Processor** turns sewage in to bricks and water safe enough to drink and irrigate crops.

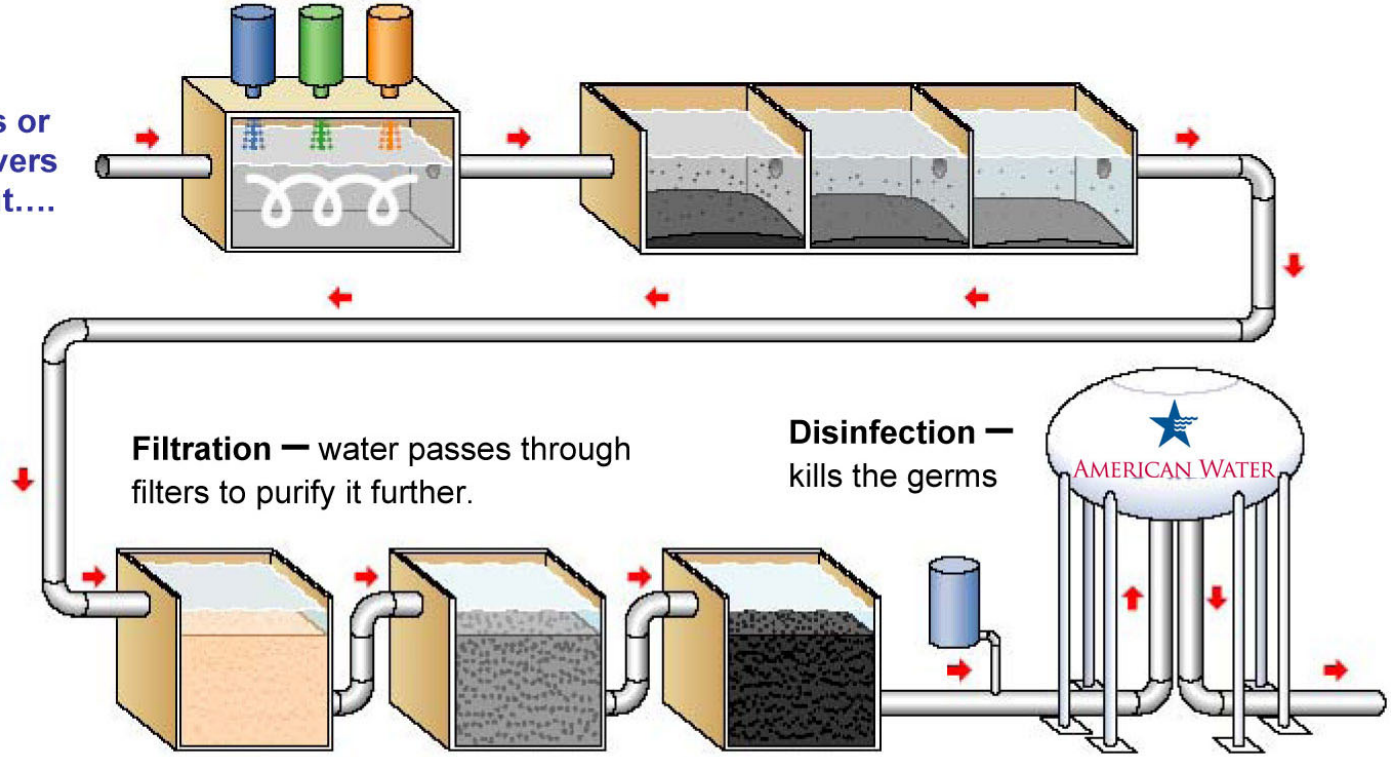
A worker in Dakar, Senegal, irrigates crops using water produced by the Omni Processor.

How a Water Treatment Plant Works

Coagulation – special compounds remove the dirt particles from the water

Sedimentation – the dirt settles to the bottom and the water becomes cleaner

From wells or lakes or rivers to the plant….



Filtration – water passes through filters to purify it further.

Disinfection – kills the germs

From the water tower to your home!

WATER QUALITY STANDARDS

Drinking water must meet State and Federal regulations before it goes into the distribution system

- **Federal** – Environmental Protection Agency (EPA)
  1974 Safe Drinking Water Act
- **State** – Iowa Department of Natural Resources

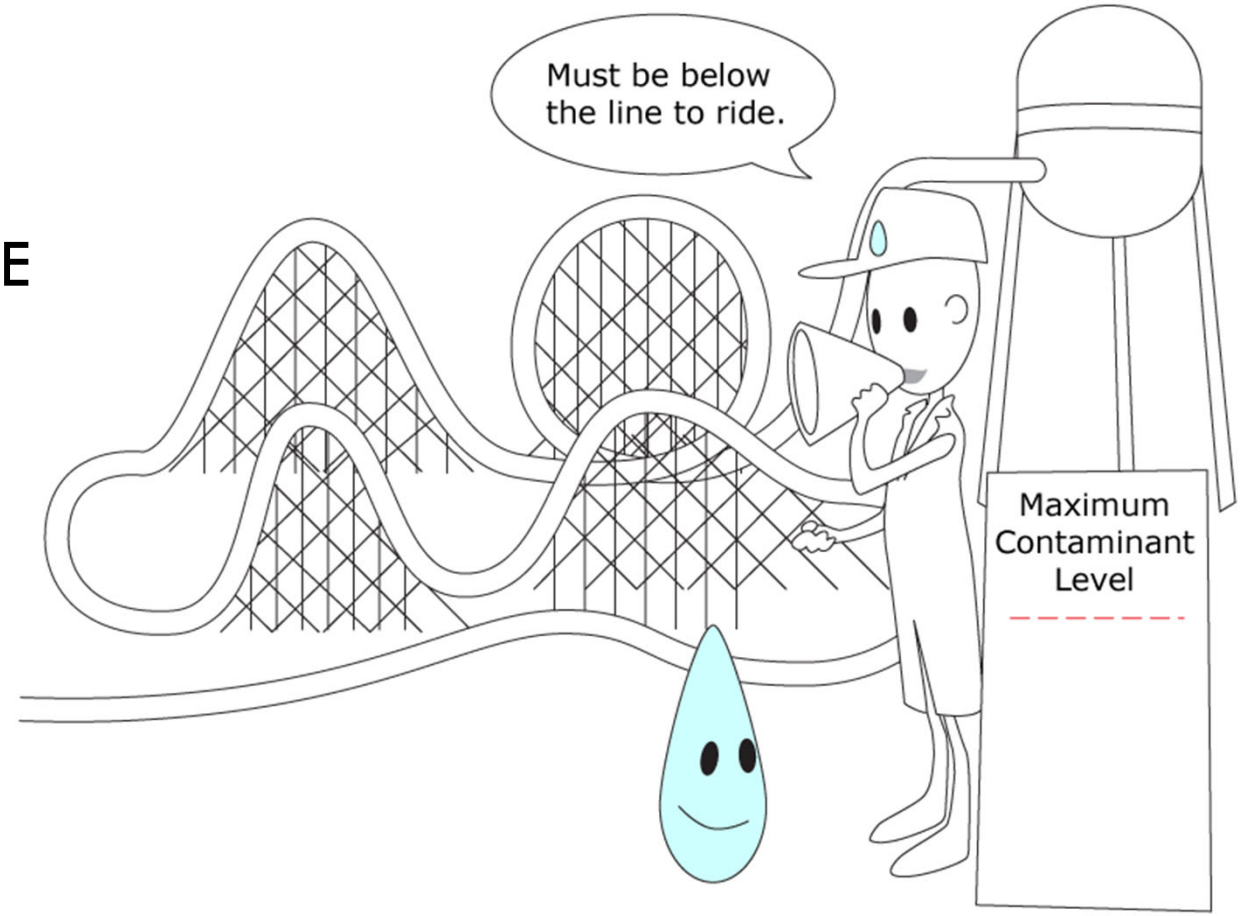
MAXIMUM CONTAMINANT LEVEL

Primary MCLs

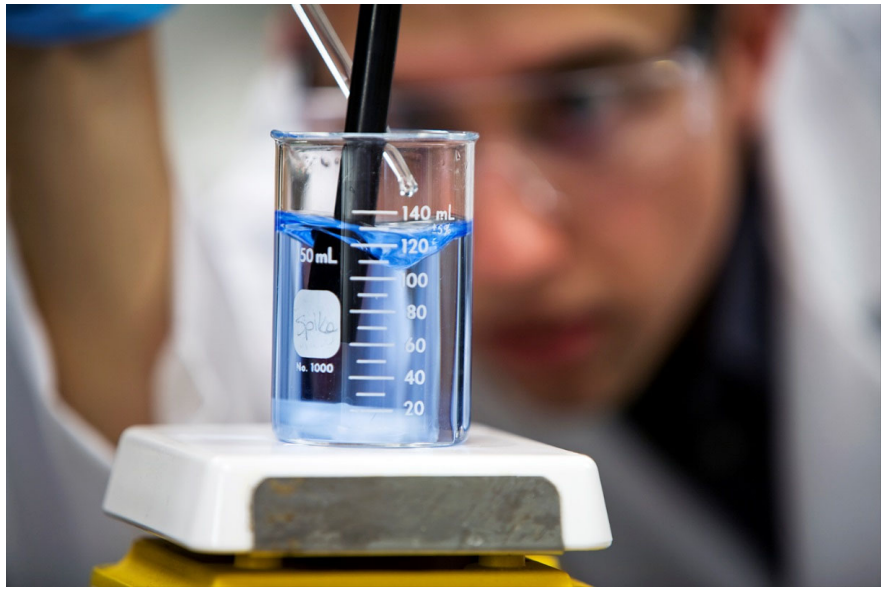
- Enforced by KDHE
- Fined if exceed

Secondary MCL

- Not enforced
- This is the goal



WATER TESTING



Bacteria	Turbidity
pH	Organics
Alkalinity	Metals
Calcium	Chloride
Chlorine	Sulfate
Nitrate	Nitrite
Color	

WATER TESTING EXAMPLE

Purpose	Improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and Escherichia coli (E. coli).

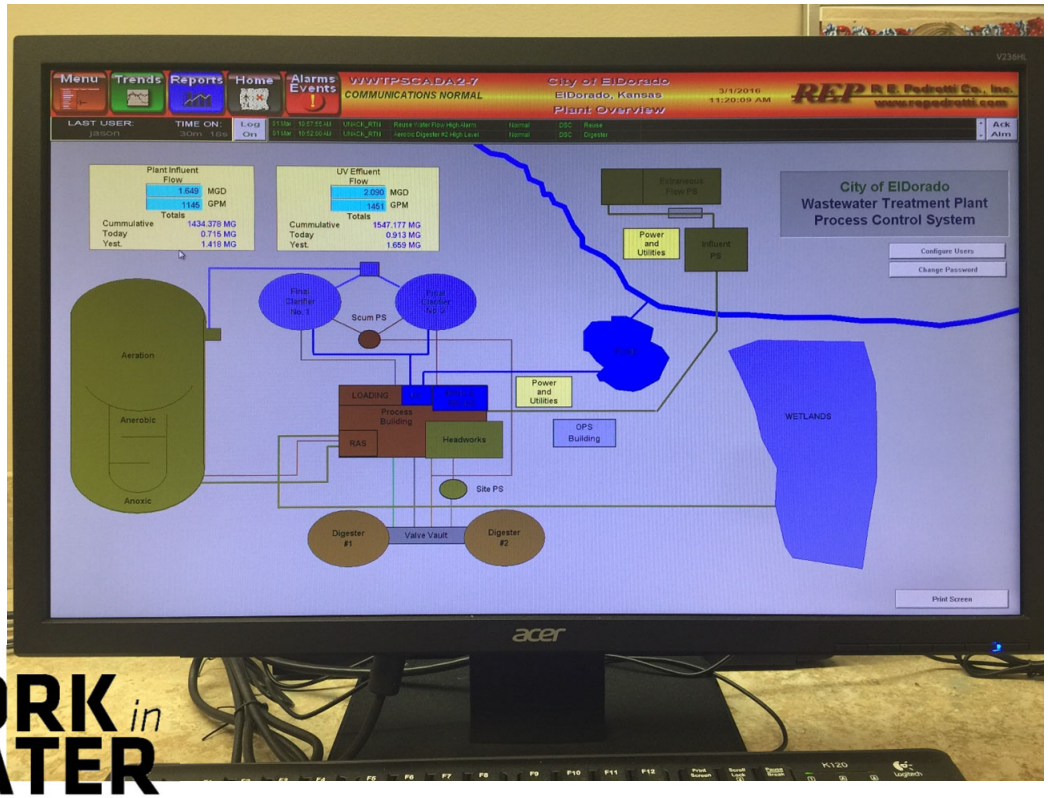
Total Coliform Rule

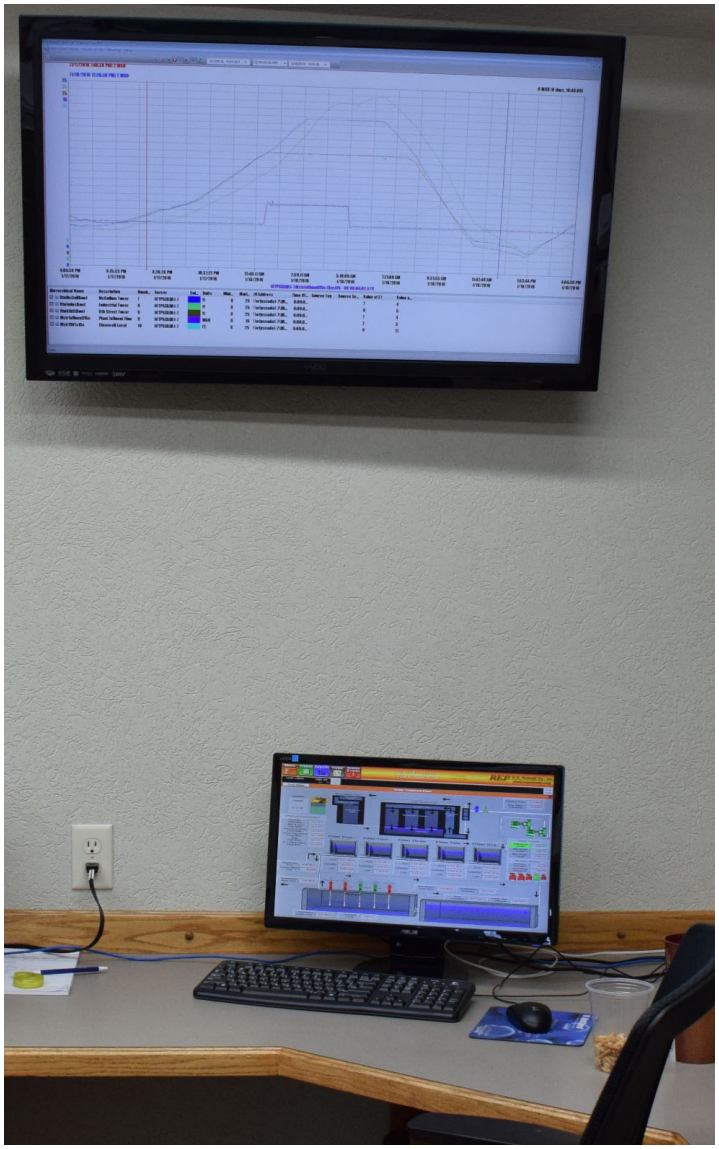
Public Water System ROUTINE Monitoring Frequencies

Population	Minimum Samples/ Month	Population	Minimum Samples/ Month	Population	Minimum Samples/ Month
25-1,000*	1	21,501-25,000	25	450,001-600,000	210
1,001-2,500	2	25,001-33,000	30	600,001-780,000	240
2,501-3,300	3	33,001-41,000	40	780,001-970,000	270
3,301-4,100	4	41,001-50,000	50	970,001-1,230,000	300
4,101-4,900	5	50,001-59,000	60	1,230,001-1,520,000	330
4,901-5,800	6	59,001-70,000	70	1,520,001-1,850,000	360
5,801-6,700	7	70,001-83,000	80	1,850,001-2,270,000	390
6,701-7,600	8	83,001-96,000	90	2,270,001-3,020,000	420
7,601-8,500	9	96,001-130,000	100	3,020,001-3,960,000	450
8,501-12,900	10	130,001-220,000	120	≥ 3,960,001	480
12,901-17,200	15	220,001-320,000	150		
17,201-21,500	20	320,001-450,000	180		

*Includes PWSs which have at least 15 service connections, but serve <25 people.

TECHNOLOGY - SCADA





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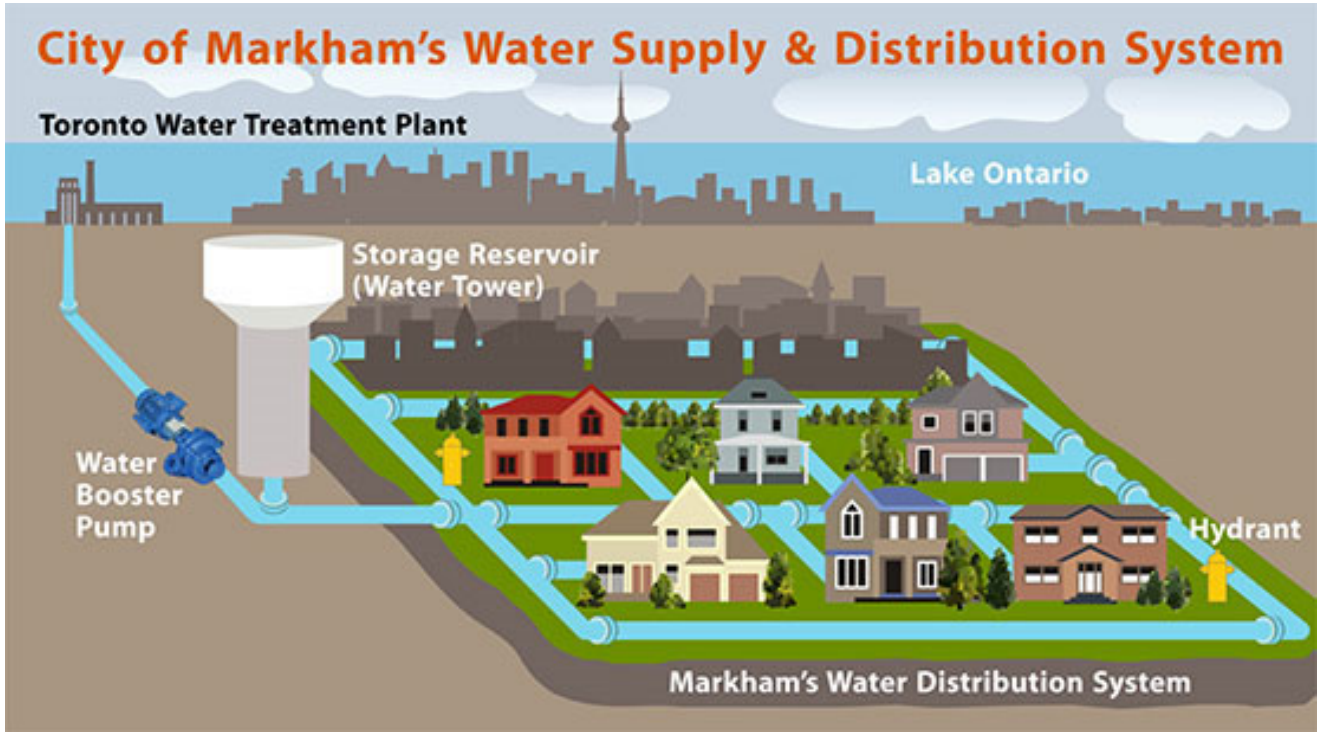
DISTRIBUTION SYSTEM



Water mains deliver water from the treatment plant to homes and businesses

Trace amounts of chlorine must be present even in the furthest part of the distribution system

CHEMISTRY FOR PIPES

Cement lined steel pipe

Cast iron pipe with scaling
When pH is high scaling occurs

Pipe corrosion
When pH is low corrosion occurs

CHEMISTRY FOR HEALTH

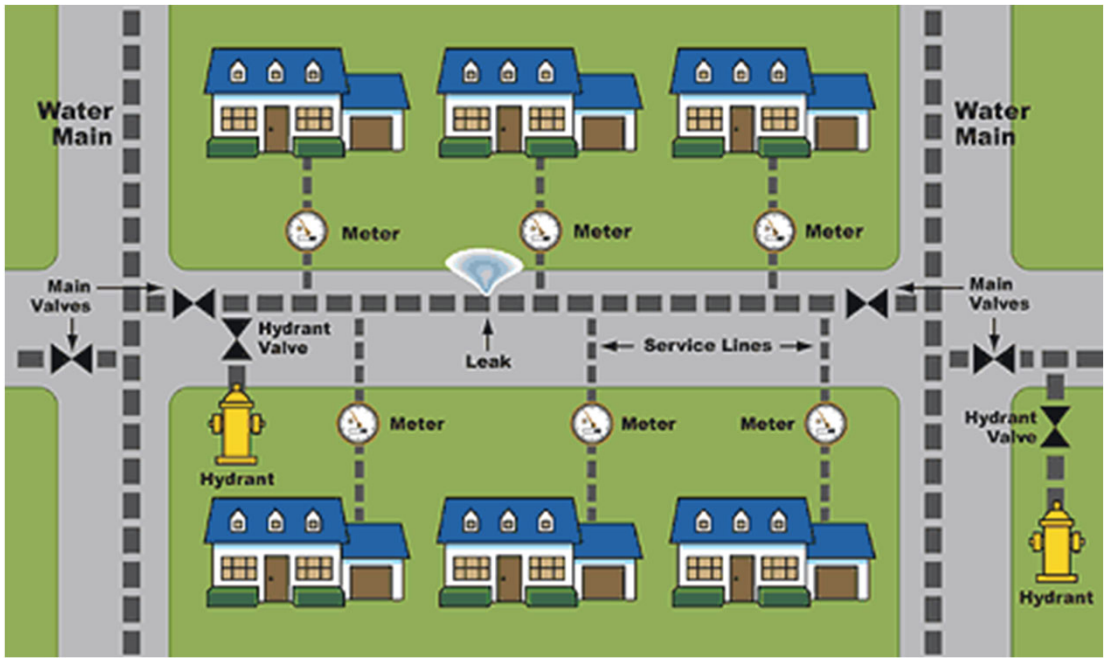
MCL for Cl is 4 mg/L

Treatment puts in Cl to keep the water disinfected throughout the system

A trace amount of Cl must be detectable in water at the farthest tap

Chlorine kills bacteria & viruses, like this E.Coli bacteria

WATER METERS



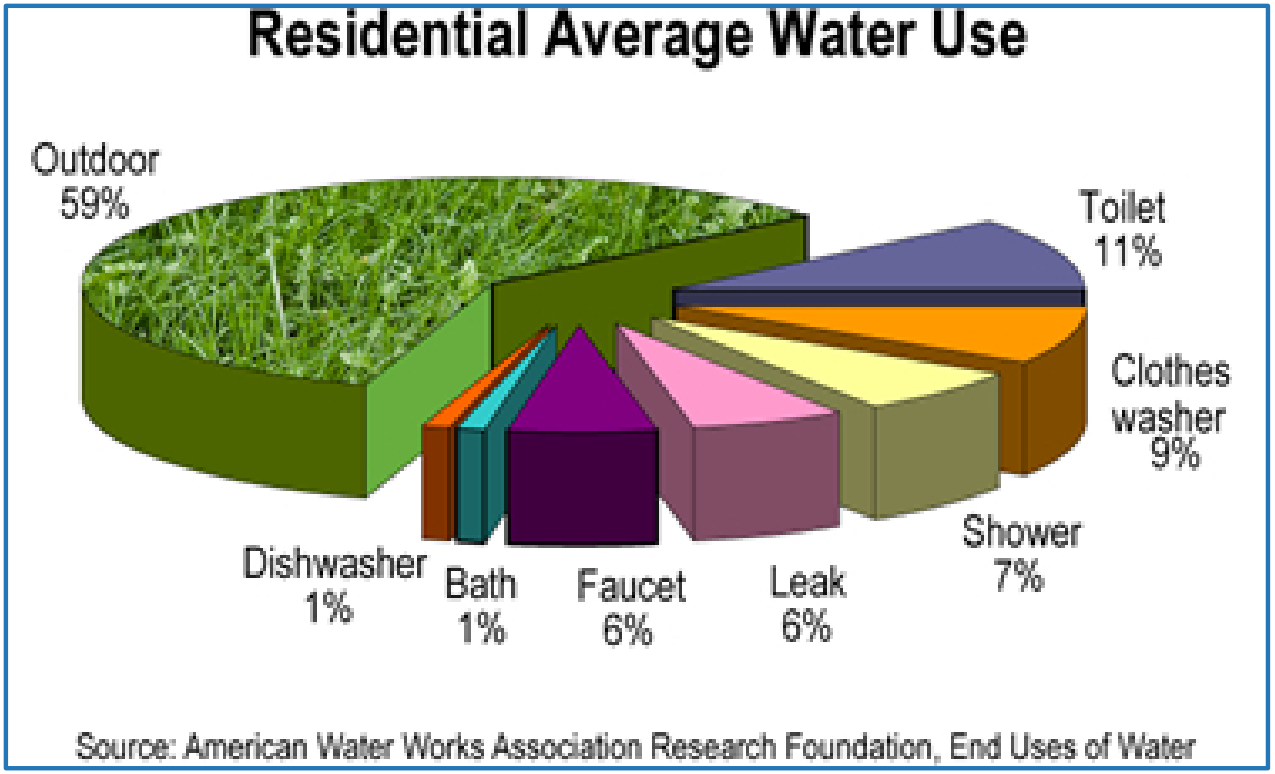
Water meters calculate the water you use so that you can be charged

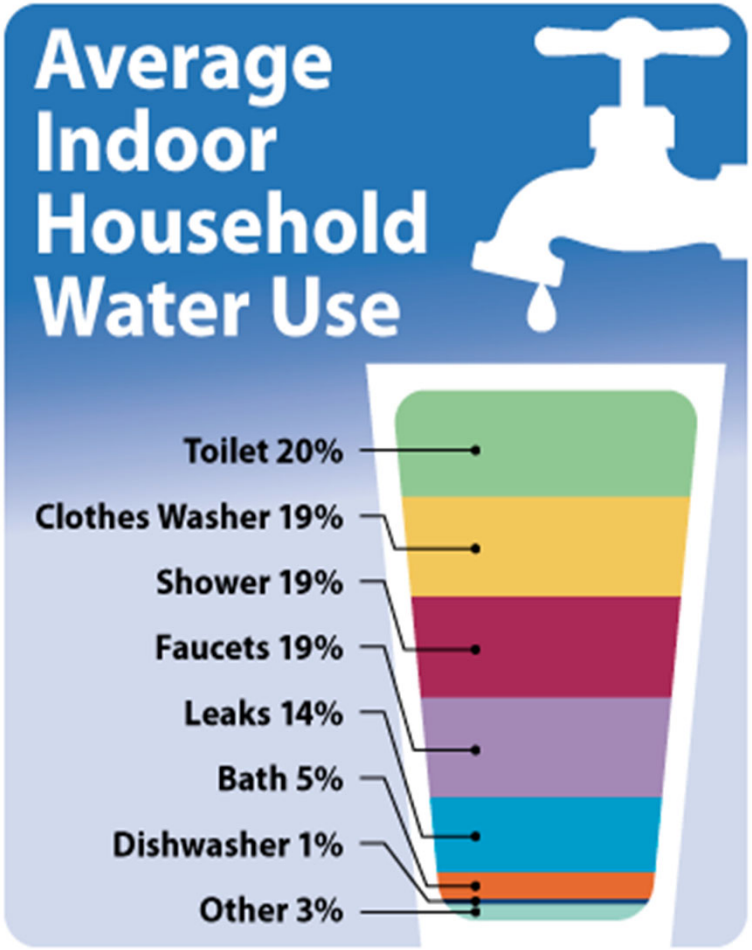
How much water do you use?

WATER USE IN AMERICA

The average American uses 88 gallons of water every day

The poorest countries use less than 5





East Bay Municipal Utility District

CALCULATE YOUR WATER FOOTPRINT

Google

Southwest Florida Water Management District Water Use Calculator

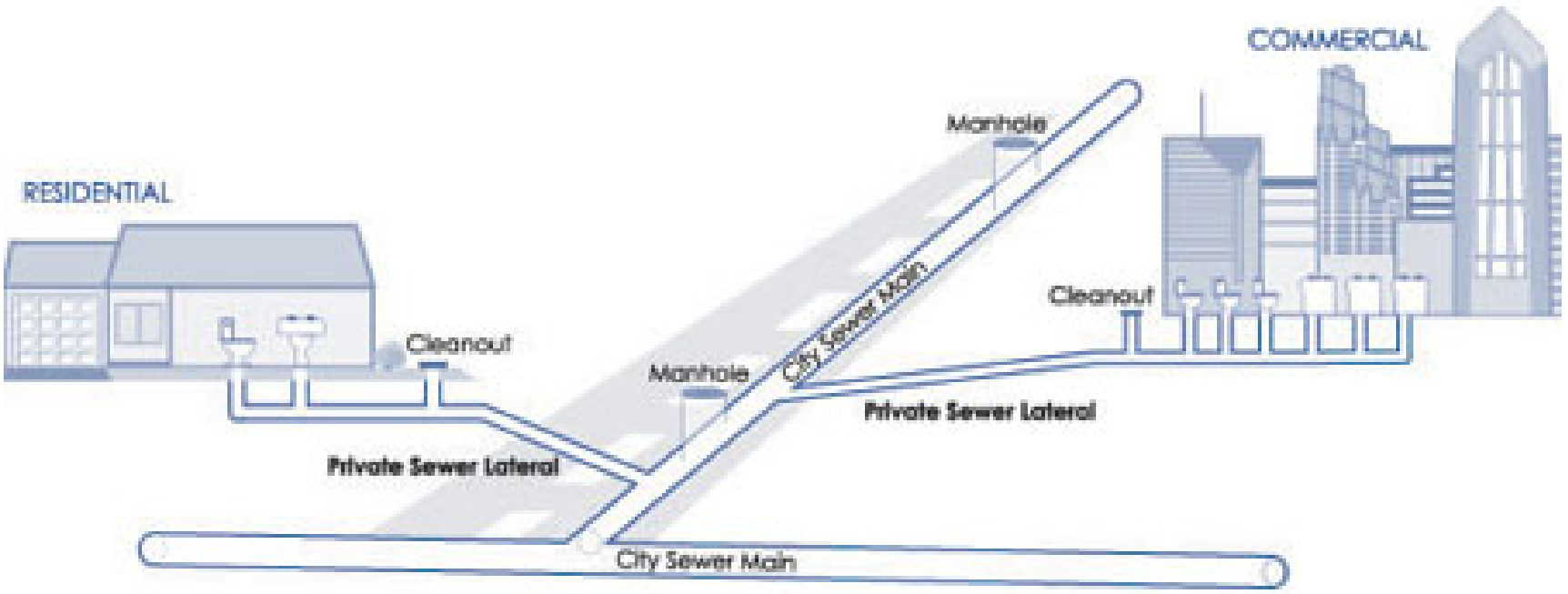
https://www.swfwmd.state.fl.us/conservation/thepowerof10/

AFTER THE FLUSH

WHERE DOES THE WATER GO?


WHERE DOES THE
WATER GO?

YOUR HOME SEWER PLUMBING



WASTEWATER COLLECTION
KEEPING SEWER MAINS FLOWING

SEWER PIPE PICTURES

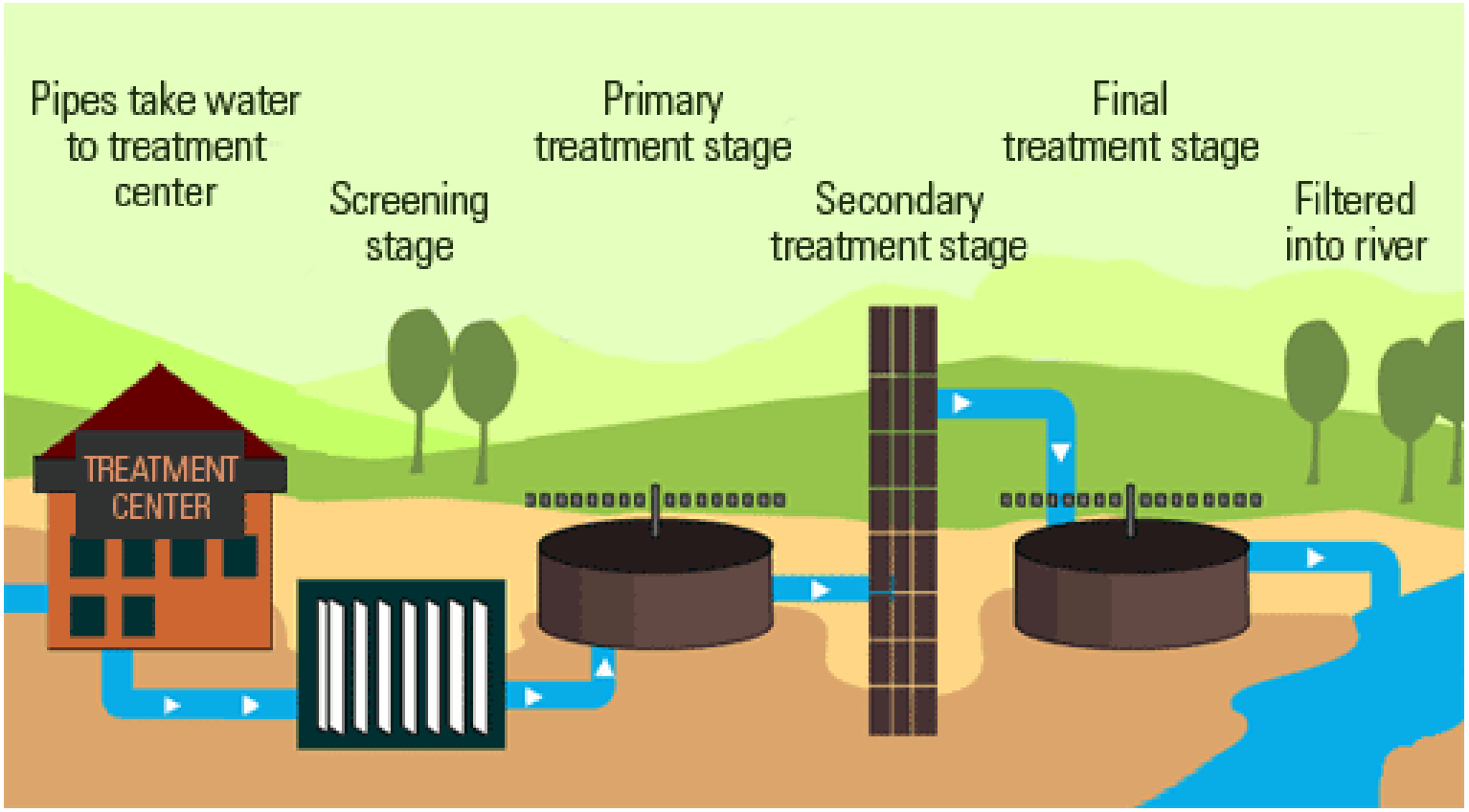
Grease can cause pipes to clog

Tree roots can cause clogs and leaks

Major clogs can cause major problems

CAN'T FLUSH THIS

4 STEPS TO WASTEWATER TREATMENT

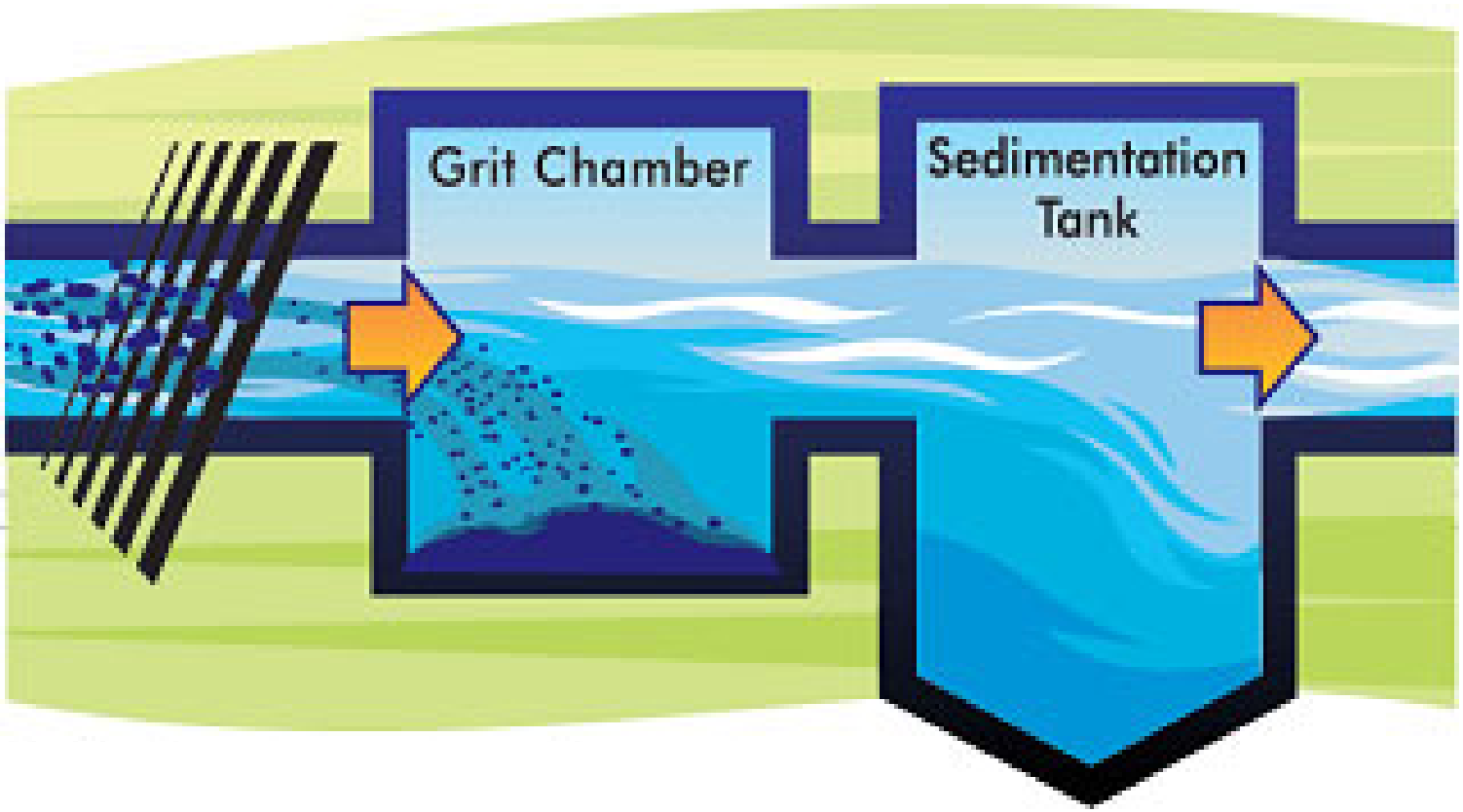


PRELIMINARY TREATMENT - SCREEN

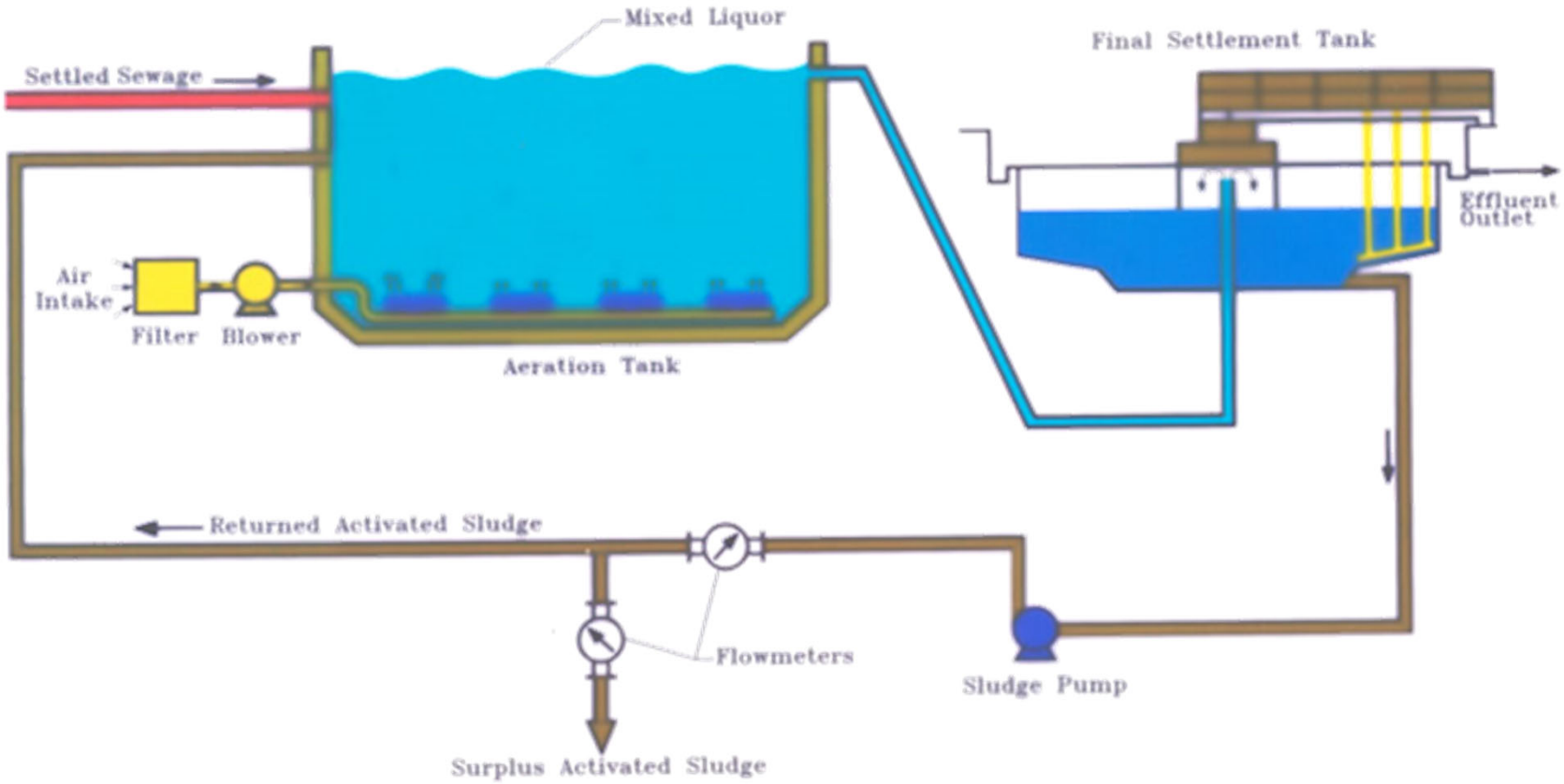
Screens trap
"big stuff"

trash
diapers
rags
branches
coffee grounds
potato peels

PRIMARY TREATMENT - SEPARATE



SECONDARY TREATMENT - SNACK



ADVANCED TREATMENT - DISINFECT

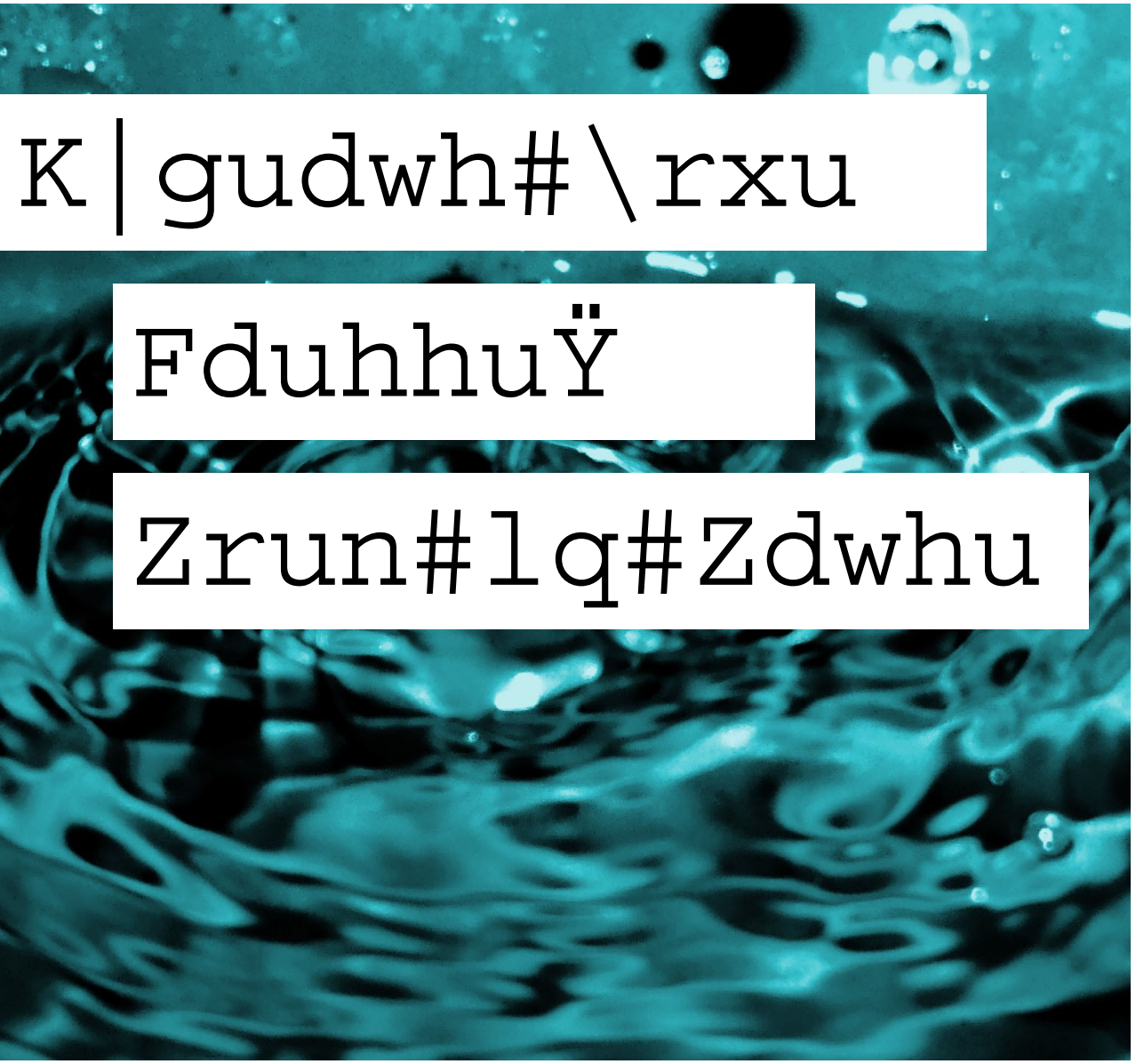
UV light tubes

EFFLUENT RELEASE

Effluent from the Wichita's Northwest Wastewater Treatment Plant flows in to a fishing pond

Fish are thriving and healthy


WHO'S DOWNSTREAM?
Chicago
Des Moines
Omaha
Lincoln
Peoria
Springfield
Kansas City
Topeka
Denver
St. Louis
Indianapolis
Columbus
Cincinnati
Pittsburgh
Evansville
Lexington
Tulsa
Oklahoma City
Memphis
Baton Rouge
New Orleans
About 2,000 miles (3,219 km) across



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OPERATOR

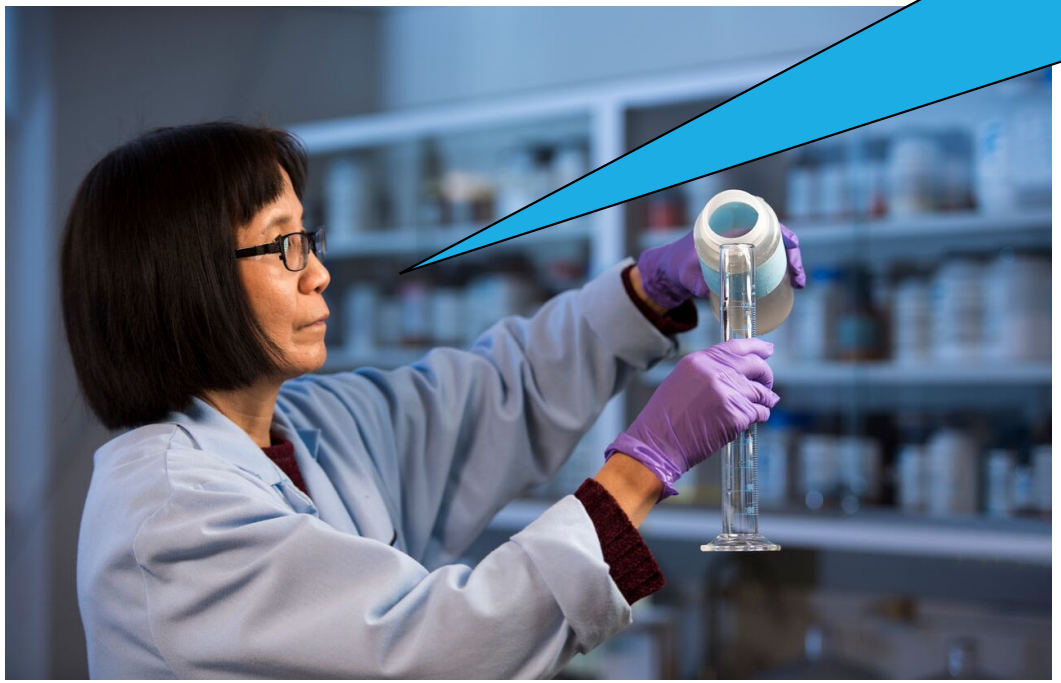
Recycling is more than pop cans and plastic bottles. **We recycle water.** There is no new water being made, so we have to recycle what we have. At a wastewater treatment plant that's what we do. We turn wastewater into clean water and put it back into nature to get used by someone else.

Jamie Belden
Wastewater Treatment Plant
Operator City of Wichita
(City of Rose Hill pictured)

WORK in WATER
advancing water careers in Iowa

CHEMIST

Working in a wastewater laboratory is challenging and interesting. With a wide variety of analytical work needed to evaluate processes and meet discharge permit regulations, **you will never be bored.**



Rwei-Ying Trefz
Chemist
City of Wichita

WORK in WATER
advancing water careers in Iowa

COMMUNICATIONS

When you pick a career you want to think about ***what*** you want to do as well as ***where*** you want to do it. Doing PR in the water industry is challenging, exciting and significant. You're repping the **greatest commodity on earth.**

Mandy Cawby
Customer Relations Director
WaterOne

WORK in WATER
advancing water careers in Iowa

REGULATOR

My job affords me the opportunity to **protect** both the **public and environmental health.** I accomplish this by **enforcing** regulations and providing **technical and financial assistance.** My job challenges me to develop **creative approaches** to achieve compliance

Andrew Hare
Capacity Development & Enforcement
Kansas Department of Health & Environment

WORK in WATER
advancing water careers in Iowa

BIOLOGIST

Biologists find a balance between ecology and sociology. **We connect people to natural resources.** I have been drawn to water since I was very young. The **mystery** of what goes on beneath the surface, combined with the interactions between land and water continues to fascinate me.

Jessica Mounts
Fisheries Biologist
Kansas Department of Wildlife, Parks & Tourism

WORK in WATER
advancing water careers in Iowa

ENGINEER

I help design and build water supply systems. I feel like I'm doing something important for the generations to come.

Jerry Blaine
City of Wichita Engineer
(Retired)

WORK in WATER
advancing water careers in Iowa

LAW

Water attorneys help people comply with the law, conduct complex transactions involving water issues and handle litigation between competing water users. I grew-up on a farm in SW Kansas, obtaining and preserving adequate water has always been important to me. The **complexity and competition** involved in obtaining and keeping water rights keeps my water-law practice **interesting and rewarding.**

Daniel Buller
Attorney
Foulston Siefkin LLP

WORK in WATER
advancing water careers in Iowa

College students in New Zealand use drones, water quality testing and phone apps to monitor pollution in rivers and streams

Zdwhu#lv#d#juhdw#lqgxvwu|#iru#|rxqj#shrsoh1#

Zdwhu#zloo#qhyhu#eh#revrohwh/#exw#hyhqwxdoo|#wkh#zd|#zh#uxq#rxu#rujdql}dwlrqv#dqg#wkh#shrsoh#zkr#uxq#lw#zloo#eh1#

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Iuhvk#shuvshfwlyhv#dqg#qhz#yrlfhv#kdyh#ydoxh#lq#wkh#zdwhu#lqgxvwu|1#

►*Mandy Cawby, WaterOne*

MINI-GRANTS

Applications at
wichita.edu/workinwater

$500 – $4,500

For transportation, supplies
and internship salary
(no food)

MINI-GRANT APPLICATION

All utilities here can apply

Fund your first Work in Water

- ►Transportation
- ►Internship

Funding range: $500 - $4,500

Applications due: Jan 15, 20121

www.wichita.edu/workinwater