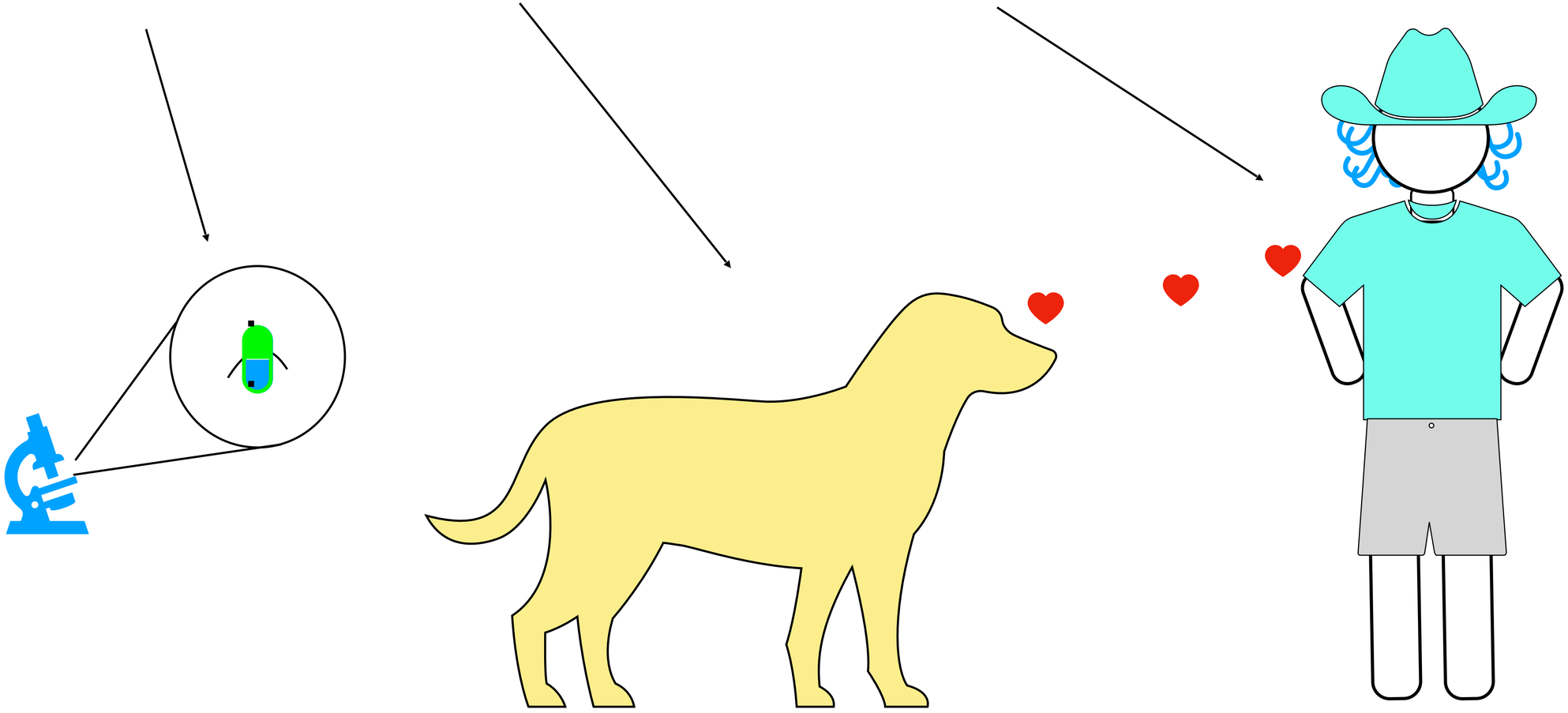
Cy and Anna and Jenny Share the Lake



A Children's Story and Coloring Book 1
About Cyanobacteria That Live In Our Lakes And How To Keep Our Children And Pets Safe

By William Richtsmeier, MD, PhD and The Otsego Lake Watershed Supervisory Committee

Note to parents:

This Book 1, is an experiment in providing free education to children about our lake. Specifically, with the help of an accompanying adult, it is to teach children about the risk to people and also, particularly to dogs, if they come in contact with toxins produced by Cyanobacteria that live in our lakes. It is expected that the accompanying adult will read through the book before a child encounters the book alone and makes sure the child can understand the point of the book and how the child can continue to use the lake safely.

The use of the book is provide free of charge to be down loaded, and printed at home in a landscape format or read on the computer. You should be able to staple the left sides with adequate space to create a “book”. Some of the pages are in color for educational reasons but the child should feel free to color anything to help them bond with the story and participate in knowing what goes on in the lake. If you don’t have a color printer you can get the colors started by referring to this master copy.

We hope you will provide us with feed back about the book’s value, and how your child responded to it by contacting us through the Village of Cooperstown’s Web site. There will be 3 books in this series.

Book 1

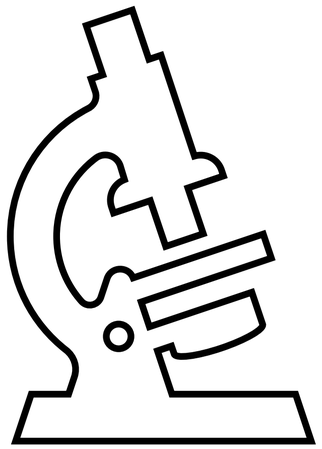
This book is for children with an adult who can help read the story and explain some of the more complicated observations of our Lake and it's water inhabitants. If the adults have questions, the Otsego Lake Watershed Supervisory Committee will be happy to help answer them. Cyanobacteria do not have eyes or arms or "friends" and they don't need suite cases when they travel, but they are shown here with them for the sake of explaining their roll in lake biology to young people. Toxins, illustrated here as a small x, are not alive but are a chemical - sort of like the substance on poison ivy leaves. You just have to touch it to get the bad effect (although the mechanism of injury is quite different).

I hope the children will color in all the area's left uncolored and to add anything to the picture story they feel they would like to see in it, like a facial expression. Some pages have color on parts that are important to the lesson. This "book" can be copied or downloaded and reproduced for the purpose of education about the Lake.

The presentation's graphics are limited by what is available through the laptop computer's programs. There is more information about Harmful Algae Blooms (HABs) at: https://otsegocountyhabs.com/ and a complementary books about cyanobacteria and the lake are available through The WSC entitled "Book 2 - Tommy Loves His Lake", and Book 3 "Jenny and Tommy and Their Dads Go Camping"

Cy is a Cyanobacterium.  He lives in the Lake.

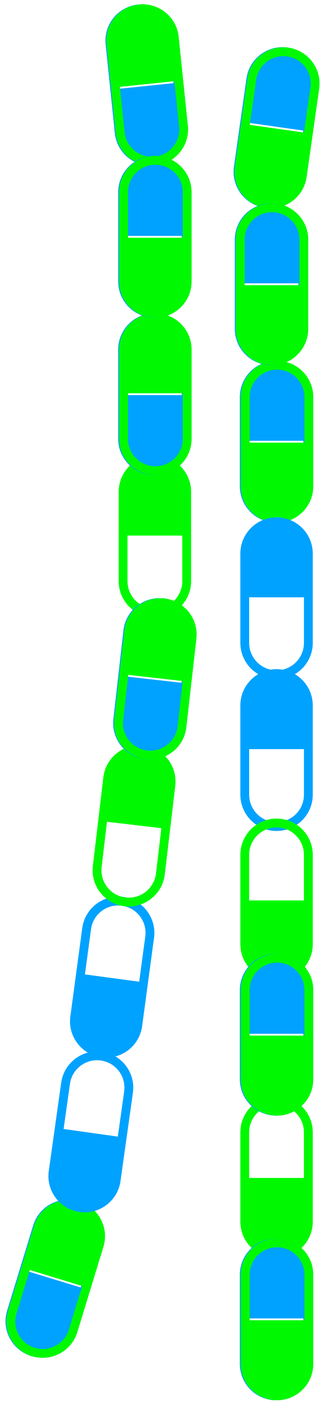
His family was blown to our lake thousands of years ago. Some of his cousins are green and some are blue-green or “turquoise” color. They all have a greenish pigment like chlorophyll inside them that gives them their color - like plants.



Cy is very small, he can only be seen by us with a microscope. We have drawn him larger so you can imagine what his life is like.

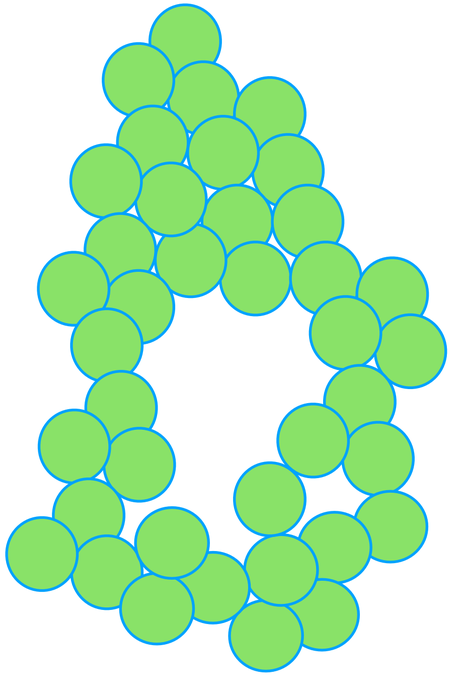
He is so small that you could line up about 100 of his friends side by side across the period at the end of this sentence. They are very small.

If they were as big as we draw them here, the line would stretch for a very long way! But they don’t even get as big as this period. (You will see why in a few pages.)

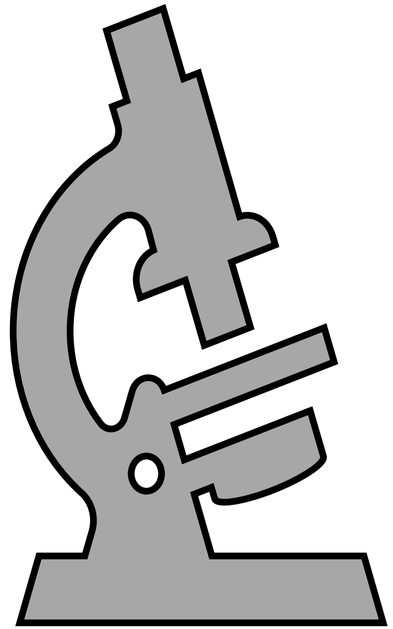


Cyanobacteria can grow in different ways. Some in long chains, like algae, some sick together in “globs” and some are just loose.

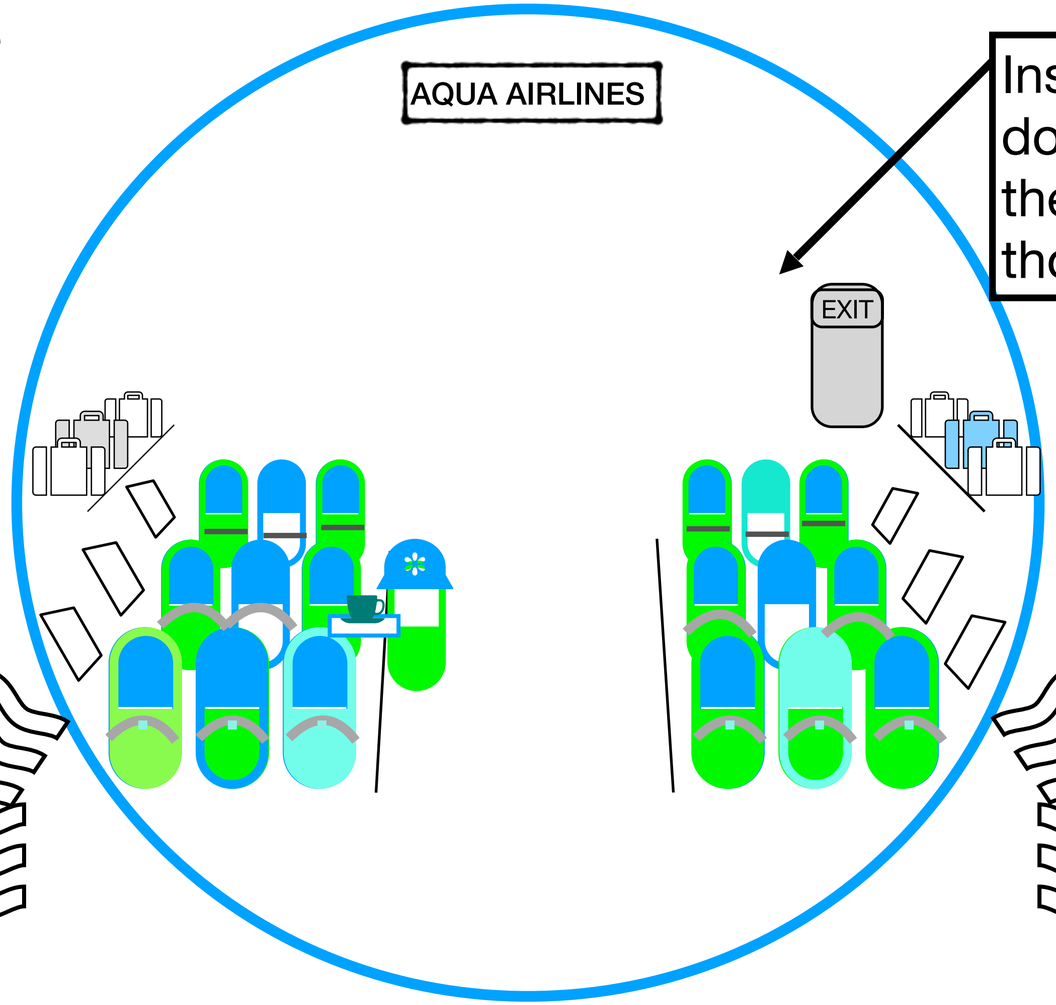
We chose to draw them as being loose to help explain how they grow and make toxins but the other two forms are very common.



They also can be bluish, or green or the color of turquoise.



Cy’s whole family is so small that they all can fit inside a raindrop. That’s how they came to the lake, long, long ago from far, far away, blown by the wind, and splashed into the lake



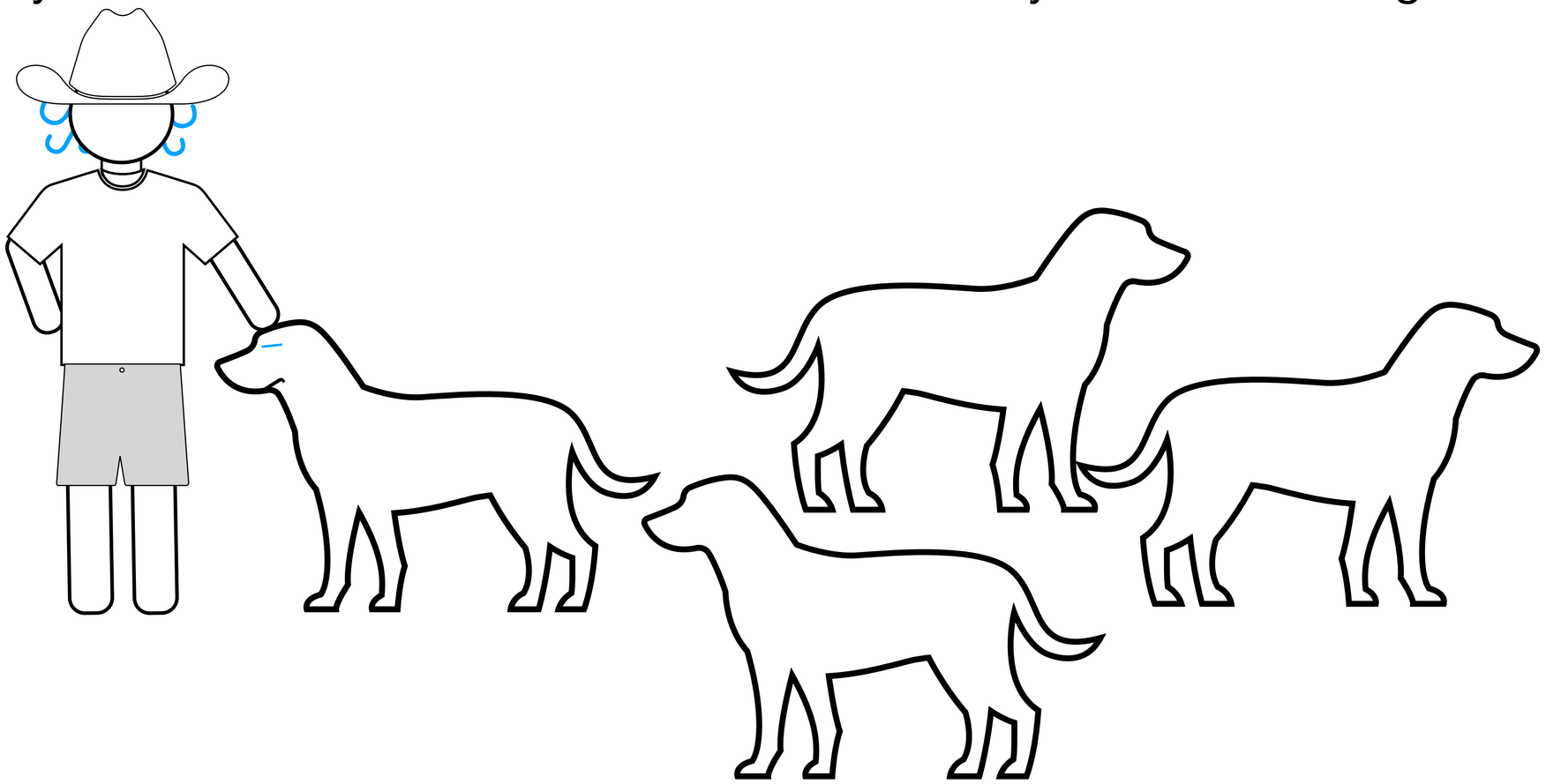
Inside a rain drop spashing down.- (It really doesn’t look like the inside of an airplane, but we thought it was funny to think that)

Can you color the water blue?

How do you think they could get into a raindrop? We’ll see later —>

Jenny is a child who's family lives near the lake. She chose her dog, Anna, to come and live with them because Anna was the nicest dog of all. Jenny's hair and skin can be any color.

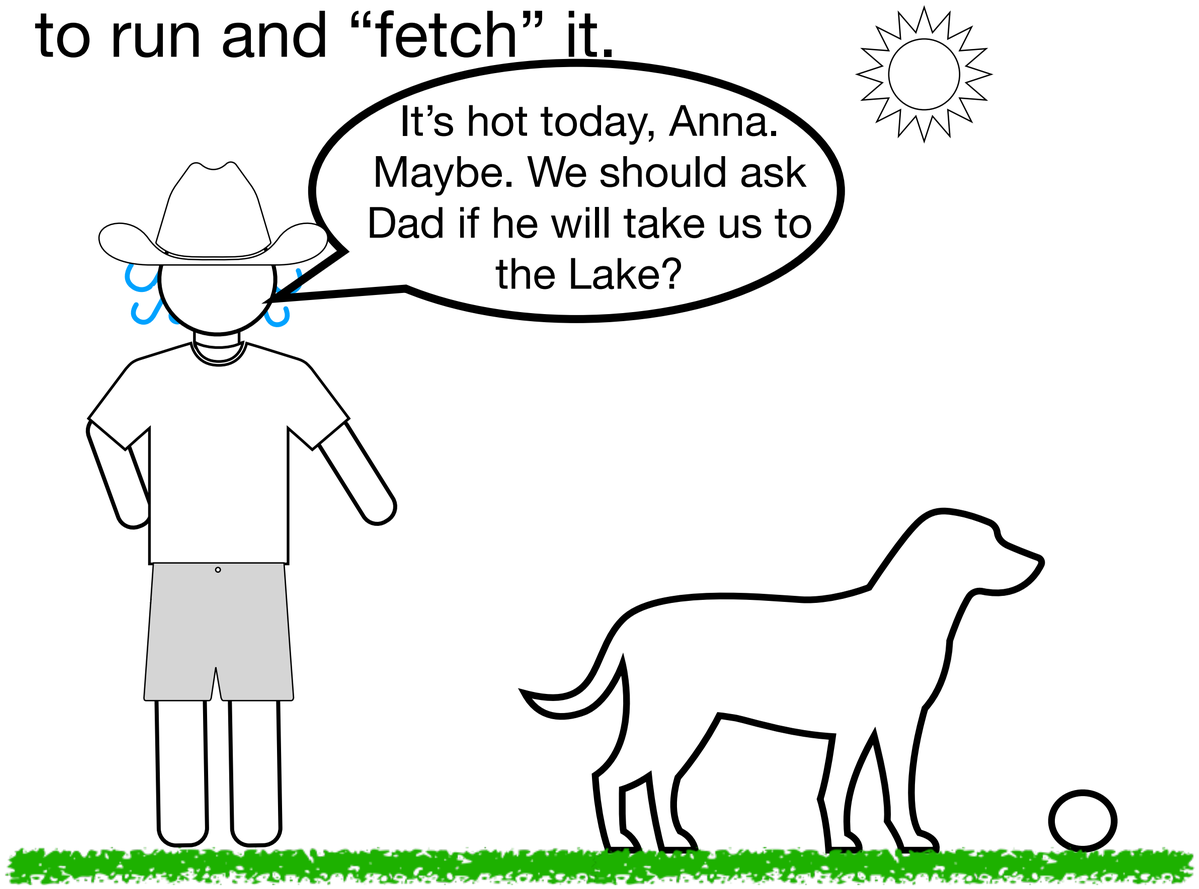
Anna is a dog called a Labrador Retriever. Her brothers and sisters can be different colors. They can be yellow or black or the color of chocolate. Can you tell which dog is Jenny's?



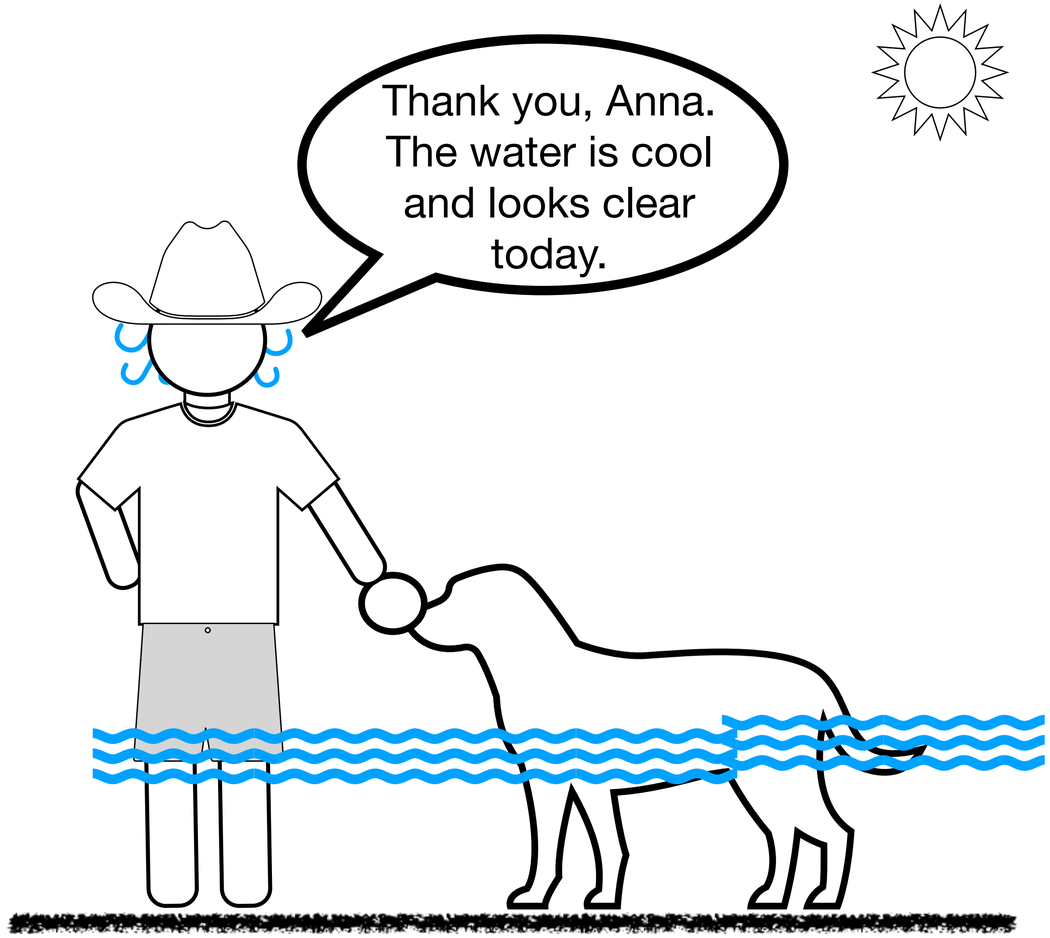
What color is Anna's hair? Can you color the other dogs their colors?

Anna and Jenny like to play together.

Sometimes Jenny throws a ball for Anna to run and “fetch” it.

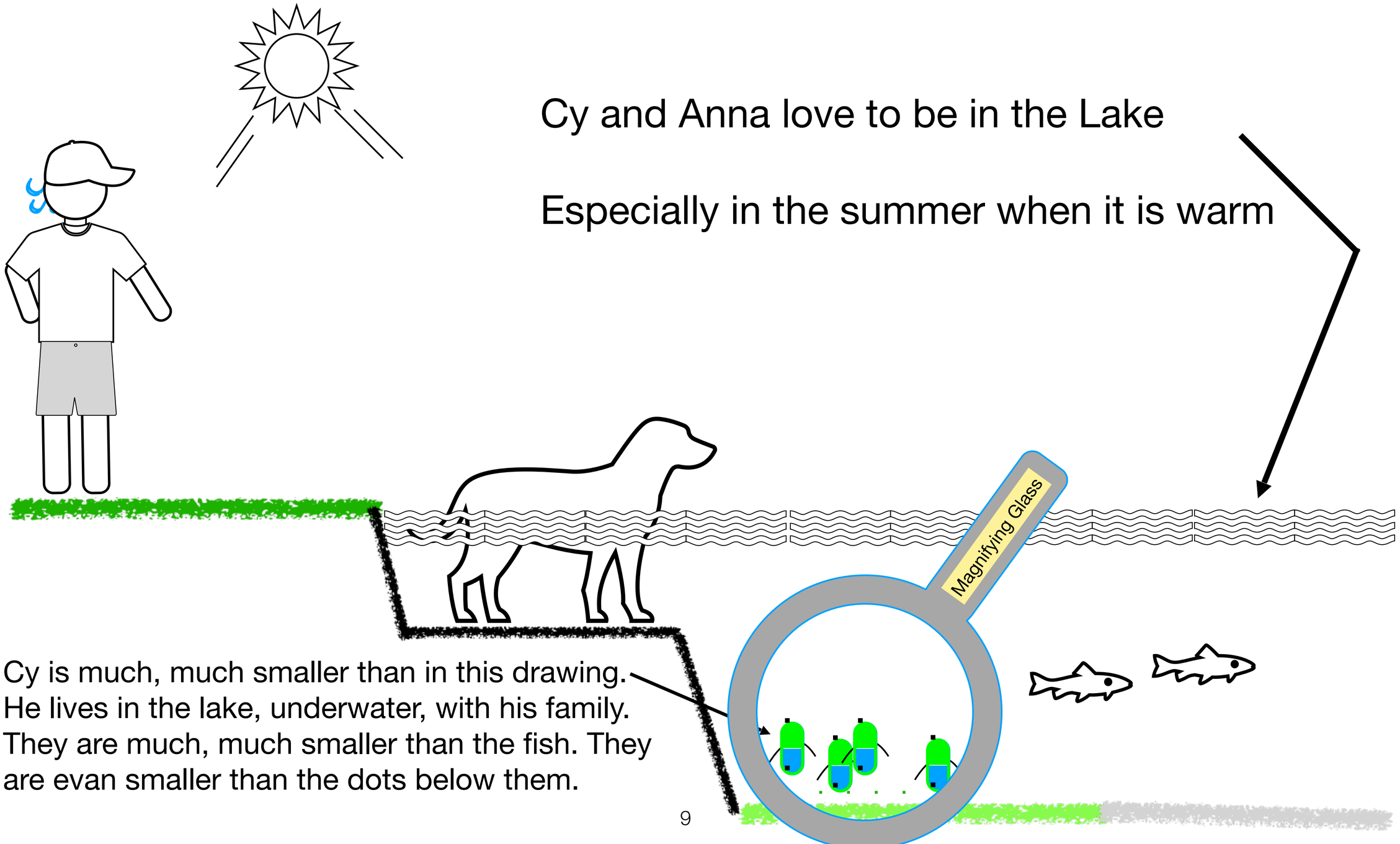


Sometimes Jenny throws a ball into the lake for Anna to swim and “fetch” it.



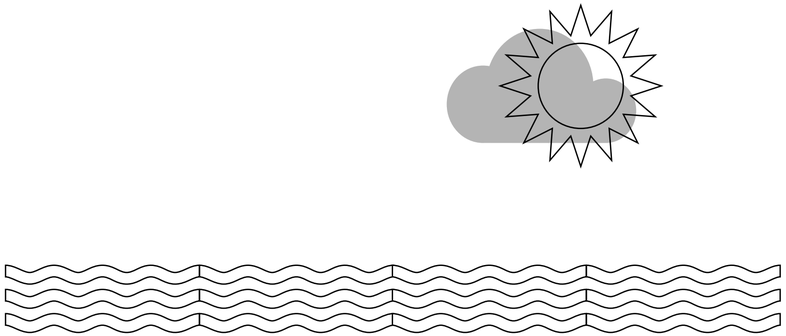
Cy and Anna love to be in the Lake

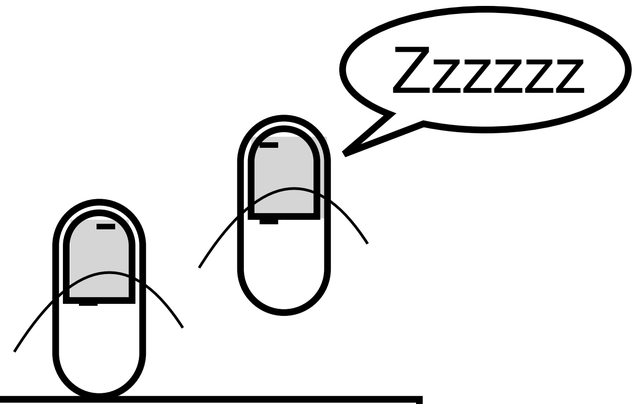
Especially in the summer when it is warm



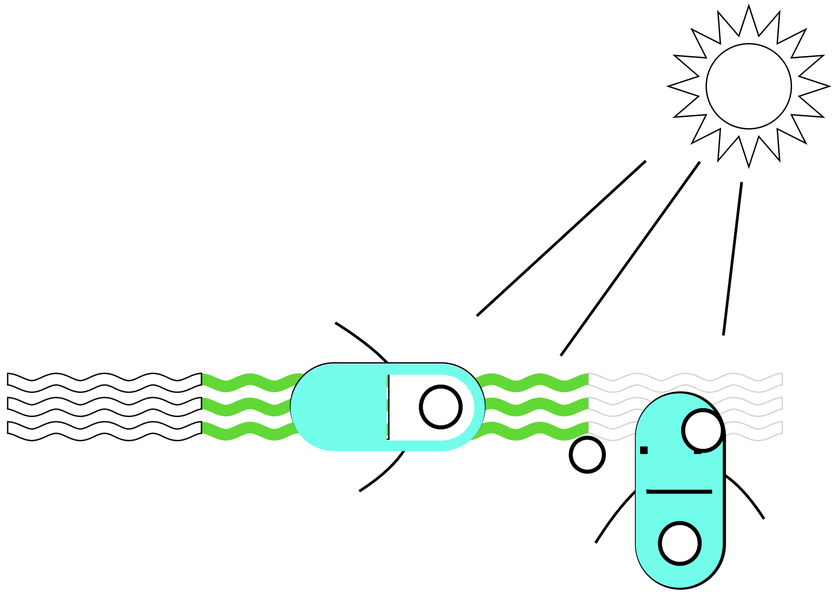
Cy is much, much smaller than in this drawing. He lives in the lake, underwater, with his family. They are much, much smaller than the fish. They are evan smaller than the dots below them.

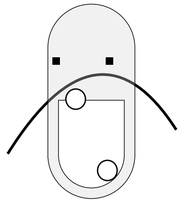
Cy and his friends love the sunshine





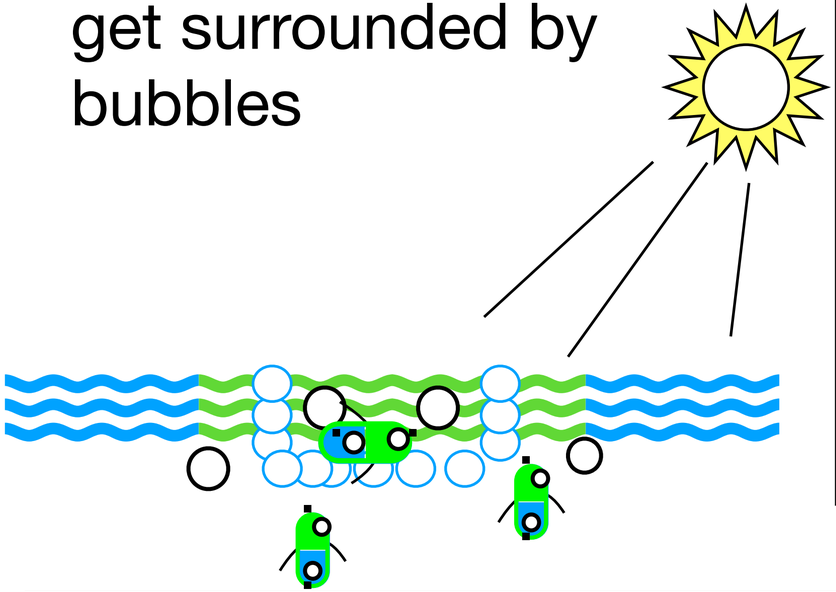
When it’s night or cloudy, they are sort-of asleep.





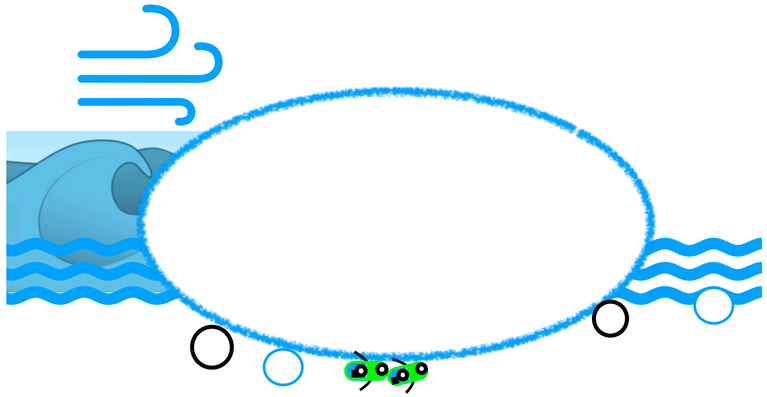
When the sun shines and warms the lake, Cy and his friends can make oxygen bubbles from the sunshine using a green chemical, like chlorophyll, that makes plants green. When they make bubbles, they can float to the surface. If there are enough of them they can make the water look green.

If Cy's friends are making a lot of oxygen they can make so much that they get surrounded by bubbles

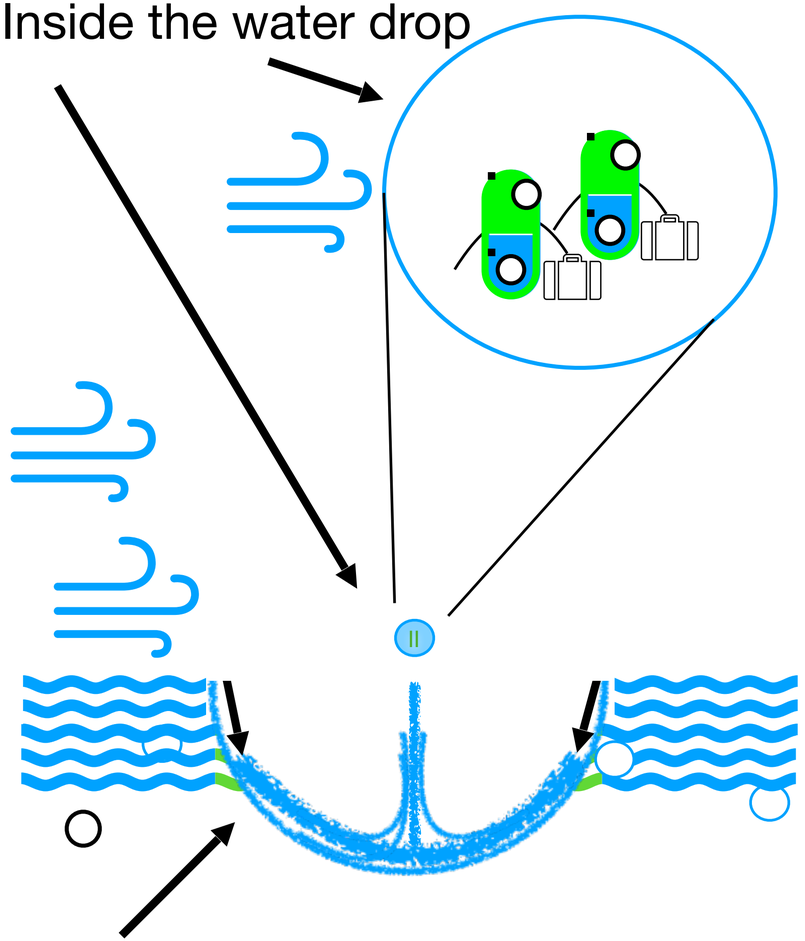


Cy's friends are drawn smaller on this page but in the drawing they still look much bigger than they really are.

If the wind is blowing they may get underneath a big bubble or part of a wave.



Inside the water drop



When the bubble bursts, the water on the sides falls down very fast and pops up a drop of water right in the middle of the bubble and shoots it up into the air. If the bacteria are right there, they can be pitched up into the drop, then swept away by the wind within the new drop. They may go far away to live somewhere else.

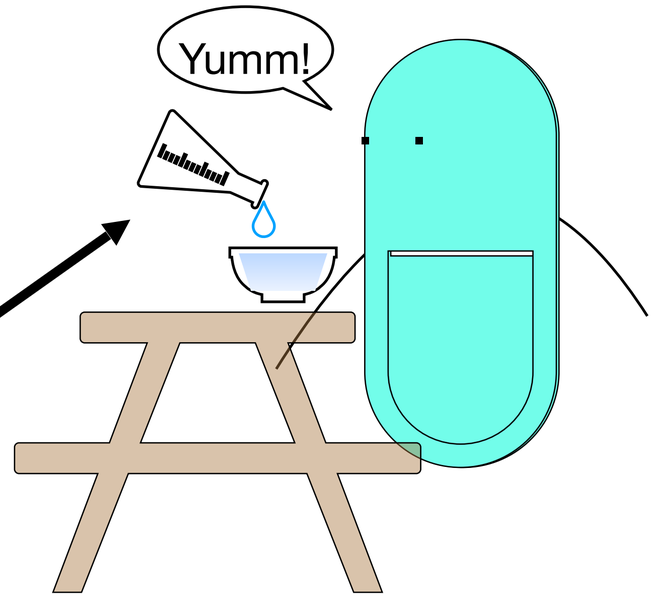
Where do you think they might go?

Cy and his friends love to eat breakfast.

Like plants, they love to eat funny things - like Nitrogen and Phosphorus. People can’t eat Nitrogen or Phosphorus like bacteria can. Nitrogen and Phosphorus are some of the things in dirt than help plants grow. They can get washed into the lake when there is melting snow or a lot of rain near the lake.

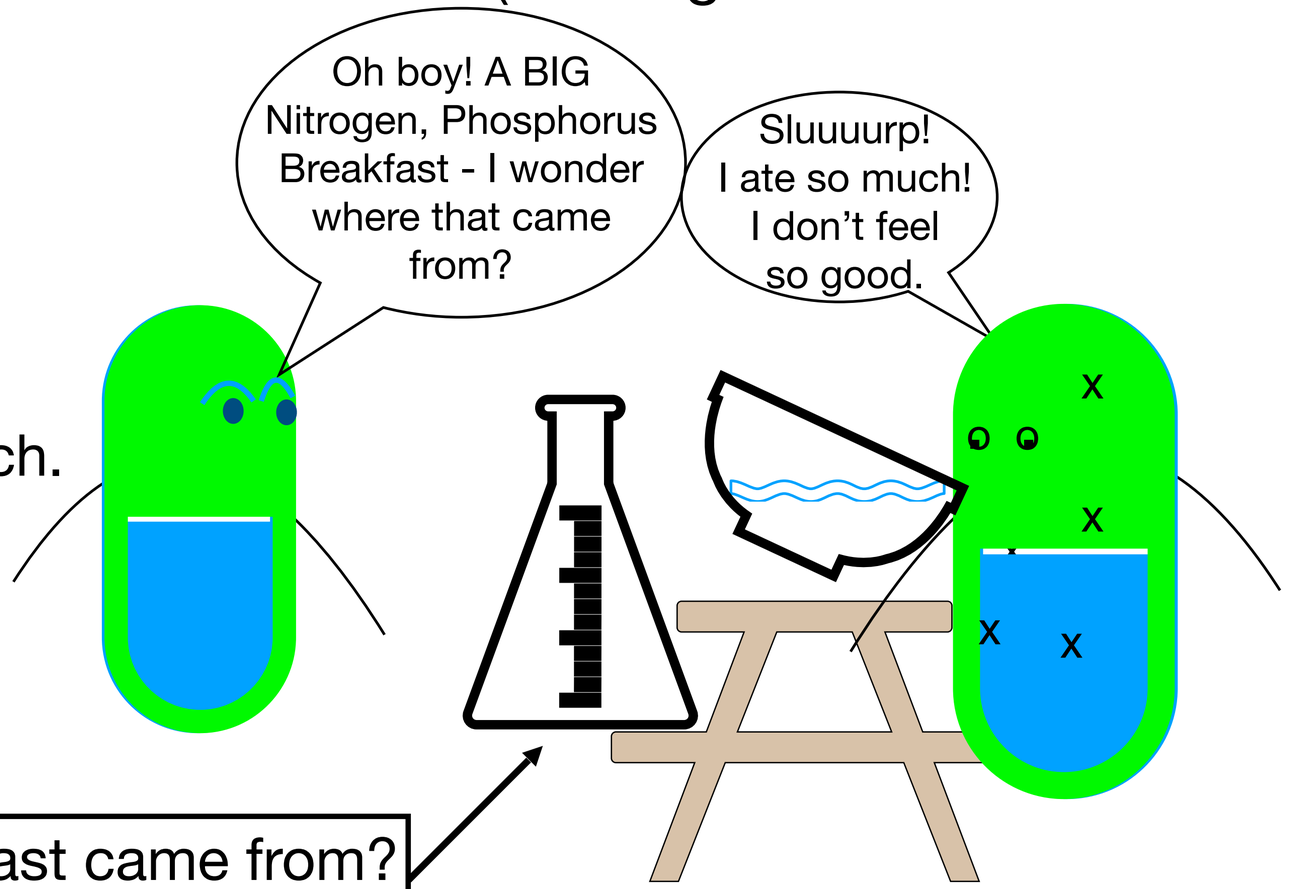
Sometimes, even sewage gets washed into the lake! Yuck! Sewage can have lots of Nitrogen and Phosphorus in it. People would never eat sewage, but Cy and his family love it!

What colors do you think Nitrogen and Phosphorus are?

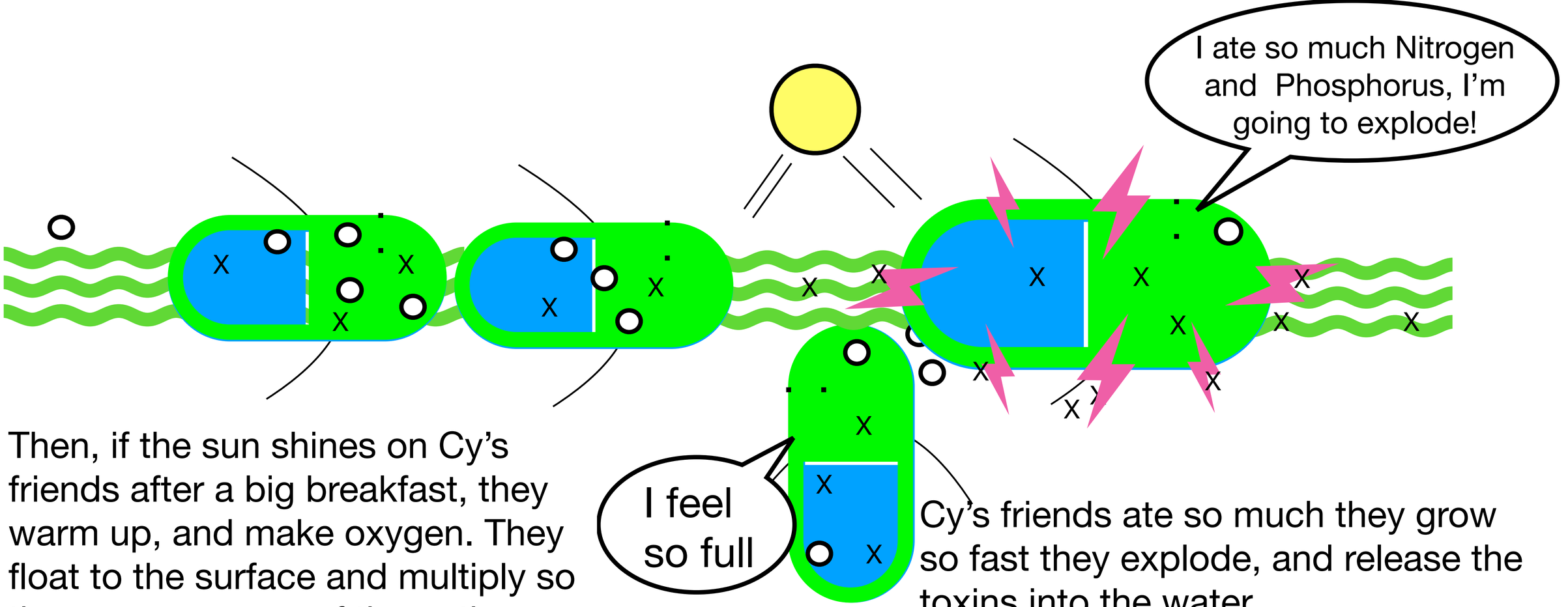


Most of the time, the small amounts of phosphorus and nitrogen don't bother Cy and his family. But, if they have too much to eat, it can cause them to make the bad toxins. We can't see toxins - we show them here as little xs (x) so you will know that they are there. Toxins are not alive, but are a chemical - sort of like the substance on poison ivy leaves. You just have to touch it to get the bad effect (although the mechanism of injury is very different).

People can't make toxins even if they eat too much… and people never explode if they eat too much.



Where do you think that big breakfast came from?

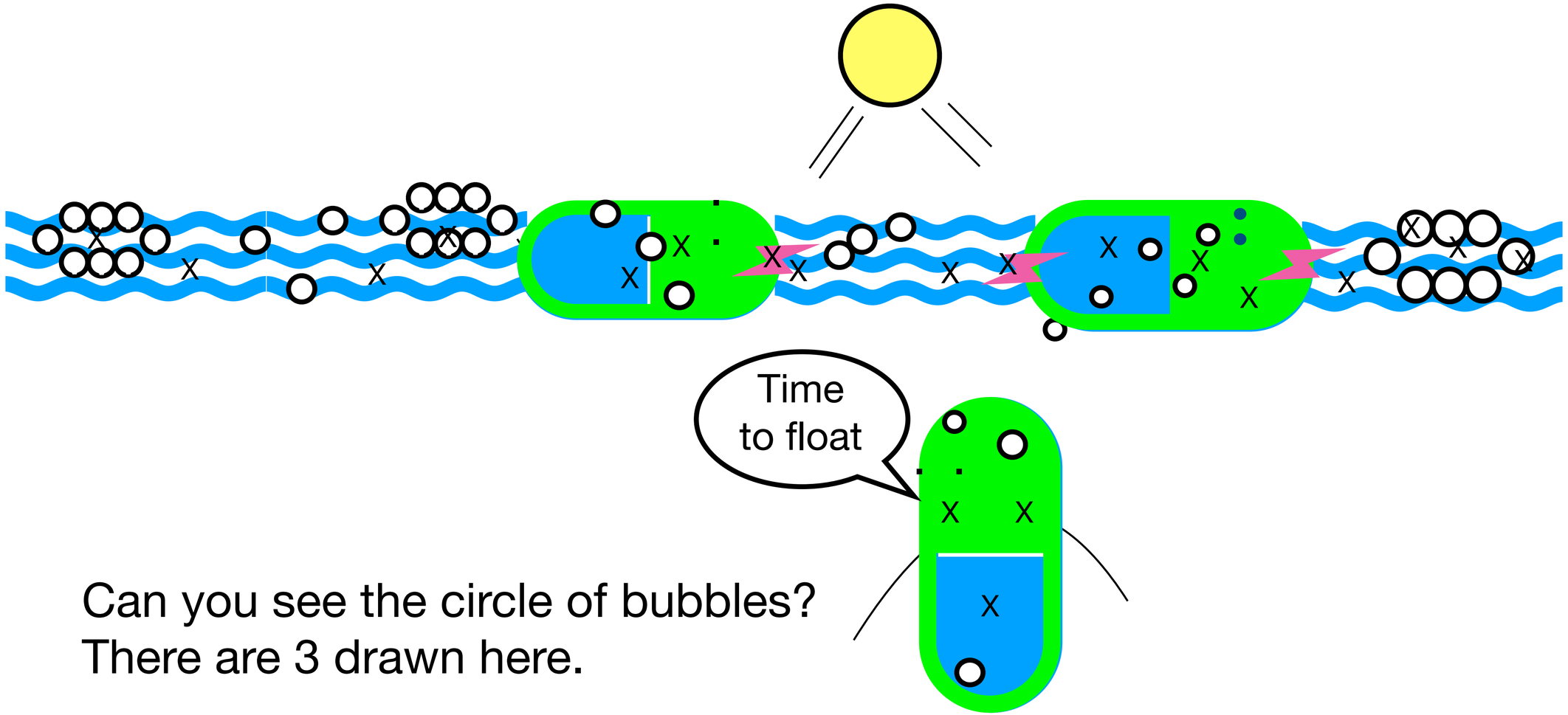


Then, if the sun shines on Cy's friends after a big breakfast, they warm up, and make oxygen. They float to the surface and multiply so there are so many of them, they turn the water green.

Cy's friends ate so much they grow so fast they explode, and release the toxins into the water.

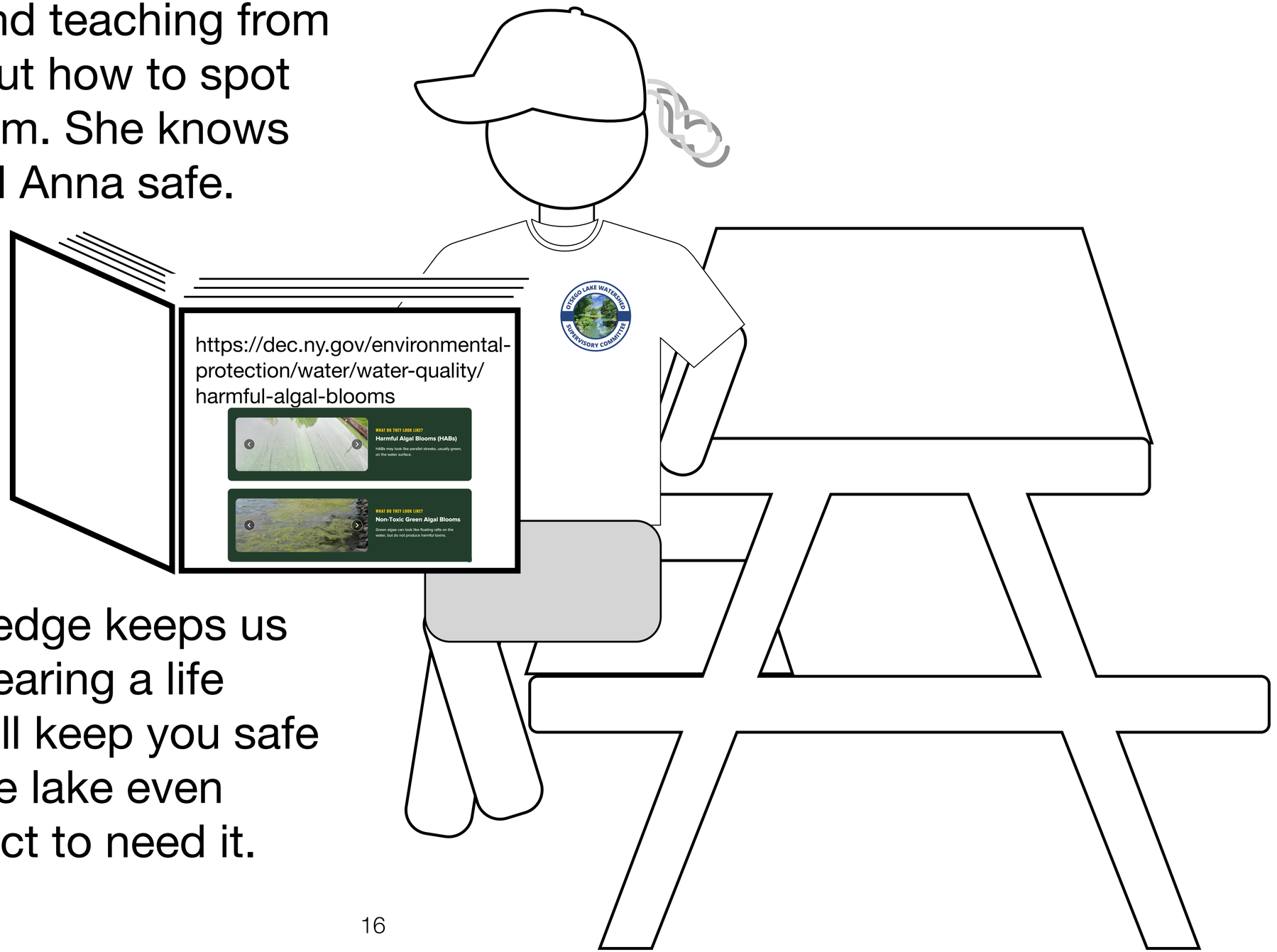
Toxins can make animals like Anna very sick if she drinks green water or even swims in it.

Sometimes the water doesn't turn green. It just makes bubbles that stick together. Sometimes the bubbles form circles.
WARNING: The toxins (x) may still be there!



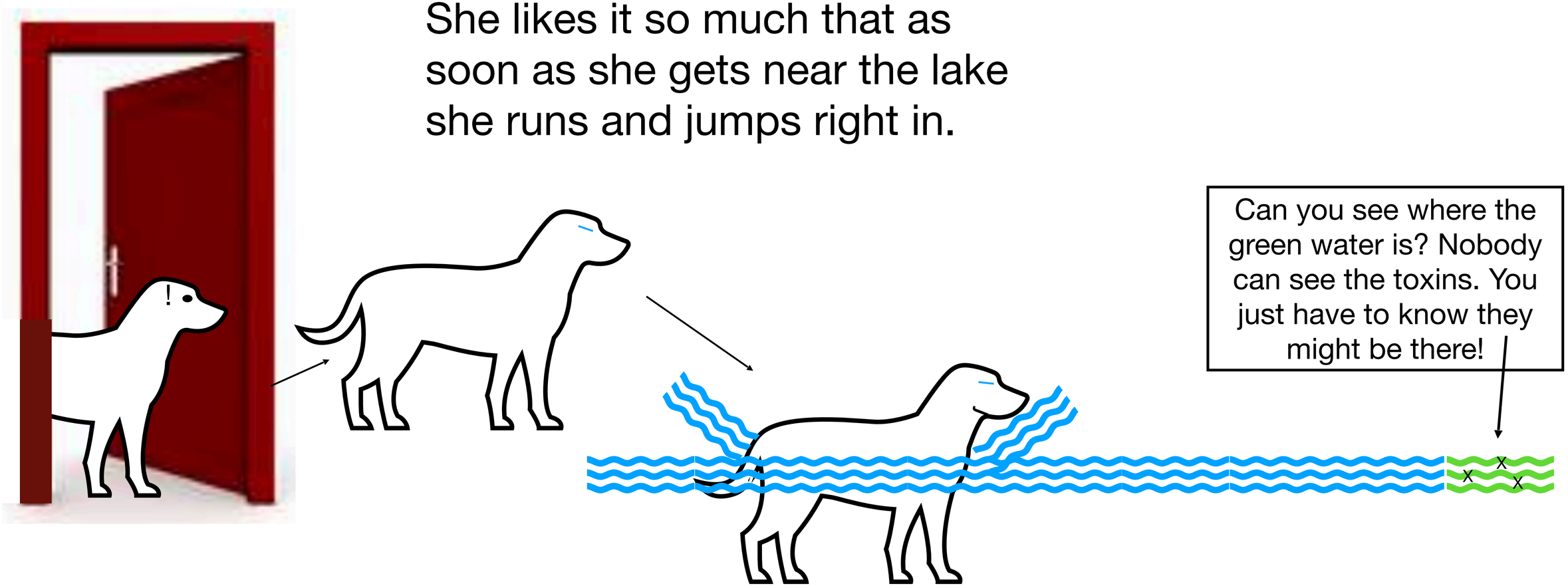
Can you see the circle of bubbles?
There are 3 drawn here.

Jenny has visited the NYDEC website with the supervision and teaching from her family to learn about how to spot HABs and to avoid them. She knows that will keep her - and Anna safe.



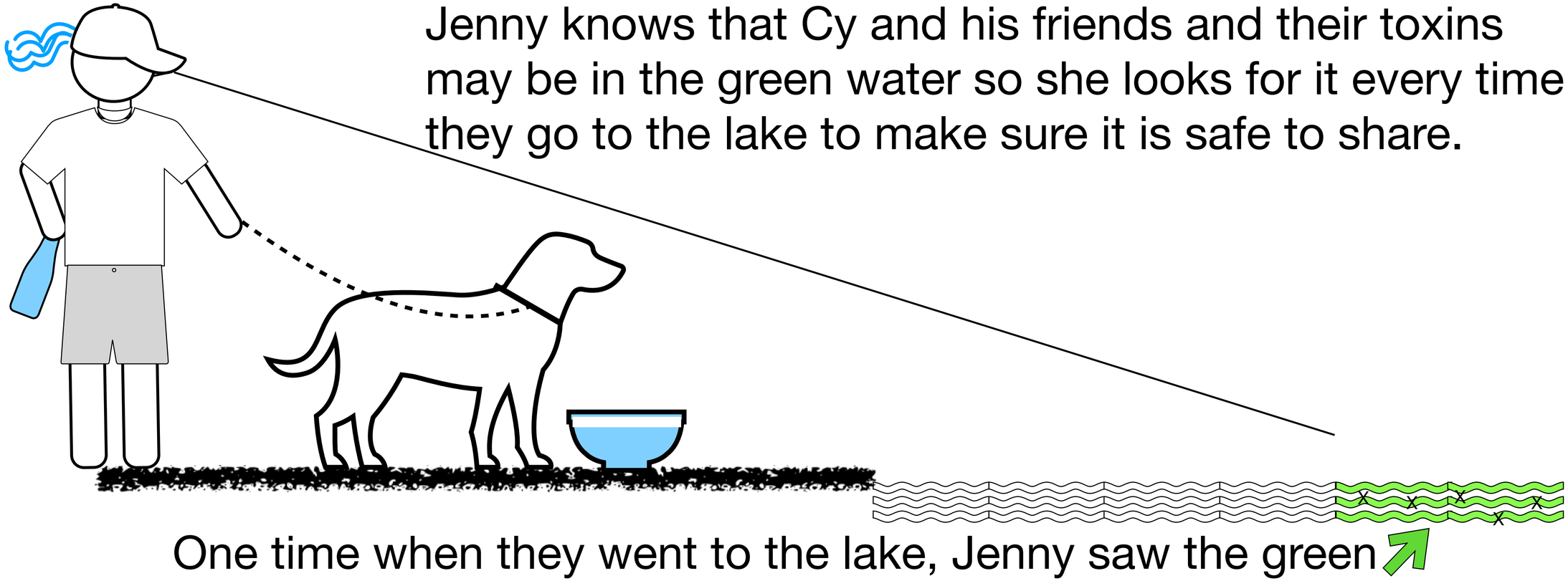
She knows that knowledge keeps us safe. It’s like always wearing a life jacket in the boat. It will keep you safe if there is a threat in the lake even though you don’t expect to need it.

Anna loves to be in the Lake.
She likes it so much that as soon as she gets near the lake she runs and jumps right in.



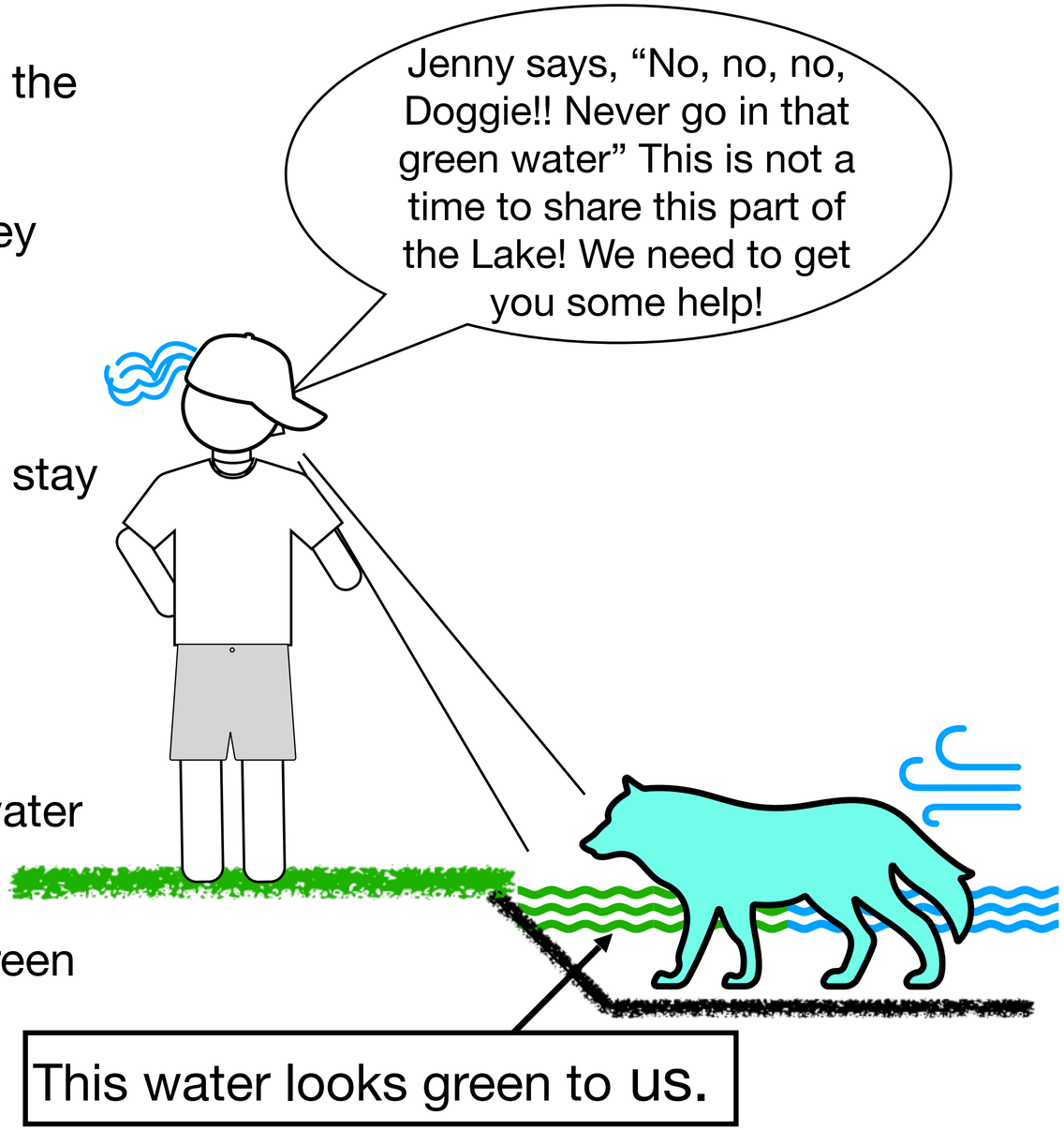
Anna doesn't even notice if some of it is full of Cy's friends with their toxins and the water has turned green. We're glad it's not in the water near to her today! Anna should not be allowed in the lake unless someone is with her to know that the green or bubbley water is **not** there.

Fortunately, Anna has her friend, Jenny, who knows that that green water may have toxins in it and can make Anna very sick if she drinks any of it or swims in it. Jenny knows that Cy and his friends and their toxins may be in the green water so she looks for it every time they go to the lake to make sure it is safe to share.

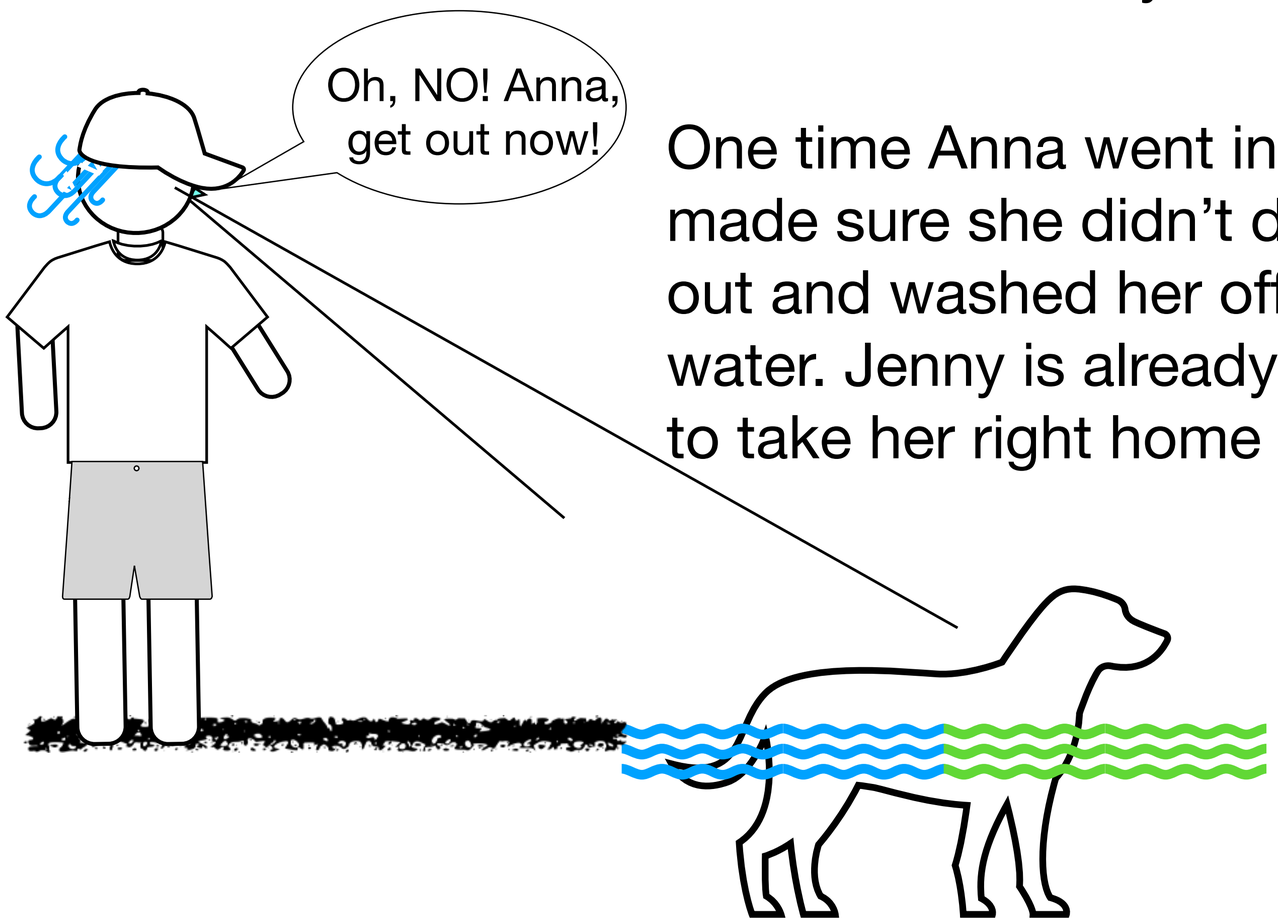


One time when they went to the lake, Jenny saw the green water. Jenny kept Anna on a leash to keep her out of the water and gave her a drink from a water bottle she brought with her from home - so Anna wouldn't drink the lake water!

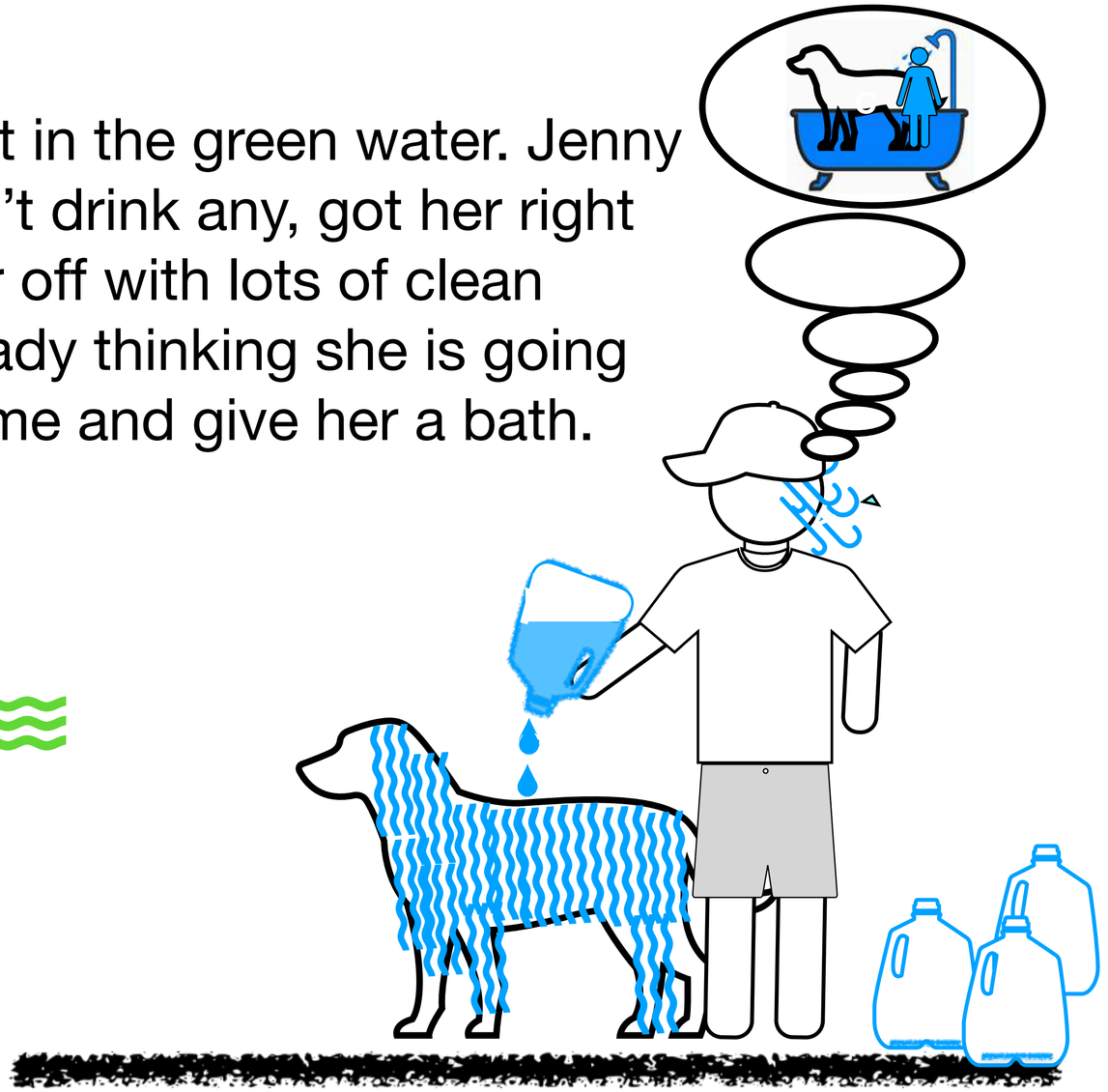
- Jenny is smart, she knows that:
- A wind can blow, floating, dangerous, green water near the shore where dogs spend most of their time.
- Dogs swallow water when they swim so if it's green, they may get very, very sick.
- Dogs will drink water that looks awful to us.
- Dogs hold water on their coats for a long time and may stay in contact with the toxins that way.
- Dogs lick their wet fur and swallow toxins in that water.
- Dogs don't go home and take a shower.
- Dogs don't complain of feeling sick and get out if the water even if they have swallowed a lot of toxins.
- That's why dogs are more likely to get <u>very sick</u> from green water, much more than humans.



Jenny, knows that that green water may have toxins in it and can make Anna very sick.

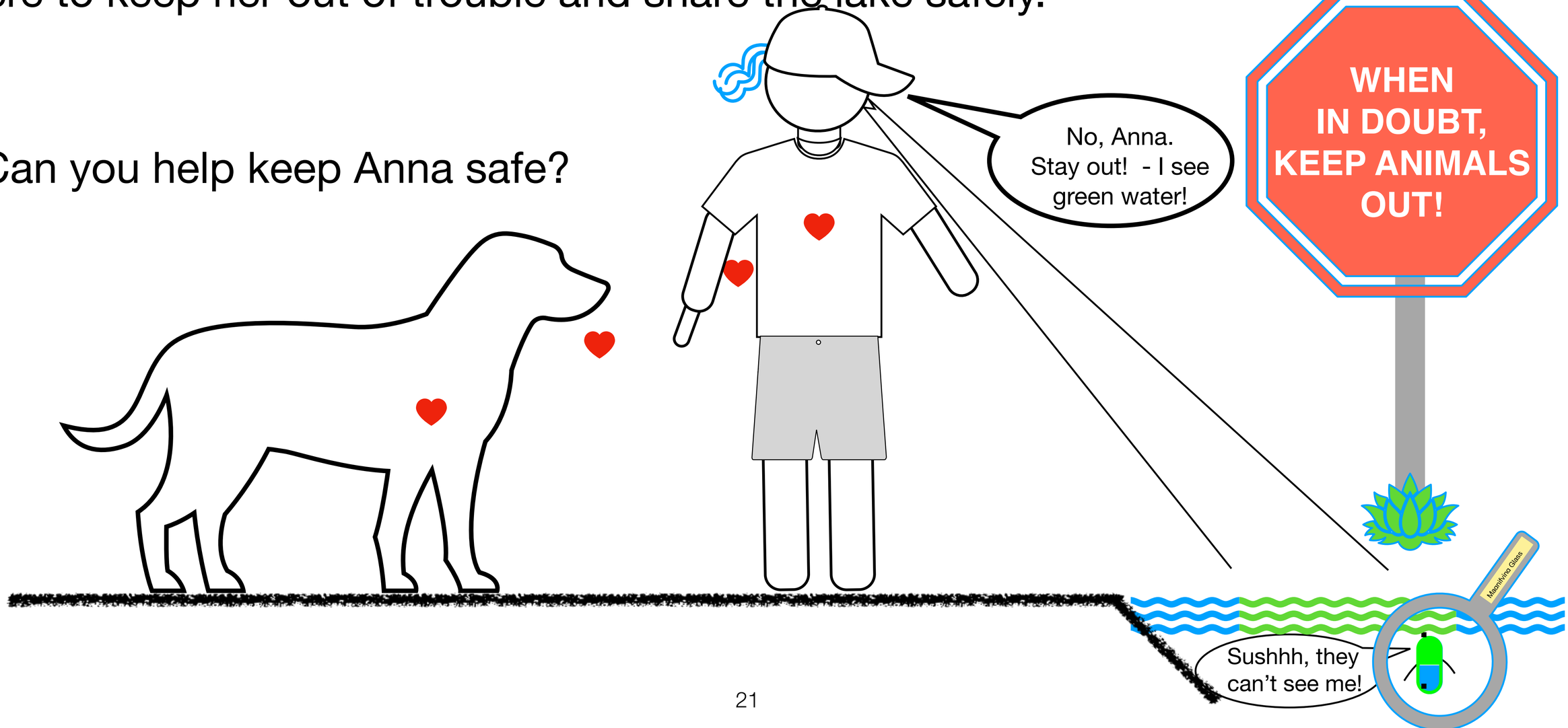


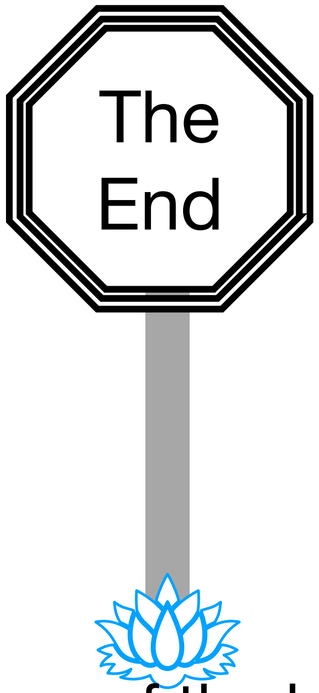
One time Anna went in the green water. Jenny made sure she didn't drink any, got her right out and washed her off with lots of clean water. Jenny is already thinking she is going to take her right home and give her a bath.

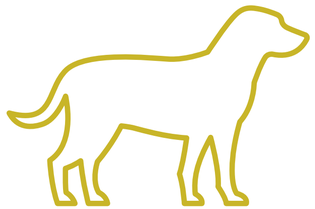


Even though Cy and Anna can be in the same lake, most of the time they don't bother each other. Cy is too small for Jenny or Anna to see him and Anna isn't too concerned about water quality. Fortunately, Jenny loves Anna and is there to keep her out of trouble and share the lake safely.

Can you help keep Anna safe?







For a book about more of the biology of the lake see: Book 2 - Tommy Loves His Lake. And for concerns about safe drinking water and the Lake see: Book 3 - Jenny and Tommy and Their Dads Go Camping. Both are from the Otsego Lake Watershed Committee.

This book is dedicated to my daughter Jenny, who loves dogs and all animals. She has taught me a so much about how valuable they are… in so many ways.