

THE ADVENTURES OF **EHO EMMA**

AND THE FLASH FLOOD





This comic is the second in a series of comic books created by First Nations Technical Services Advisory Group to teach students in grade 3-6 about the Superheroes that make and keep our water safe to use.

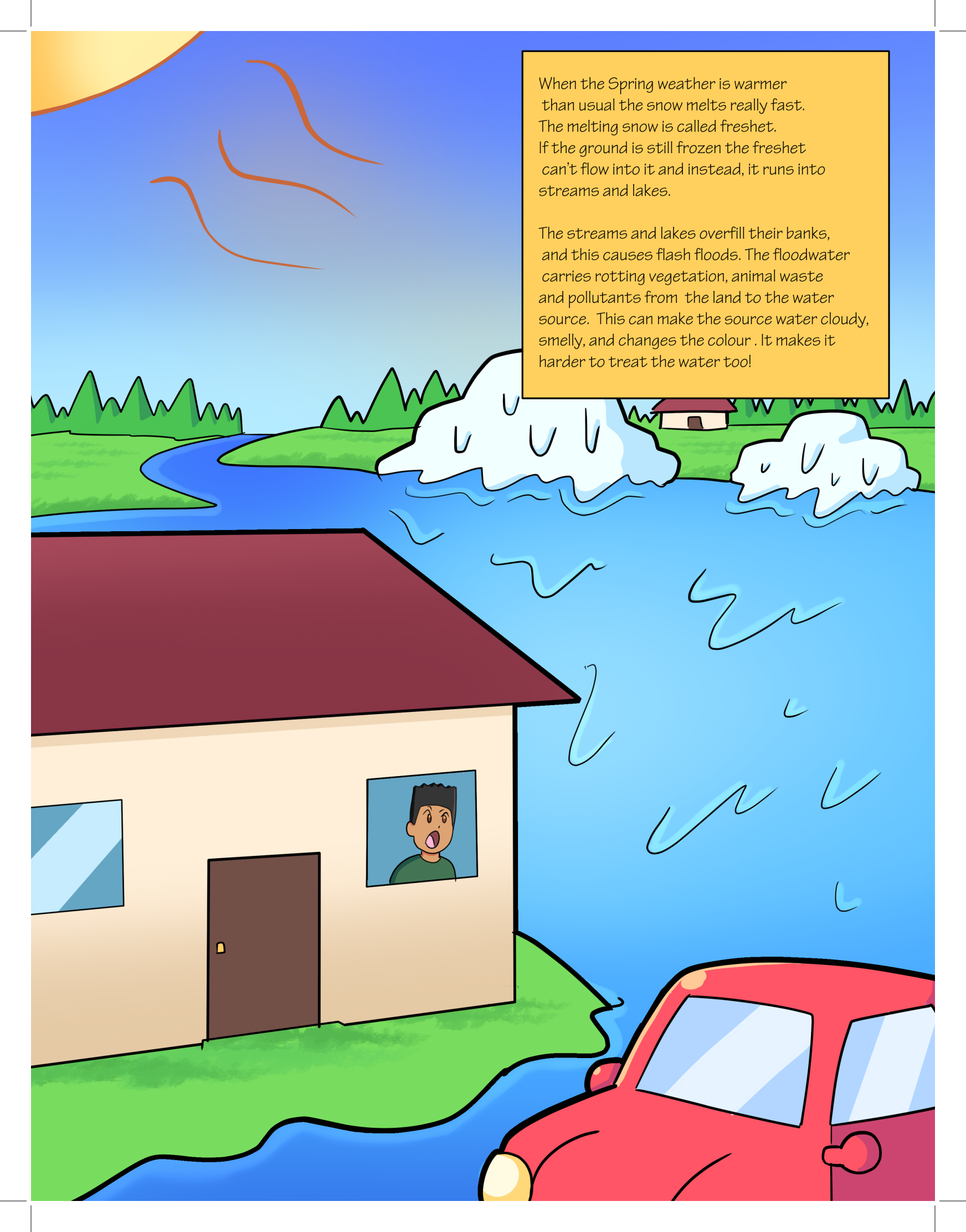
PDF copies of this booklet and other educational materials are available from TSAG

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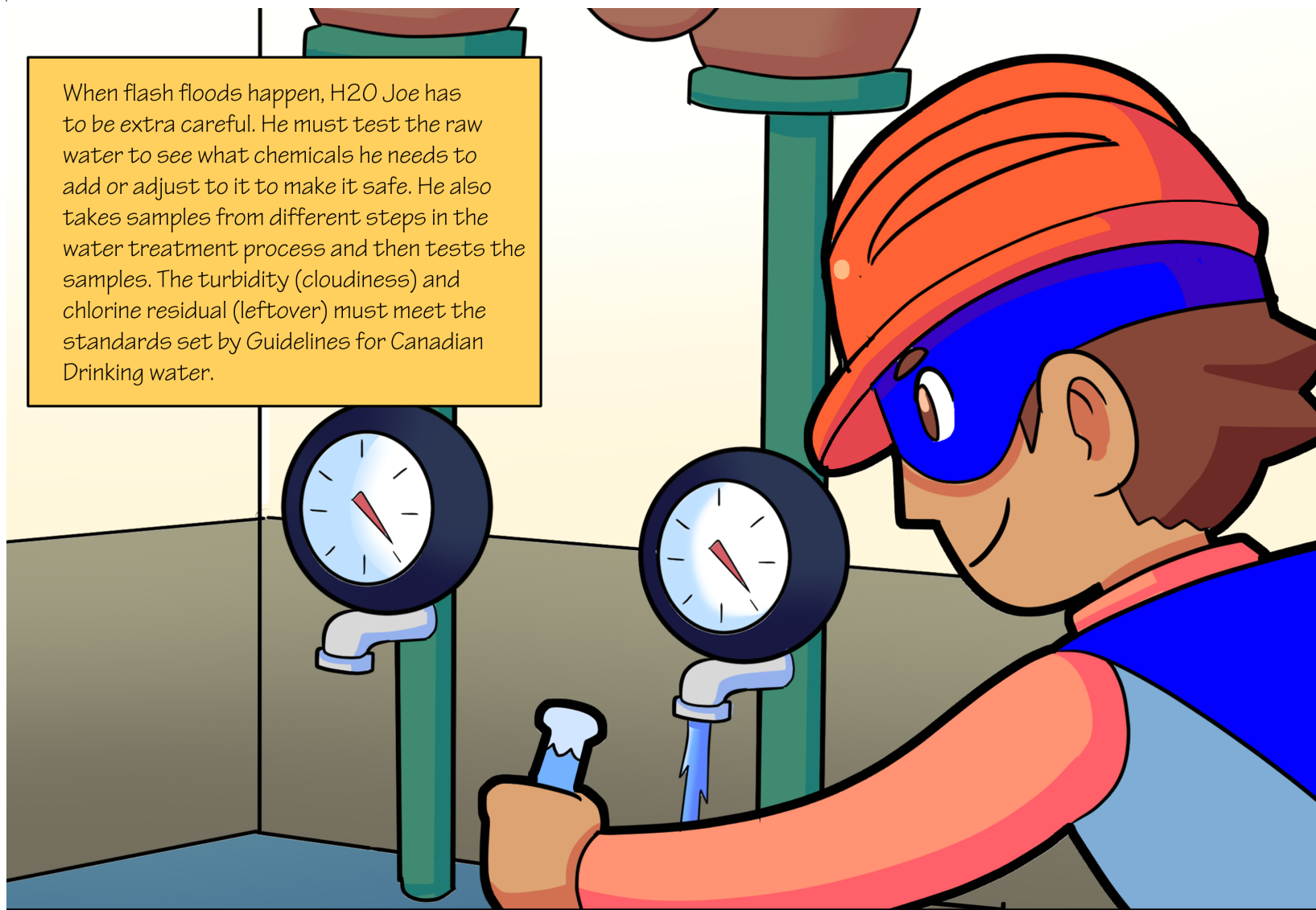




When the Spring weather is warmer than usual the snow melts really fast. The melting snow is called freshet. If the ground is still frozen the freshet can't flow into it and instead, it runs into streams and lakes.

The streams and lakes overflow their banks, and this causes flash floods. The floodwater carries rotting vegetation, animal waste and pollutants from the land to the water source. This can make the source water cloudy, smelly, and changes the colour. It makes it harder to treat the water too!

When flash floods happen, H2O Joe has to be extra careful. He must test the raw water to see what chemicals he needs to add or adjust to it to make it safe. He also takes samples from different steps in the water treatment process and then tests the samples. The turbidity (cloudiness) and chlorine residual (leftover) must meet the standards set by Guidelines for Canadian Drinking water.



This raw water is so turbid (cloudy). I wonder why. Could it be from the flood, a problem in the lines or ...?

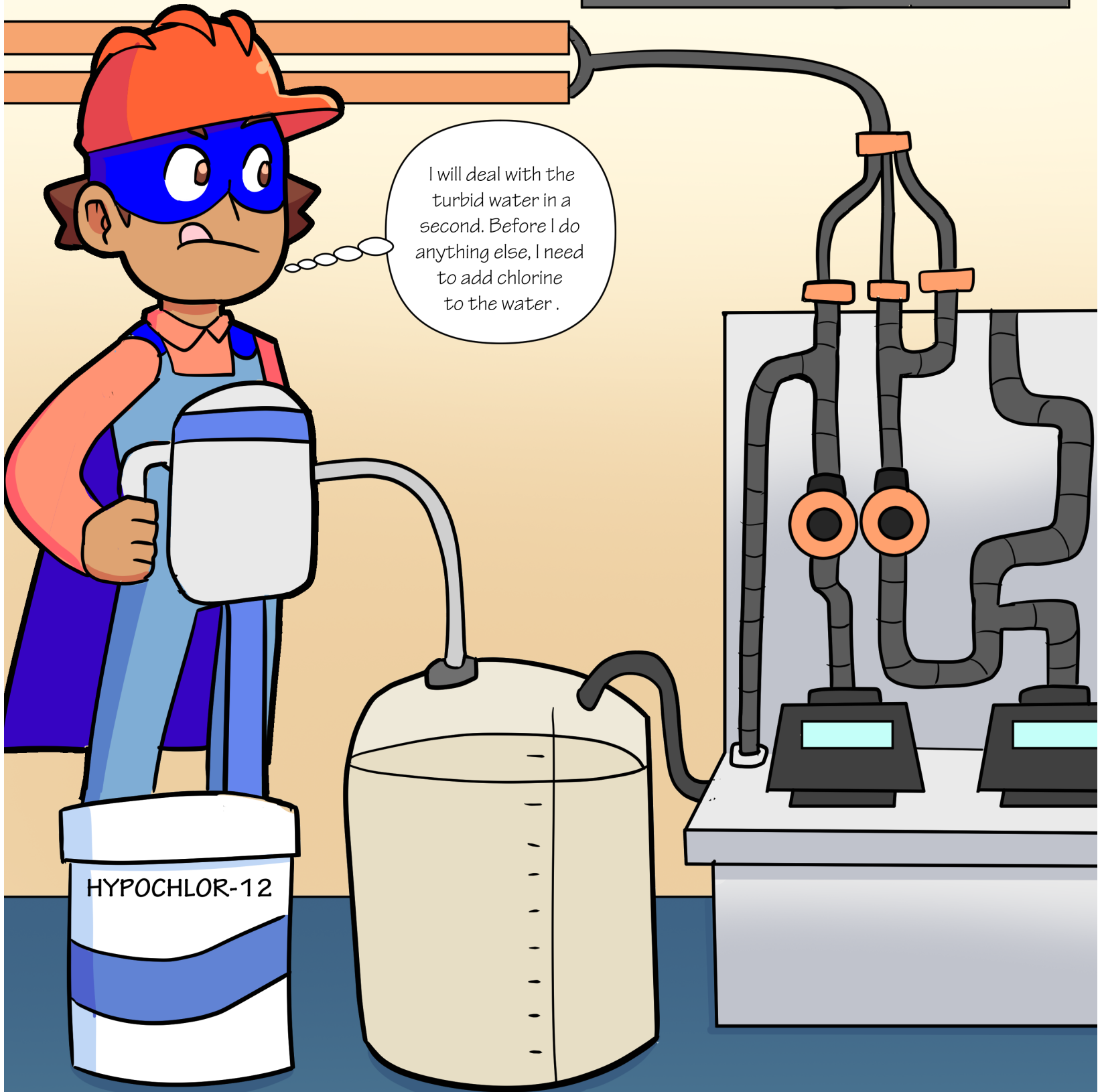


When the system alarm goes off, that means that the water in the system is not meeting the guidelines for Canadian drinking water quality (CDWQ). In this case, the turbidity (cloudiness) is too high

System Turbidity Too High!

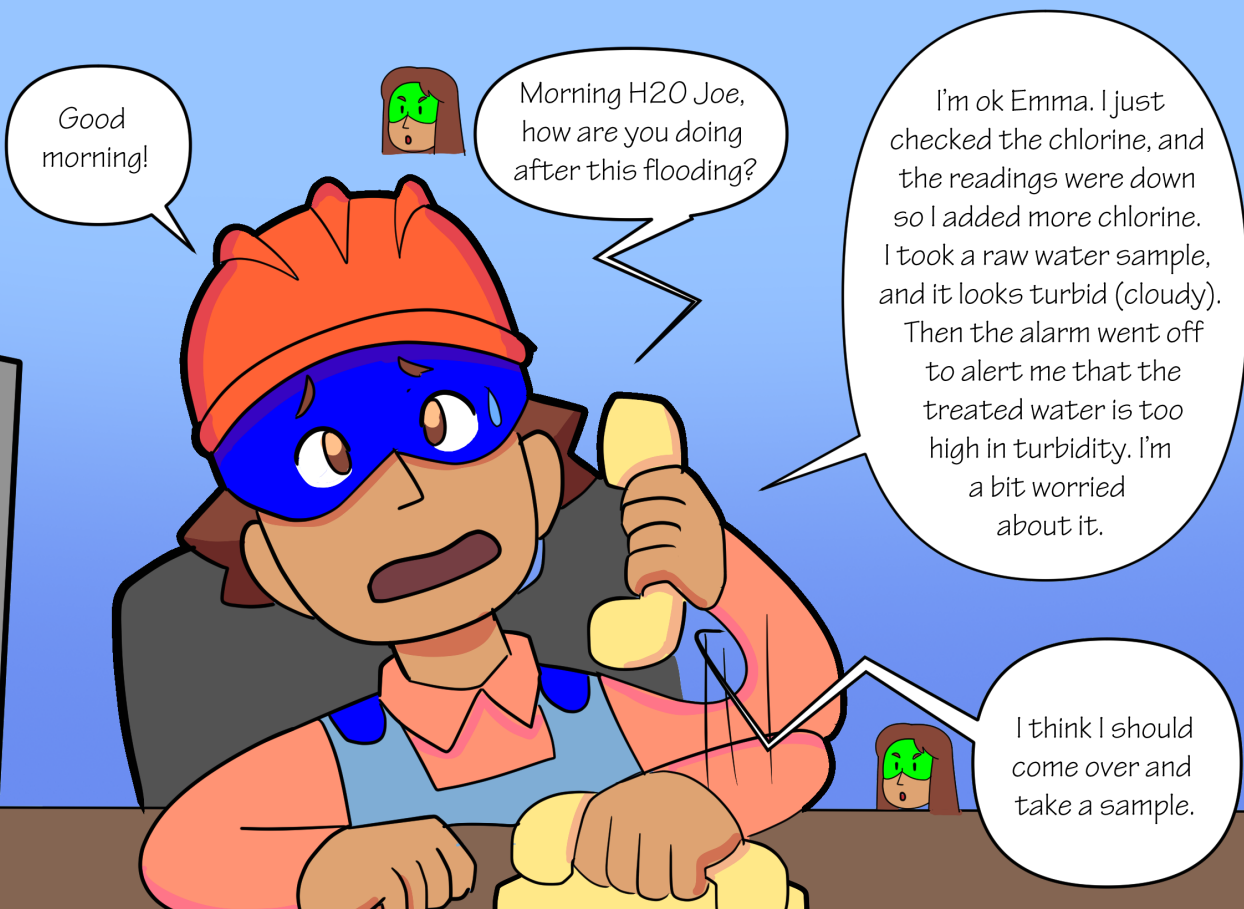


I will deal with the turbid water in a second. Before I do anything else, I need to add chlorine to the water.





System Turbidity
Too High!



Good
morning!

Morning H2O Joe,
how are you doing
after this flooding?

I'm ok Emma. I just
checked the chlorine, and
the readings were down
so I added more chlorine.
I took a raw water sample,
and it looks turbid (cloudy).
Then the alarm went off
to alert me that the
treated water is too
high in turbidity. I'm
a bit worried
about it.

I think I should
come over and
take a sample.

Emma the Environmental Health Officer (or EHO) does many things in her job. She teaches the community about water safety. She takes water samples and tests them. Emma lets the people in the community know when the water is not safe to drink.

Let's do some tests and see what is happening with the water.

The chlorine levels are a bit low but still within guidelines, but the water is too turbid (cloudy). That means that the water treatment plant is having a hard time treating the water properly. I need to issue a Boil Water Advisory right away.



A Boil Water Advisory tells people to boil all the water they are going to use for cooking or that they will drink. Boiling the water will protect them from disease causing germs. Boil water advisories can happen when there is concern for germs in the water. Sometimes the water treatment plants are overloaded when floods happen. It is hard for them to keep up with adjusting the water treatment processes and chemical dosages to match the drastically changing raw water quality.



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URGENT

*****BOIL WATER ADVISORY*****

Public Water Supply

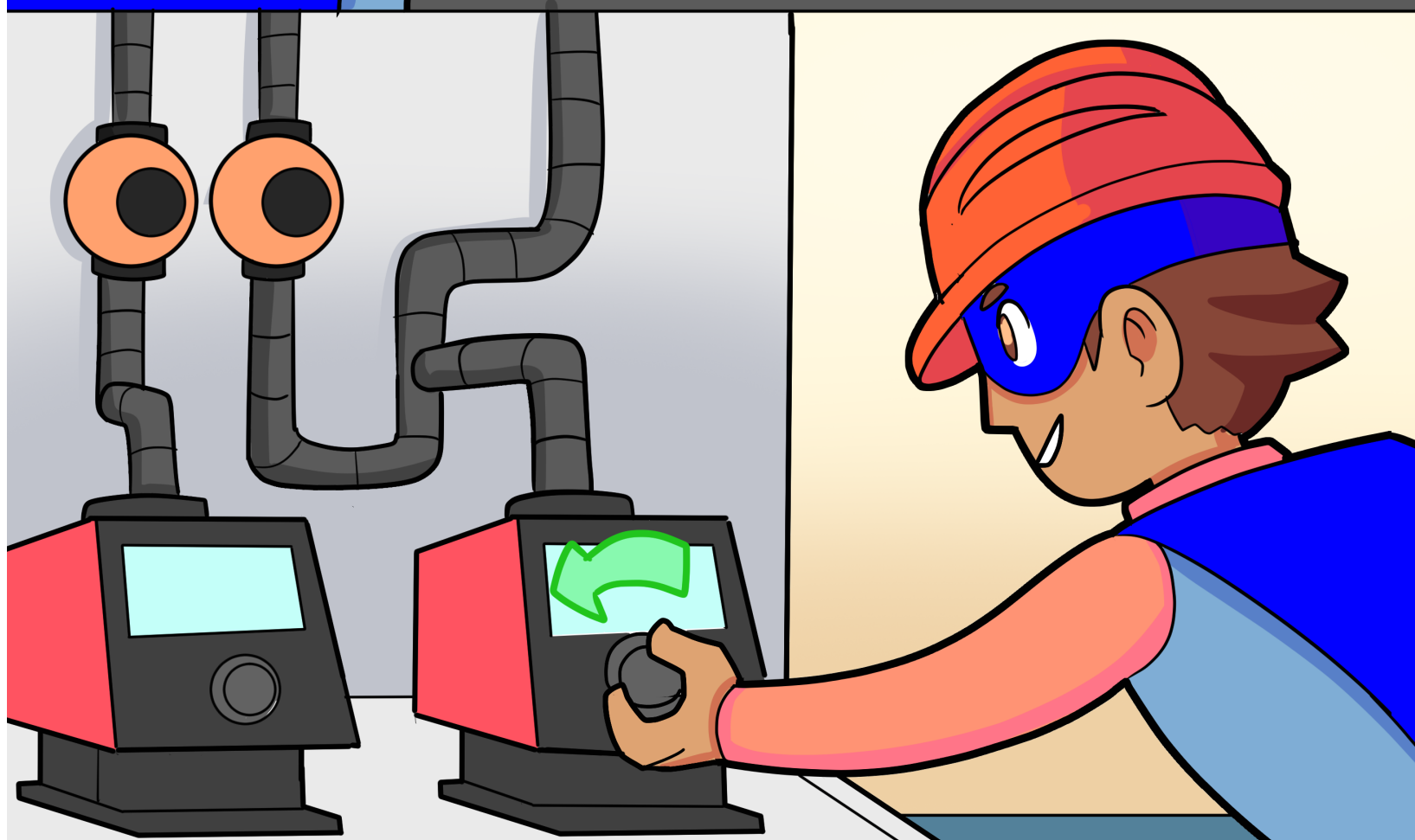
Public Water Supply

I will help
by putting the alert
on Facebook.

We need to change
how the water is being
treated. I will do some jar
testing to see how different
treatment chemicals or amounts
of chemicals would work
to fix the turbid water.

Thanks H2O Joe. I am
going to help the Community
Health Representative (CHR)
post advisories around
the community.

**URGENT:
BOIL WATER
ADVISORY**



The next day...

After H2O Joe has decreased the coagulant to the water, he needs to wait for it to go through the system and then he tests the water again.

Hurray!
the water is clear
and clean again!

Now I need to go
and flush all the dirty
water out of the
distribution lines that
go to people's
houses

Water Quality:
Normal

Flushing the distribution lines replaces the dirty water with clean water. To flush the water out of the distribution system, he opens all the community fire hydrants.





The next day...

Hey H2OJoe,
I got all the water samples
tested and they are all
clean and there are no germs
at all! I am sending out
messages right now that
the Boil Water Advisory
is over.

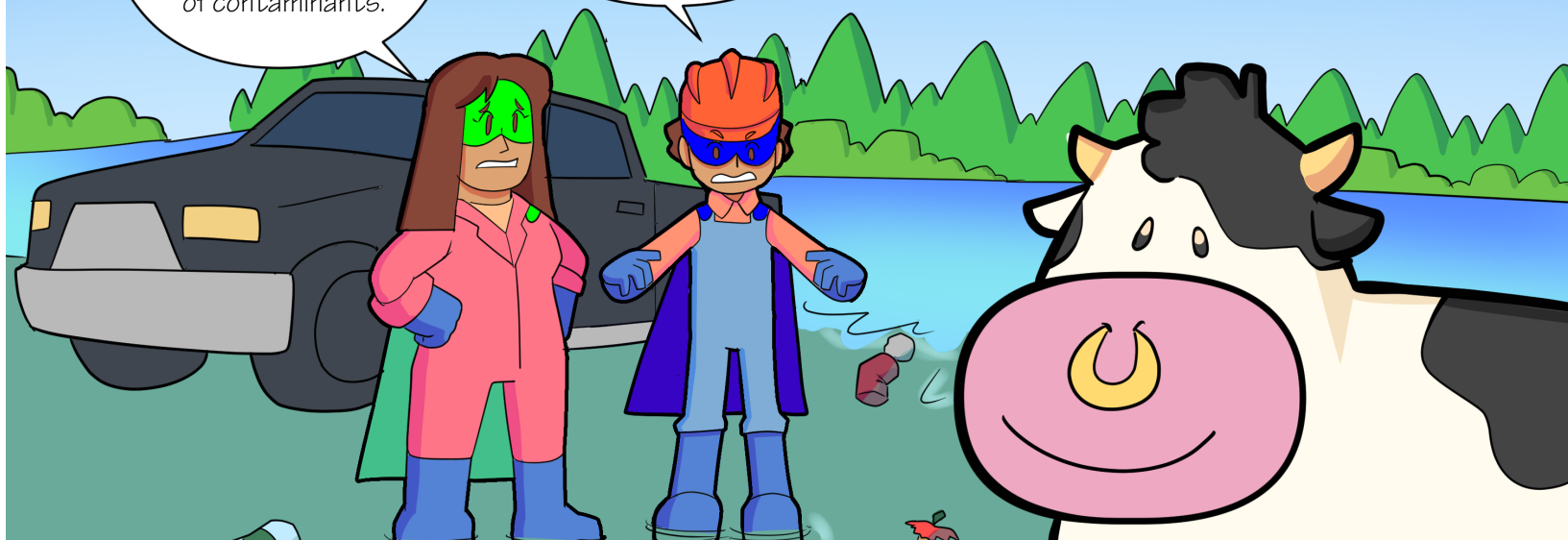
You know, floods always
make the water cloudy,
but I think we should
go to the water source
to see if there is
anything else is
going on.

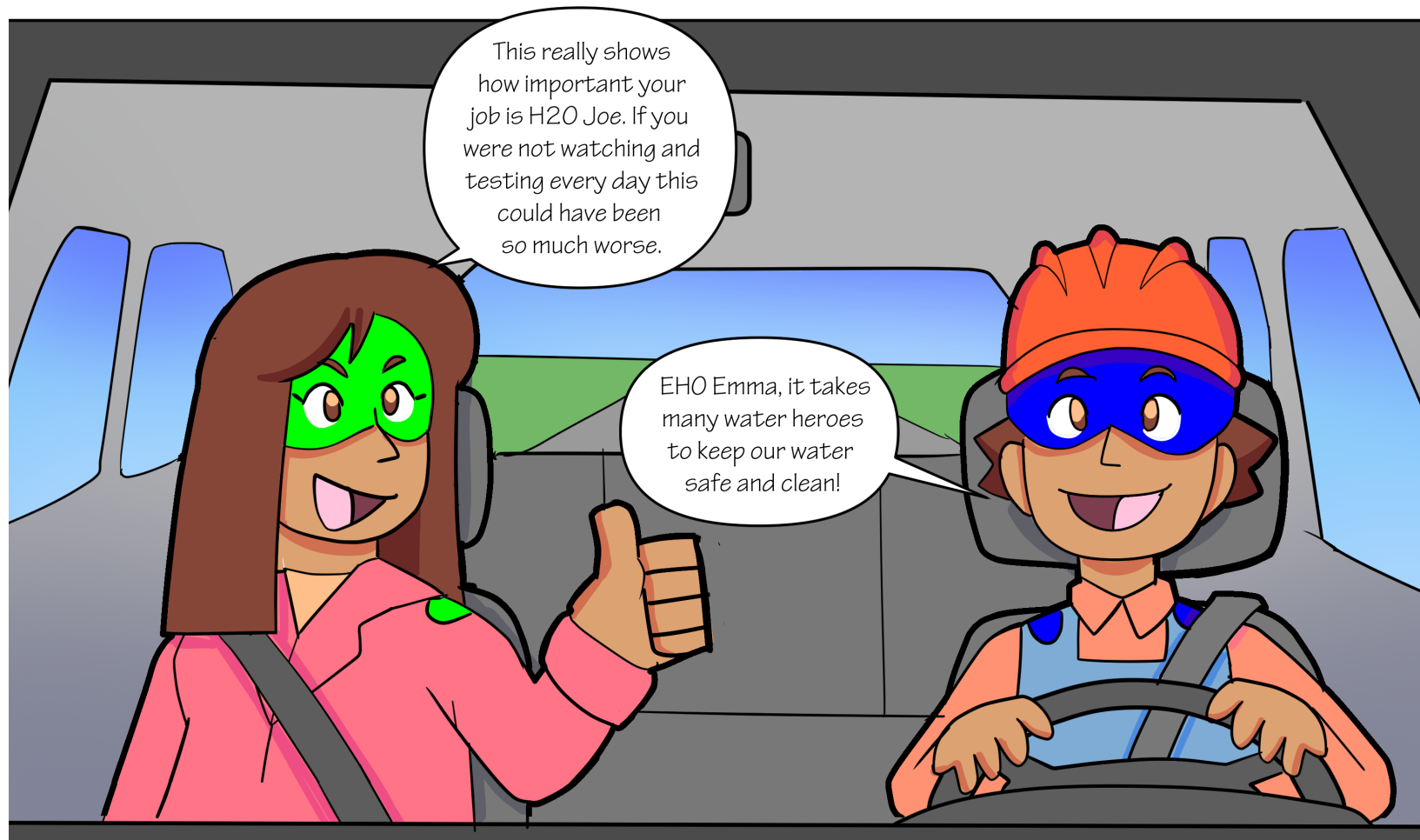
This is really
good news. The
community will be
really happy

I will meet you at
the lake this
afternoon.

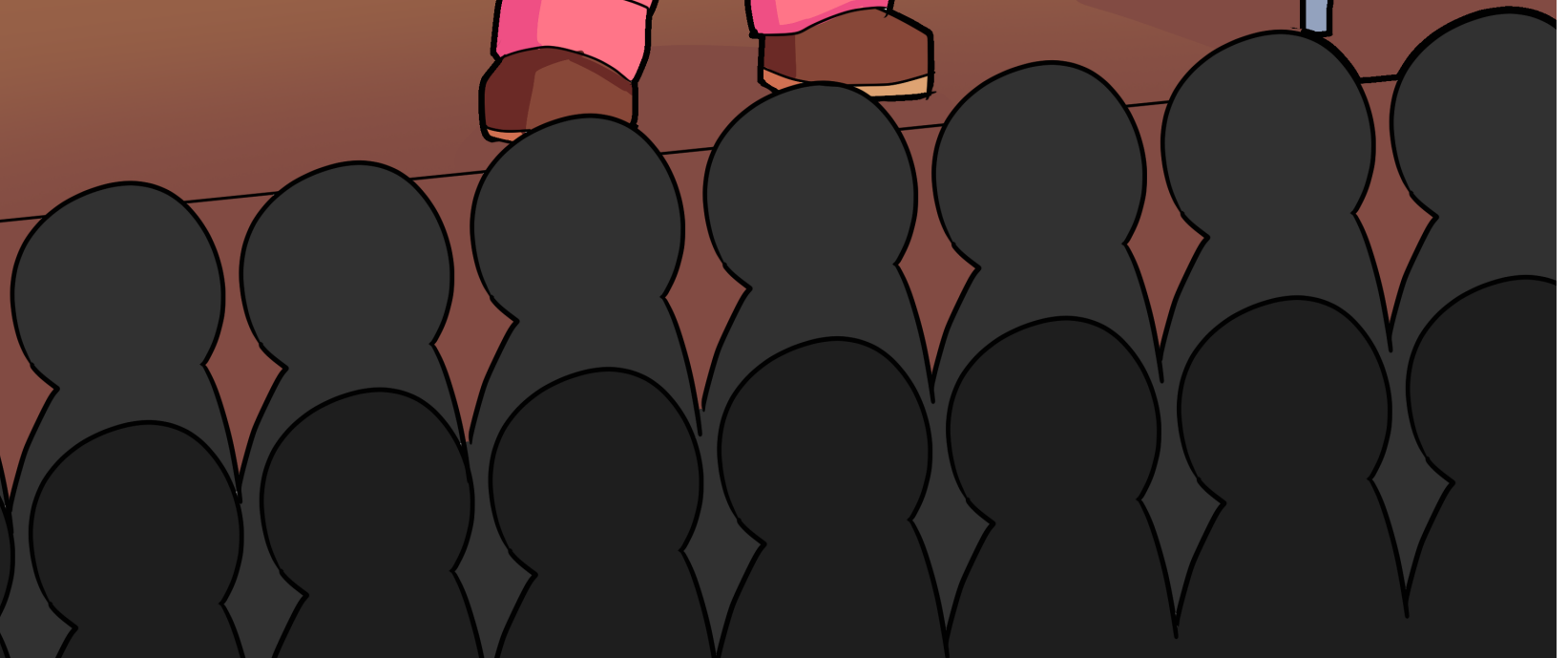
I think it is good
that we met at the
water source to see
if there is anything
else going on. We need
to keep an eye out for other
sources of contamination
like algae blooms, fish
kills or other sources
of contaminants.

All the farms
and pollution nearby
can add germs to
the water.



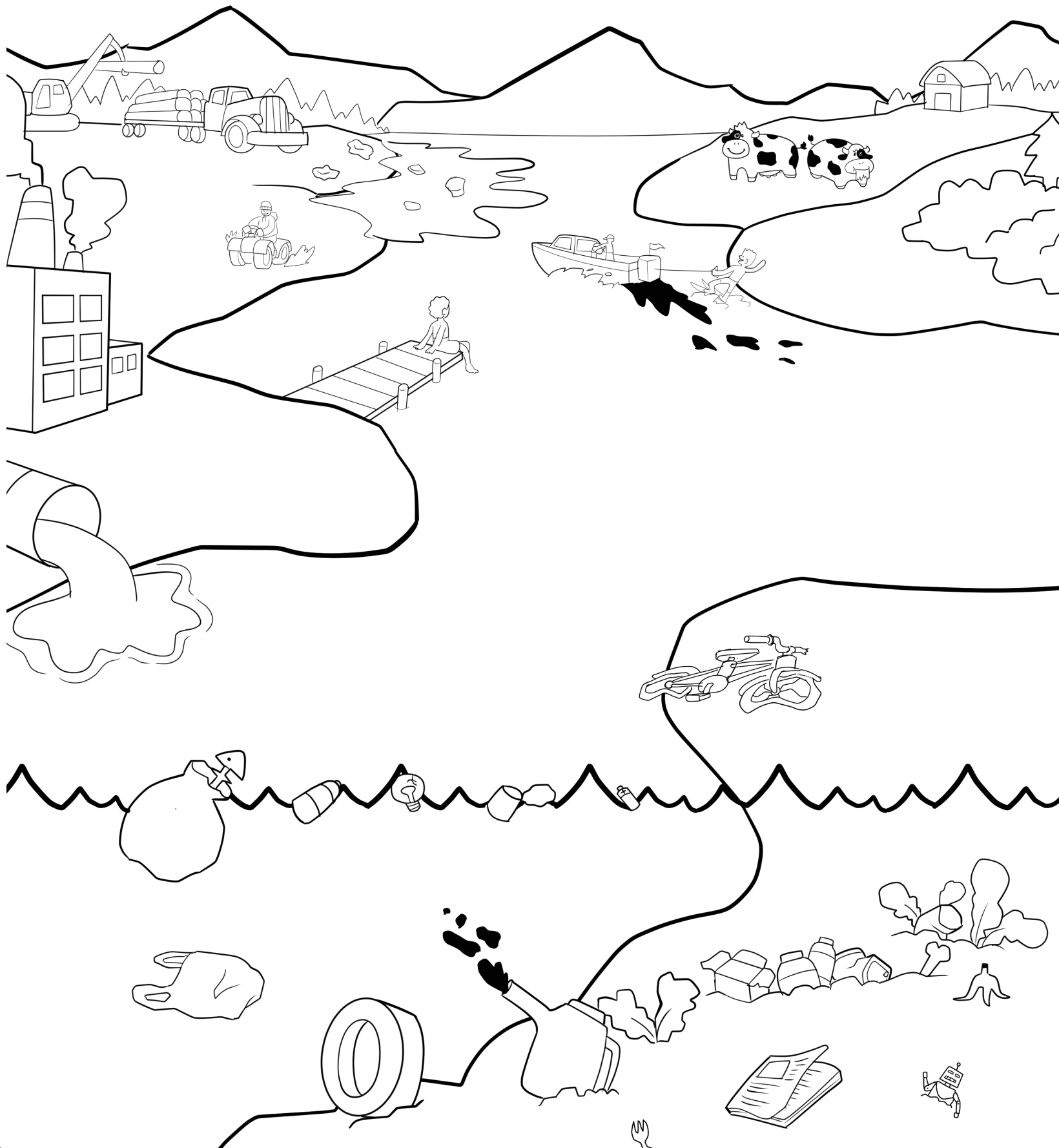


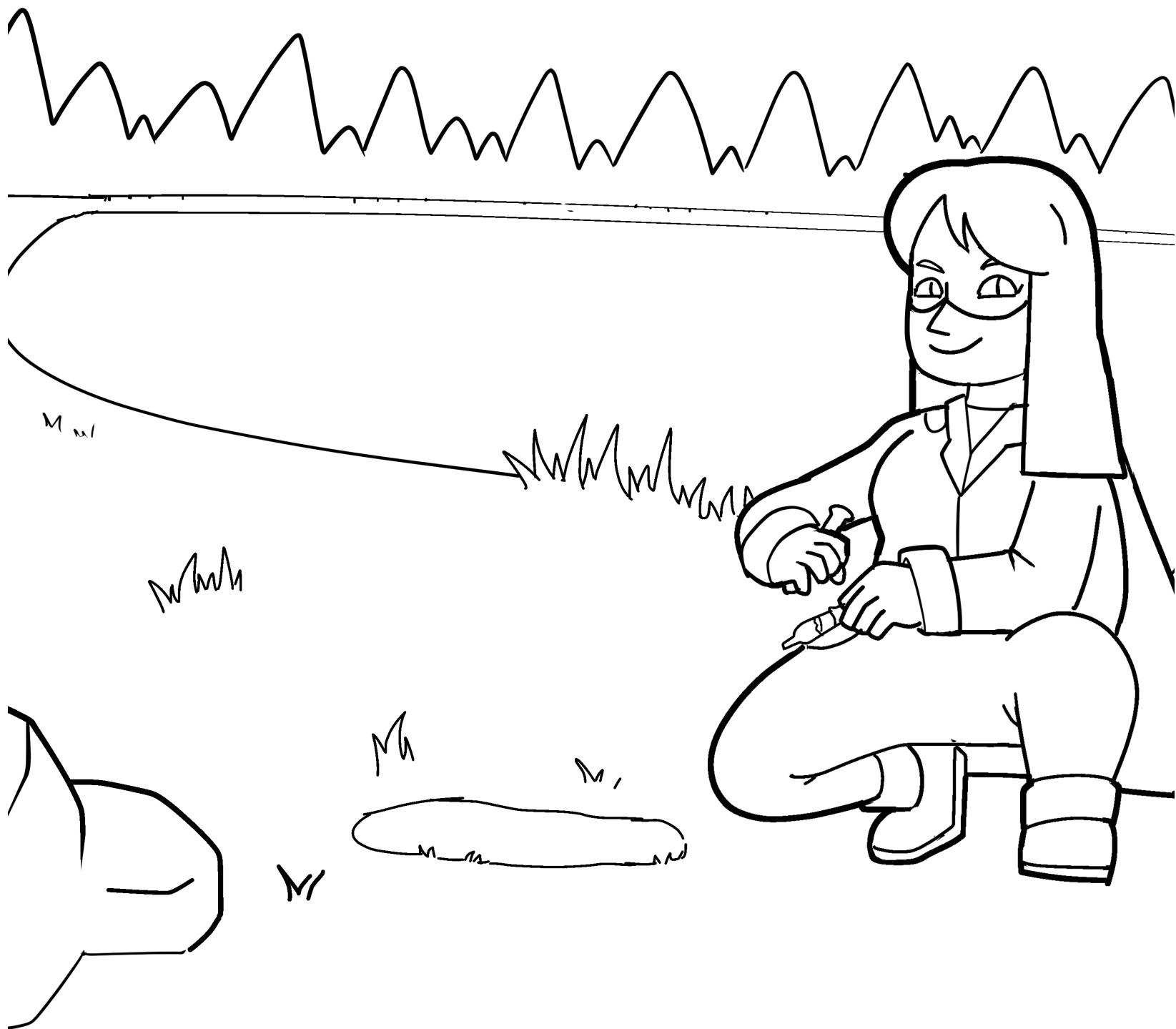
Emma EHO holds a town hall to talk about the importance of using chlorine to disinfect the water. She shows people ways to get rid of the smell and taste of chlorine. She shows all the debris and sediment that washed into the lake near the intake. She talks about how they need to protect the water source by not throwing away garbage there. Some communities form a Source Water Protection Plan Committee made up of various community members. Their goal is to monitor and create a plan to protect their source water from contamination or overuse.

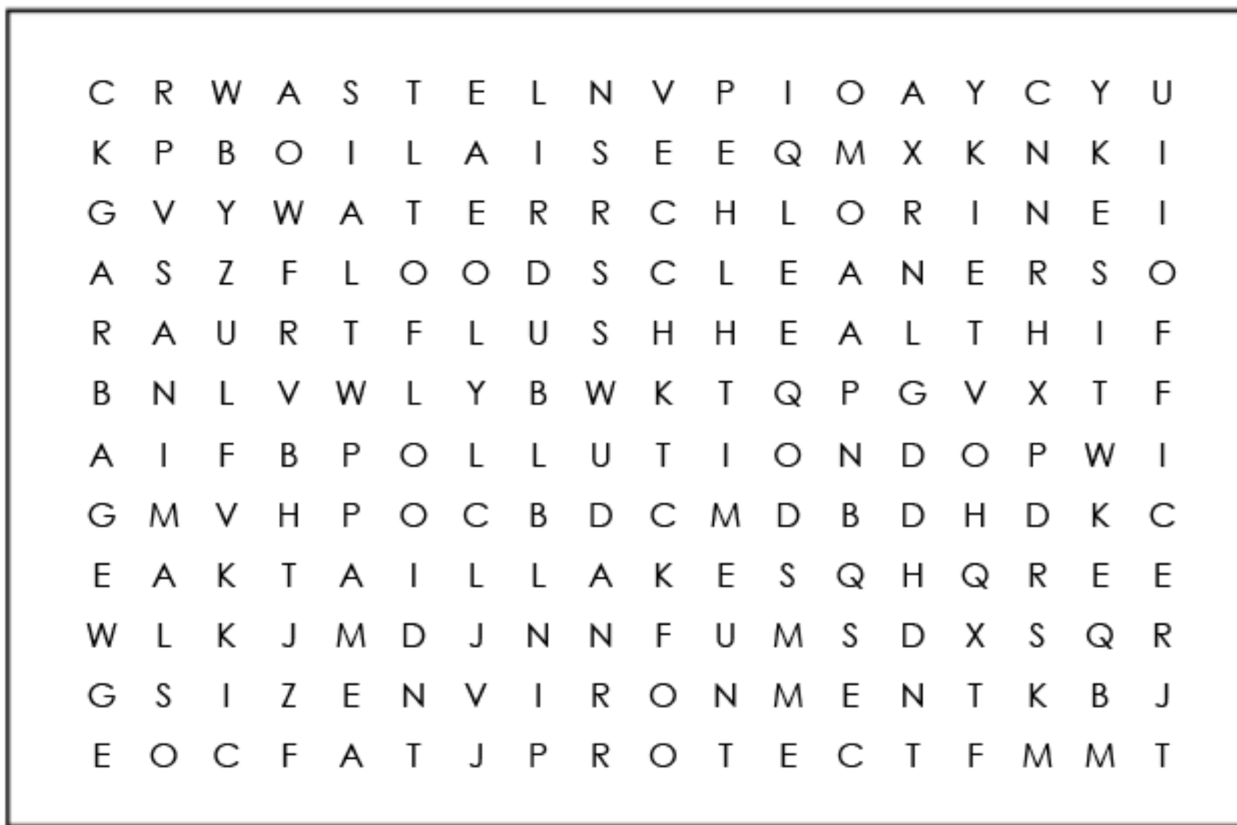


Learning Activity!

Circle all the sources of water pollution that you see in this picture.







Find the following words in the puzzle.
Words are hidden → ↓ and ↘ .

ANIMALS
BOIL
CHLORINE
CLEANERS
ENVIRONMENT
FLOODS

FLUSH
GARBAGE
HEALTH
LAKES
OFFICER
POLLUTION

PROTECT
WASTE
WATER

We can protect the sources of our drinking water.

We can stop pollution.

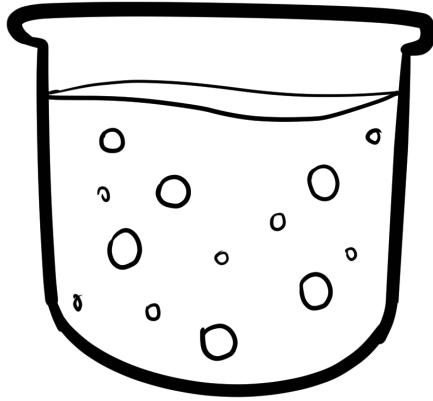
We can:

- Make sure we don't leave any garbage behind
- Make sure that chemicals from our homes don't get put down the toilets and sinks.
- Recycle all the chemicals and cleaners that we don't use anymore.

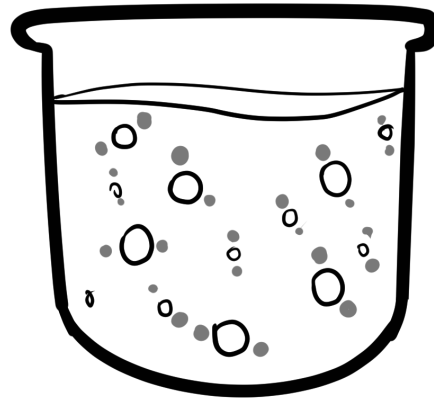
Ask your parents to take you to the nearest body of water and find all the sources of water pollution. Take a garbage bag with you and collect what you can and clean up the body of water.



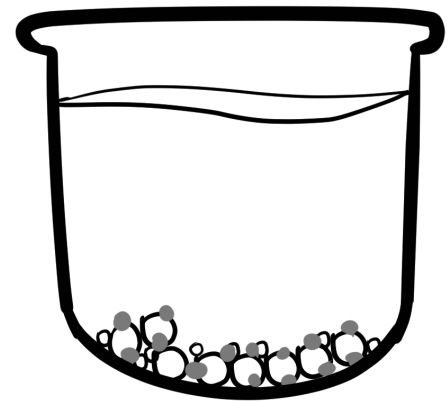
For Parents and Teachers: Water Facts



Before adding coagulant



Adding coagulant



The coagulant attaches to the impurities and forms bigger particles that can be taken out more easily.

Water Facts

Floodwater can contaminate drinking water sources when it comes into contact with things like garbage and animal waste. These things increase the amount of bacteria that seeps into the water source. They also make it more difficult to clean the water.

When water has a chlorine smell, placing it in a pitcher over night will help evaporate chlorine. You can also use a carbon filter such as Brita to minimize chlorine taste and odor.

Activities you can do with your students or children

1. Discuss how you as a family can ensure you do not contribute to contaminating the water:

- Make sure your car doesn't have any toxic liquids leaking from it: gasoline, oil, coolant, antifreeze,
- Don't flush diapers or wet ones down the toilet.
- Pick up after your pet.
- Don't wash paint, used oil, chemical cleaners, down your drain. Take all your household chemicals to the next toxic waste roundup in your community.

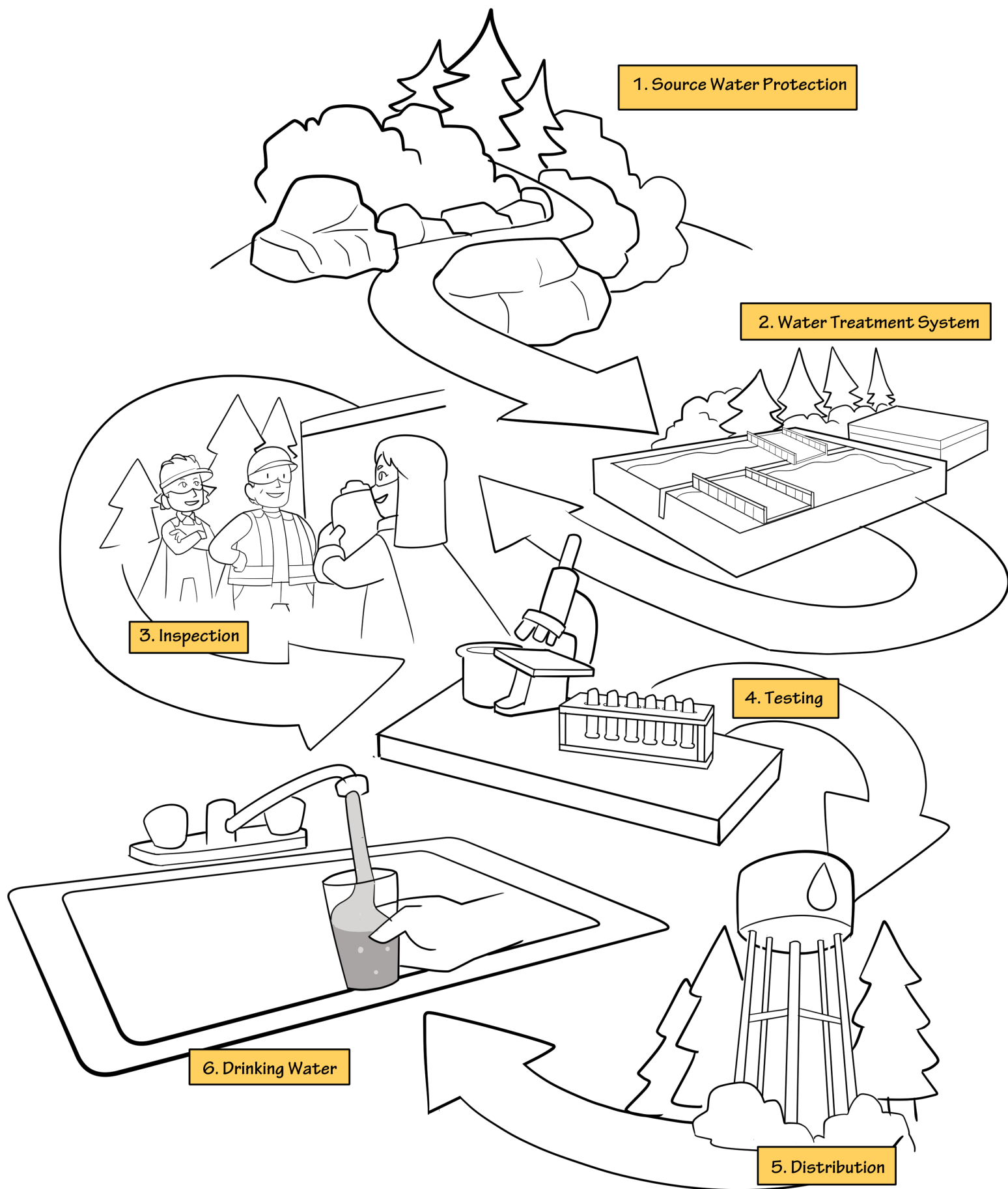
2. Take your child to the nearest local waterbody and see how many different kinds of plants and animals you can count.

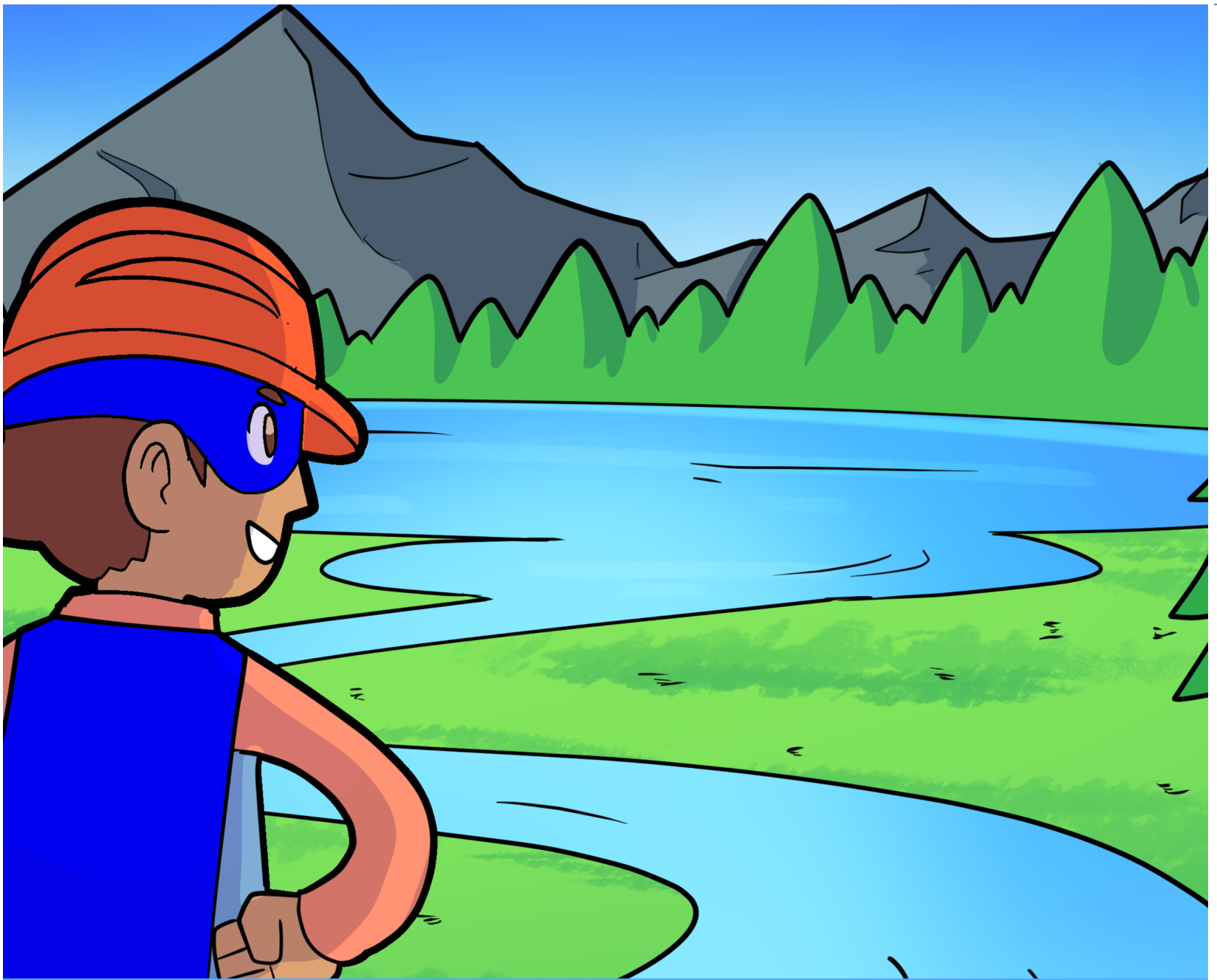
3. Start a community shoreline clean-up program – you could involve public works or the health centre!

4. See if there is a Source Water Protection Plan for your community. Maybe you would like to become a champion for this!

5. To learn more about water treatment try this experiment with your child.

<https://www.squizzelbox.com/blogs/extension-activities-for-water-theme/purify-water-through-chemical-processing>





See you again for H2O Joe's next adventure!