Thanks for reading!

Additional Information

Alaska Department of Environmental Conservation
Environmental Health
Drinking Water Program
dec.alaska.gov/eh/dw

Anchorage Water and Wastewater Utility
awwu.biz

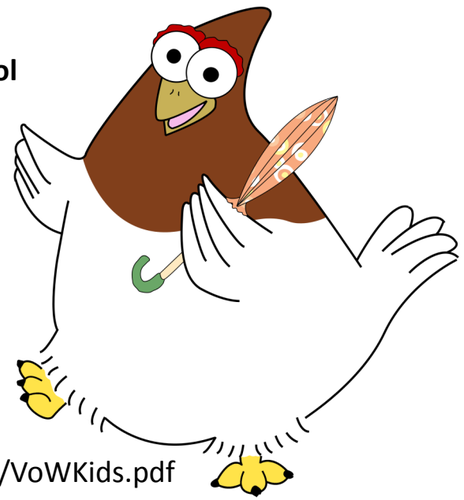
U.S. Environmental Protection Agency
Drinking Water Kids' Stuff
water.epa.gov/learn/kids/drinkingwater

Careers in Water
Work for Water
workforwater.org

Centers for Disease Control
Healthy Water
cdc.gov/healthywater

Science Kids
sciencekids.co.nz

Digital copy of
The Value of Water
dec.alaska.gov/eh/docs/dw/brochures/VoWKids.pdf



About Ptommy... Our water drop-shaped friend, Ptommy (the "P" is silent like in ptarmigan, our state bird), likes to spread his love for Alaska and its pristine drinking water! He hopes that you'll share his enthusiasm by making sure you are responsible with water. Ptommy's other hobbies include skiing, fishing, and drinking a cup of a tasty Tanzanian peaberry coffee (made with fresh tap water, of course).

Version-11-24-2014-GP

THE STATE OF ALASKA DRINKING WATER PROGRAM PRESENTS

THE VALUE OF WATER

A reading and activity book about Alaska and its drinking water!

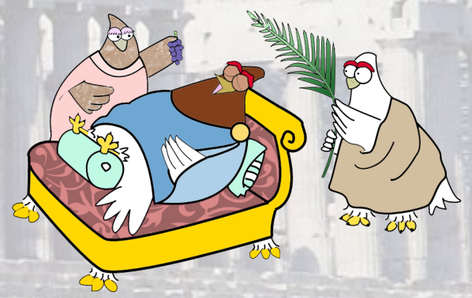
STARRING PTOMMY THE PTARMIGAN*

*SEE BACK PAGE FOR PTOMMY'S BIO!

Water Treatment History

Water is one of the most important things in the world, because without it, nothing could live. Every day, you turn on the faucet and shower and get safe, delicious, and refreshing water whenever you need it — which we commonly take for granted! Bacteria and viruses live in water, but water treatment plants clean the water before it gets to your house. Yet, it wasn't always that easy.

As far back as 7,000 years ago, people stored water in wells and started creating water transportation systems. The Egyptians used palm trees and Chinese and Japanese people used bamboo to make a type of water pipe. Ancient Pakistanis built public water facilities. But it wasn't until around 4,000 B.C. that the Greeks and Indians discovered and practiced methods of water purification (cleaning).



These ancient people filtered water with charcoal, boiled the water, or left water outside in sealed containers to be heated by the sun. Today, for water treatment, we use similar ways, but we also have even better methods to clean our water. Modern technologies allow us to not only remove dirt (sediment), but also the things you cannot see in the water, such as dangerous chemical contaminants (including arsenic, lead, and pesticides) and living creatures called *micro-organisms.** Nowadays, the risk of getting sick from water is very, very low, and it's all thanks to our effective water treatment systems.

In the United States, we have some of the strictest drinking water laws that make our water some of the safest in the world. Public water is checked every day, often many times, to make sure it is clean and safe to drink. Next time you enjoy a glass of cold water, or have a hot shower, remember to think about the people who helped to provide you with that precious resource!

*See page 5 for the scoop on micro-organisms!

Use this page for notes and doodles!

Use this page for notes and doodles!

How We Use Water

COLOR THIS PAGE

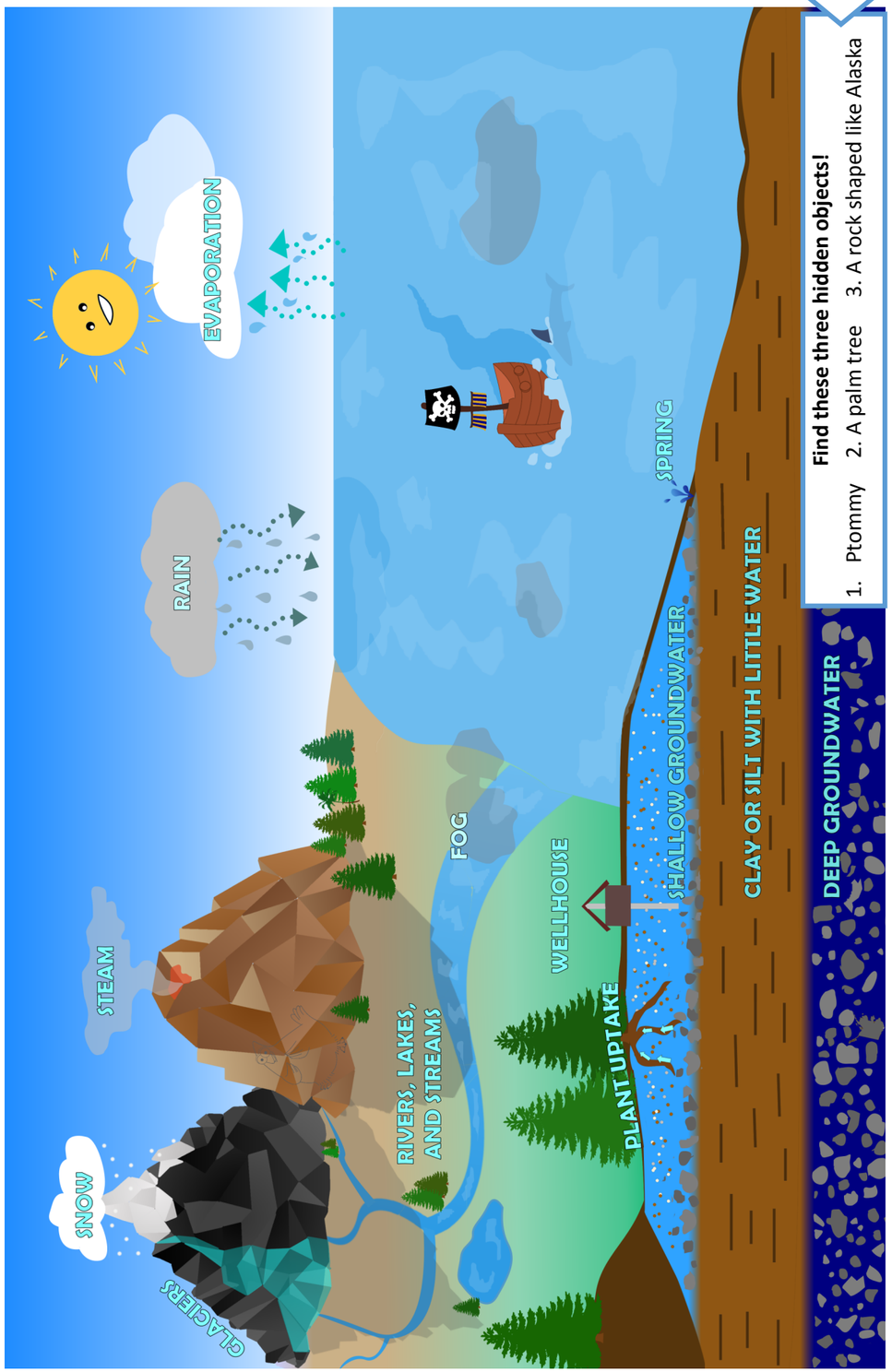
Every day, we use water for many activities. If we didn't have water, we couldn't get a lot done!

Color Ptommy and his friend as they use water at their homes.

Think about things you can do with water. What do you do when you are outside? Or when you're inside? In the empty box to the left, draw one way that you enjoy using water!

The Hydrologic (Water) Cycle

TURN THE PAGE AROUND!

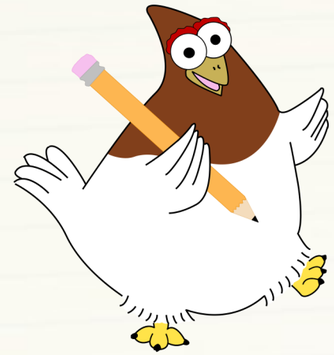


Find these three hidden objects!

1. Ptommy 2. A palm tree 3. A rock shaped like Alaska

Water Games

Answer the clues below. Each blank spot represents a letter of the word. Then, circle the words in the box. You can find them in every direction. Some words may even show up backward! Answers for both games will be on page 8.



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

1) *Cryptosporidium* or "Crypto" is a type of _ _ _ _ _ _ _ _ _.

2) Wash your hands after touching raw _ _ _ _ _ _ _.

3) An _ _ _ _ _ _ _ _ designs the water treatment facilities.

4) Ancient people filtered water with _ _ _ _ _ _ _ _.

5) _ _ _ _ sticks to stuff in water during the treatment process.

6) Don't drink _ _ _ water.

7) A _ _ _ _ _ _ _ _ _ _ _ studies how water moves.

8) The water industry is the _ _ _ _ _ largest in the world.

9) We _ _ _ _ _ water to make it clean to drink.

10) Hepatitis A can hurt the _ _ _ _ _.

11) A willow _ _ _ _ _ _ _ _ _ is Alaska's state bird and is also Ptommy's species.

12) Tiny creatures in the water are called _ _ _ _ _-_ _ _ _ _ _ _ _.

13) The Ancient Indians and _ _ _ _ _ _ first learned the importance of purifying water.

14) Another way to disinfect water is by bringing it to a _ _ _ _.

15) If you drink water from a _ _ _ _, you may get sick.

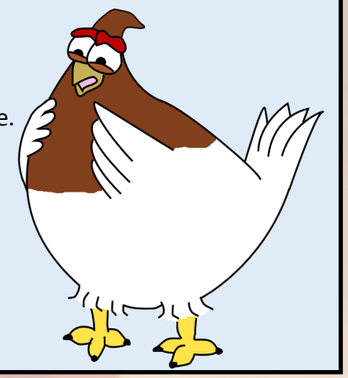
16) Drinking water laws in the United States are very _ _ _ _ _ _.

Water Games

Word Scramble

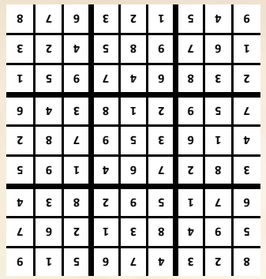
Read the clues and unscramble the words. Answers are at the bottom of this page.

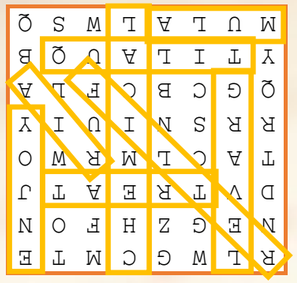
1. This chemical is used to clean water. You also find it in swimming pools.
   E R N H O C L I
   _____
2. A micro-organism in water.
   C A A R E B I T
   _____
3. A word that means "to clean."
   Y P R U F I
   _____
4. This term describes water getting dried up by the sun.
   T E R A P A V E O
   _____
5. This is water under the Earth's surface.
   R R N U G A W O E D T
   _____
6. Alaskans can get water from this.
   R L A E I C G
   _____

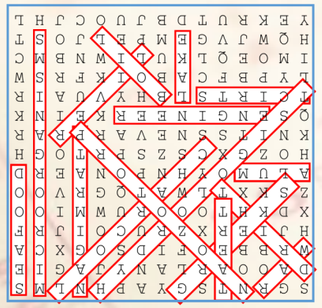


ANSWERS TO GAMES

Clockwise right to left: Sudoku, mini word find, large word search box and answers, and word scramble.







1. Chlorine
2. Bacteria
3. Purify
4. Evaporate
5. Groundwater
6. Glacier

1. Protozoan 2. Seafood 3. Engineer 4. Charcoal 5. Alum 6. Raw 7. Hydrologist 8. Third 9. Treat 10. Liver 11. Ptarmigan 12. Micro-organisms 13. Greeks 14. Boil 15. Lake 16. Strict

Sudoku 数独

A great number game for the budding engineer!

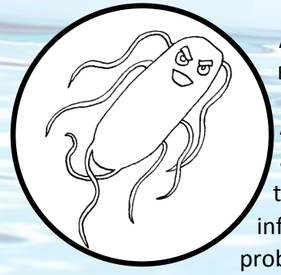
How to solve: Each column, row, and small box must end up with all the numbers 1-9.

8		3			6			9
	9	4						7
	7		5					4
		2		6	4		9	
			3		9			
	5		2	1		3		
2					7		5	
1						4	2	
9			1			6		8

What's Living in the Water?

COLOR THIS PAGE

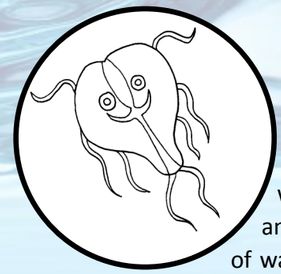
Micro-organisms (my-crow oar-gah-niz-ums) are tiny creatures that you can only see with a microscope. They can be plants, insects, or single-celled life forms. There are three micro-organisms found in raw (untreated) water: bacteria, viruses, and protozoa. Not all of them will hurt you, but there are some that can make you very sick or kill you if they're found in your water. This dirty water can get into wells and other water sources, and therefore get into the water supply. But that's where water treatment comes in! Modern water treatment facilities are designed to remove the harmful micro-organisms to make your tap water safe to drink. But be careful when you are outdoors – just because the water *looks* clean doesn't mean it is! Because animals are out in the wild and are near water that we use for drinking water, that water can get dirty from animal poop as well as from decaying plants and animals. Here are some common micro-organisms that live in the raw water in Alaska.



Escherichia coli

EH-SHUH REE-KEE-YUH COLE-EYE

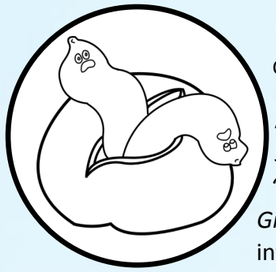
Also known as *E. coli*, this is a bacteria that you can get through uncooked food and infected water. It is a known problem in the food industry when people are not careful when handling food, and some people have even died from infections. Drinking water can also become contaminated with *E. coli* from poop. Adding chlorine to the water will kill these kinds of bacteria, so good water treatment is important to help keep people from getting sick.



Giardia lamblia

GEE-AR-DEE-UH LAM-BLEE-UH

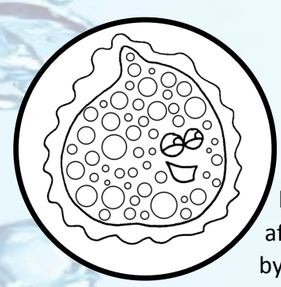
The protozoan *Giardia* lives in the intestines and is spread when a mammal (human or animal) poops near or in a source of water. *Giardia* can live a long time outside of a mammal's body and remain in water for months unless it is filtered out. If a person is infected with *Giardia*, she or he can get an upset stomach, nausea, and diarrhea. People who routinely go outdoors and drink raw water from a stream or lake have a high chance of catching *Giardia*.



Cryptosporidium

CRIP-TOE-SPORE-ID-DEE-UM

Another protozoan *Cryptosporidium*, commonly called *"Crypto,"* is spread like *Giardia*. Someone who gets infected with *Crypto* will get stomach pain, nausea, and diarrhea, as well as a possible fever. In rare cases, people have died from *Crypto* infections. It is very important to not drink raw water when you are out camping or fishing, because of the risk of *Crypto*!



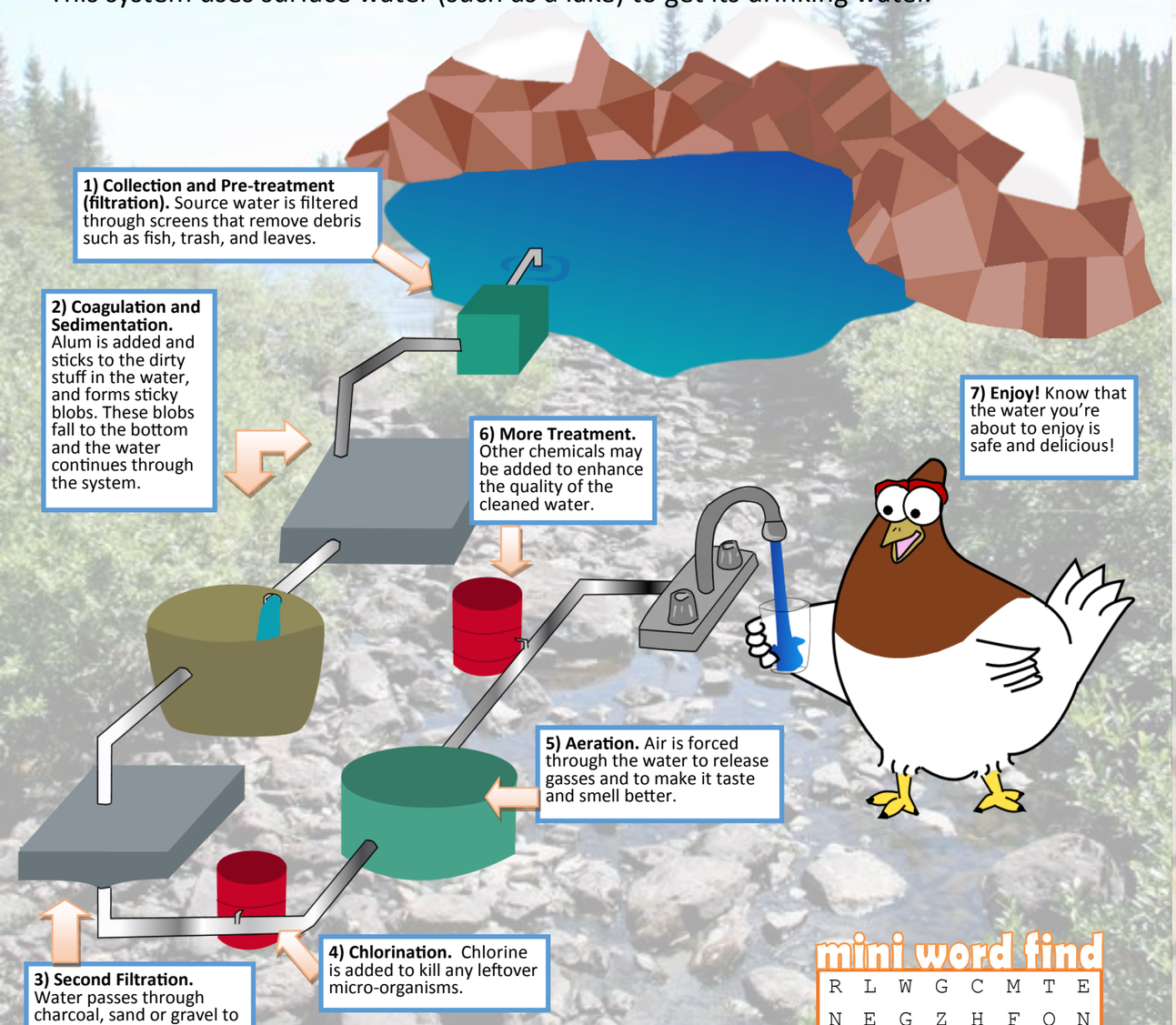
Hepatitis A

HEP-UH-TIE-TUS A

Believe it or not, Hepatitis A is one of the most common water-borne viruses in Alaska. Hepatitis affects the liver. It can be spread by dirty hands and undercooked shellfish, and it is easily transmitted through water. So remember to wash your hands after you use the bathroom and be careful after touching raw seafood!

Water Treatment

Not every system is the same, but here is one example of a water treatment system. This system uses surface water (such as a lake) to get its drinking water.



1) Collection and Pre-treatment (filtration). Source water is filtered through screens that remove debris such as fish, trash, and leaves.

2) Coagulation and Sedimentation. Alum is added and sticks to the dirty stuff in the water, and forms sticky blobs. These blobs fall to the bottom and the water continues through the system.

3) Second Filtration. Water passes through charcoal, sand or gravel to filter out smaller particles and chemicals.

4) Chlorination. Chlorine is added to kill any leftover micro-organisms.

5) Aeration. Air is forced through the water to release gasses and to make it taste and smell better.

6) More Treatment. Other chemicals may be added to enhance the quality of the cleaned water.

7) Enjoy! Know that the water you're about to enjoy is safe and delicious!

Look for these words!

AIR	FILTER	ALUM
GRAVEL	TREAT	QUALITY
ENJOY	CHEMICAL	

Answers are on page 8.

mini word find

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

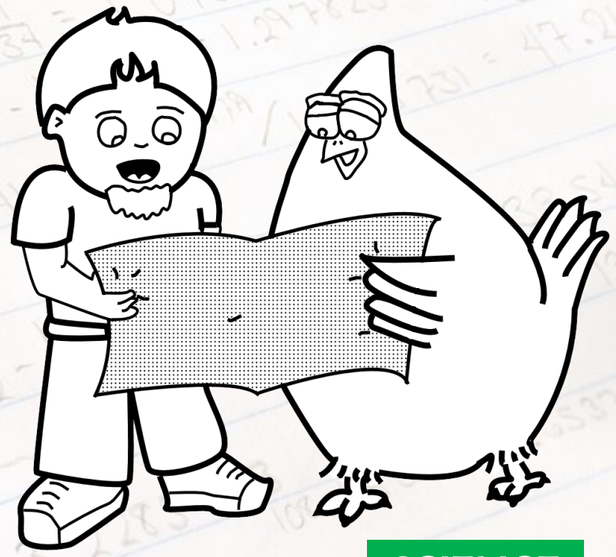
Careers in Water

COLOR THIS PAGE

The water industry is the third largest industry in the world, behind oil and electricity. People will always need water, and that means there will always be jobs in the water industry! You can become an expert in the world of water by taking classes that will teach you important things about water, such as technology, engineering, science, math, and environmental studies. It's also good to know about environmental conservation and energy efficiency. No matter what you learn, knowing how water works is important information for many jobs!

ENGINEERING

Drinking water engineers use math, science, and physics to design and study the treatment of drinking water so that people don't get sick from water borne diseases. More people die worldwide from water borne disease than for any other reason, according to the World Health Organization. But in the U.S., we have very strict drinking water standards in place to keep us safe. Engineers have an important job, which is to help make sure those standards are met when drinking water systems are built so that the water we drink is safe and healthy.



SCIENCE

People working in the drinking water field use the science of water in order to make important decisions. There are many different career paths scientists can take. A **hydrologist** studies the movement of Earth's water within the water cycle. A **hydrogeologist** looks at how water moves through soil and rock. **Climatologists** and **meteorologists** look at the climate and weather. An **aquatic biologist** studies the organisms that live in water. There are many others water professionals who use hydrology (the study of water) in their job, including environmental scientists, natural resource specialists, and water use managers.

CONSTRUCTION

While we have people who study the science of water, we also need people to build — everything from constructing new water treatment plants to fixing old pipes in the water system. Someone needs to know how to build and fix everything so that the community continues to receive clean water.