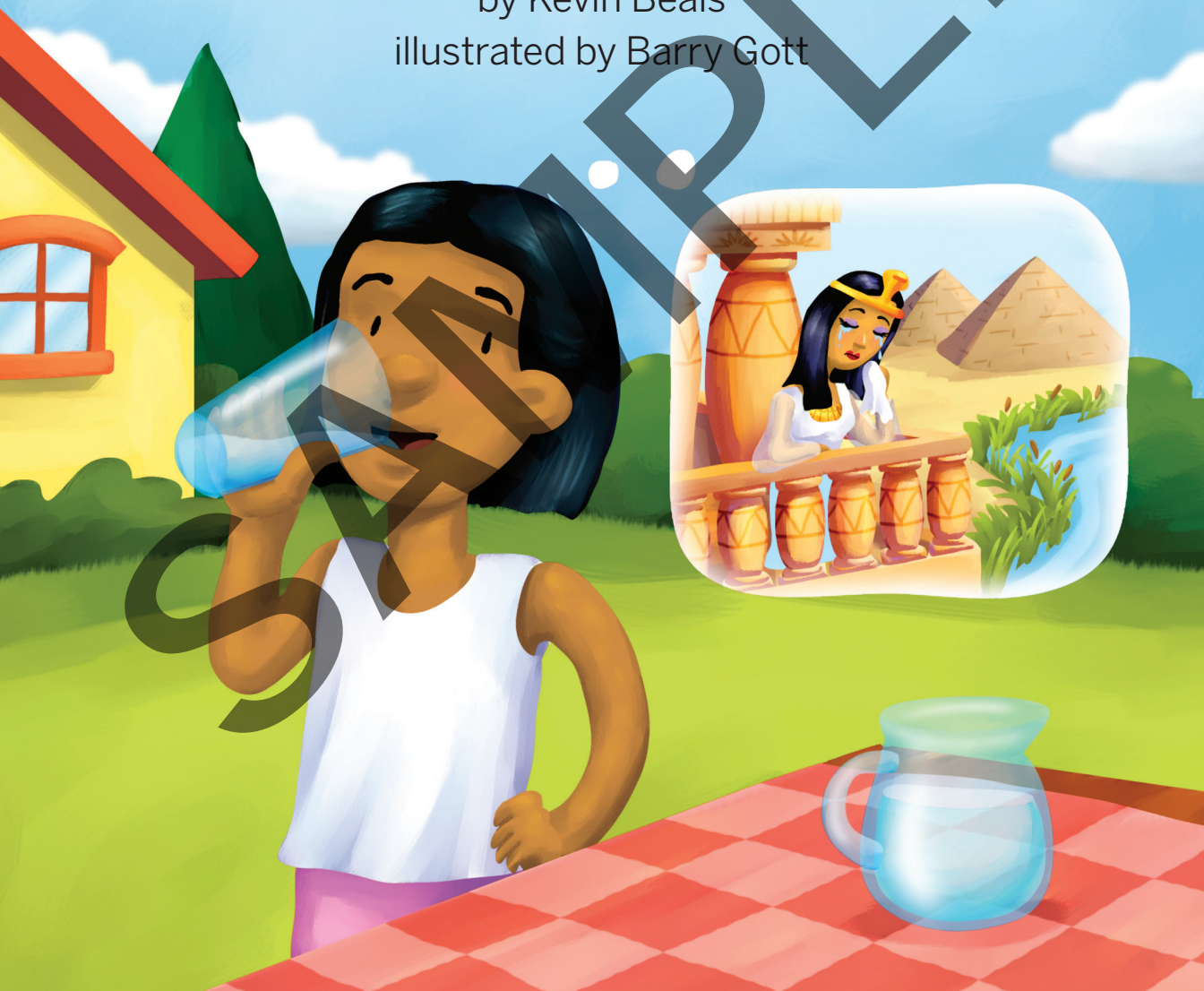


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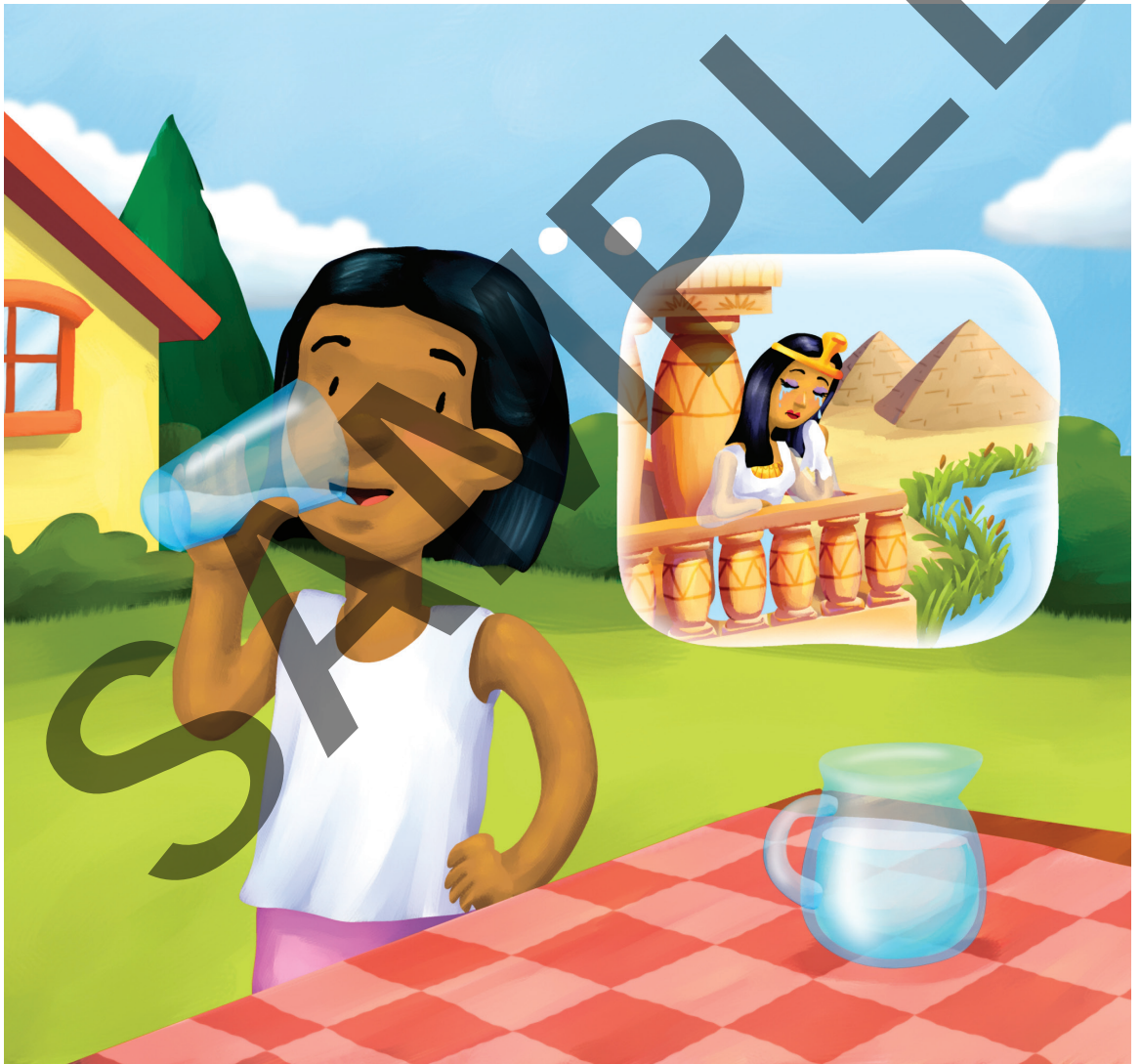
Drinking Cleopatra's Tears

by Kevin Beals
illustrated by Barry Gott



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Grade 5
Drinking Cleopatra's Tears
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Are you drinking Cleopatra's tears?

That may seem like a strange question, but the answer might be yes! Cleopatra was a queen of ancient Egypt who lived more than 2,000 years ago. Even though Cleopatra herself is long gone, the water that was in her tears is still on Earth today. The water in Cleopatra's tears became part of all the other water on Earth, so there could be a tiny bit of that water in anything you drink.

Are you washing dishes with a caveman's sweat?

Any time you turn on the tap, you could be getting caveman sweat! The water in the sweat that cave people sweated is still somewhere on Earth, and so is the water in the sweat that any person has ever sweated, including you! Maybe some of the water you wash dishes with was once in a caveman's sweat.





Are you taking a bath in *T. rex* spit?

Next time you take a bath, remember that you might be bathing in spit from an animal that's been extinct for millions of years. The water that was in *T. rex* spit is still around—in fact, all the water that was on Earth millions of years ago is still with us. The water on Earth today is the same water that was here long ago because the water on Earth gets recycled over and over and over and over again—including water that was in *T. rex* spit.



Did you know that water can be hard as rock?

Believe it or not, water can be a rock-hard solid, even though we usually think of it as a liquid. Ice is really just another name for solid water. The water on Earth can change from liquid to solid—as water gets colder, it **freezes** into ice. It can change back again, too—as ice gets warmer, it **melts** into liquid water.

Did you know that water can be invisible?

It may seem strange, but water can be an invisible gas called **water vapor**. Water vapor mixes with the air and blows around in the wind, so there is water in the air all around us. We can't see water vapor, but it's there.

Earth's **atmosphere** has a lot of water vapor in it. If you could take all of the water vapor in the atmosphere and turn it into liquid water, you would have enough to cover the surface of Earth in a layer of water more than 2 centimeters thick!



Are you breathing a puddle?

If you've ever watched a puddle for a few days, you've seen the water slowly **evaporate**. The water in the puddle didn't just disappear—the liquid water warmed up and turned into invisible water vapor through a process called **evaporation**. The air you are breathing right now has water vapor in it, and some of that water vapor could have come from a puddle.





Did you know that the air can be wet?

Water vapor is in the air all around us and for miles above us in the atmosphere. There's always some water vapor in the air, but the amount can change—sometimes there's more, and sometimes there's less. When there's a lot of water vapor in the air, people say the weather is humid. Even though you can't see all that water vapor, you can feel it—people often say humid air feels heavy and sticky.

Have you seen drops of water all over the grass, even though you know it didn't rain?

Dewdrops often form on the ground overnight. Dewdrops may look like raindrops, but dewdrops don't fall from the sky—so where do they come from? They seem to appear out of thin air, and that's exactly what happens! The water vapor in the air all around us can **condense**, meaning it can turn from an invisible gas into a liquid. The drops of liquid water you see all over the grass condensed from water vapor in the air.

Condensation is more likely to happen when water vapor cools off. Dew usually forms at night, when the air is cooler, but we may not notice it until we go outside in the morning. The colder and more humid it is near the ground, the more dewdrops will form.





Can you make a cloud with your mouth?

Gallons of water are inside you right now—in fact, your body is mostly made of water. The warm air you breathe out has some water vapor in it. On cold days, the air you breathe out cools quickly in the cold air around you. When the air you breathe out gets colder, the water vapor in your breath condenses into tiny drops of liquid water. The condensed water looks like a tiny cloud coming out of your mouth, and people call this “seeing your breath.”

Have you ever gone for a walk in the clouds?

Clouds usually form high up in the air. In fact, when clouds form lower down, we don't even call them clouds—we call them fog. Even so, clouds and fog are both made of the same thing—tiny drops of liquid water. These drops form when invisible water vapor cools and condenses into liquid water. Condensation usually happens high off the ground, but every once in a while it gets cool enough near the ground for water vapor to condense, and fog is formed. If you go for a walk in the fog, you are walking through clouds.





Have you ever seen clouds made of waves?

Sunlight heats water in the ocean, and wind blows over the water. The warmth and wind make some of the water evaporate and turn into water vapor. That water vapor mixes with the air, which may rise up higher and get colder. If there is enough water vapor in the air when it cools, the water vapor condenses back into liquid water, forming clouds. That means the water in a cloud above you may have come from an ocean wave.

The colder it gets, the more likely water vapor is to condense. As you go higher and higher up in the part of the atmosphere where weather happens, it gets colder and colder. That's why clouds usually form high up in the sky.



Have you ever been hit by a falling piece of cloud?

You have if you've ever been out in the rain! Clouds are formed from tiny drops of liquid water, and these drops of water sometimes bump into each other to form bigger drops. If the drops get big enough, they fall to the ground as raindrops. Rain is a kind of **precipitation**, and so are snow and hail. Precipitation that falls on you used to be part of clouds.

Have you ever shot Niagara Falls out of a squirt gun?

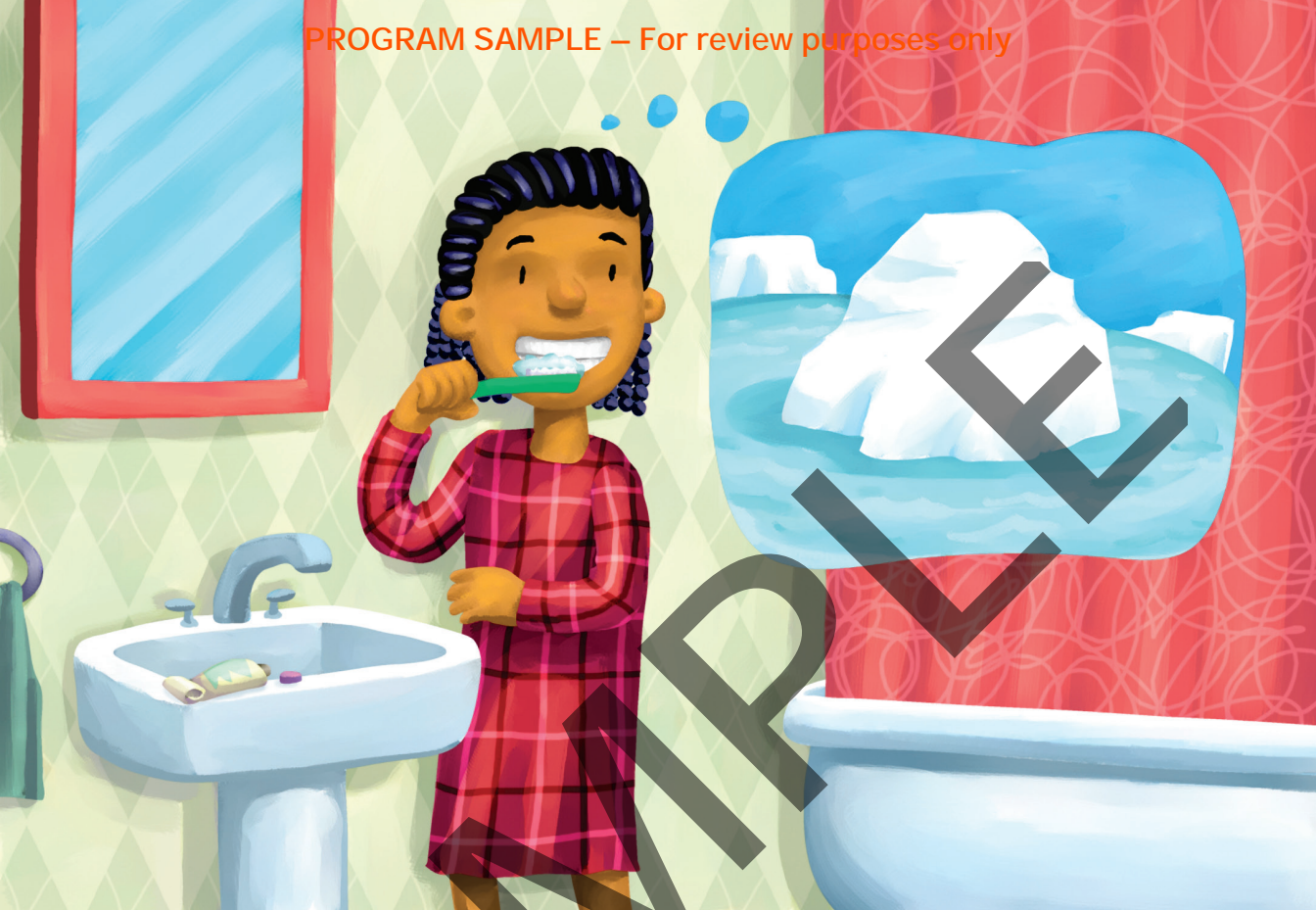
After it rains, liquid water flows across the land and fills rivers, streams, lakes, ponds, and waterfalls like Niagara Falls. The water then might get collected, cleaned, and sent through pipes to your home, where you might use it to fill your squirt gun. The water you put in your squirt gun today may have been in Niagara Falls long ago.



Did you know that people really can walk on water?

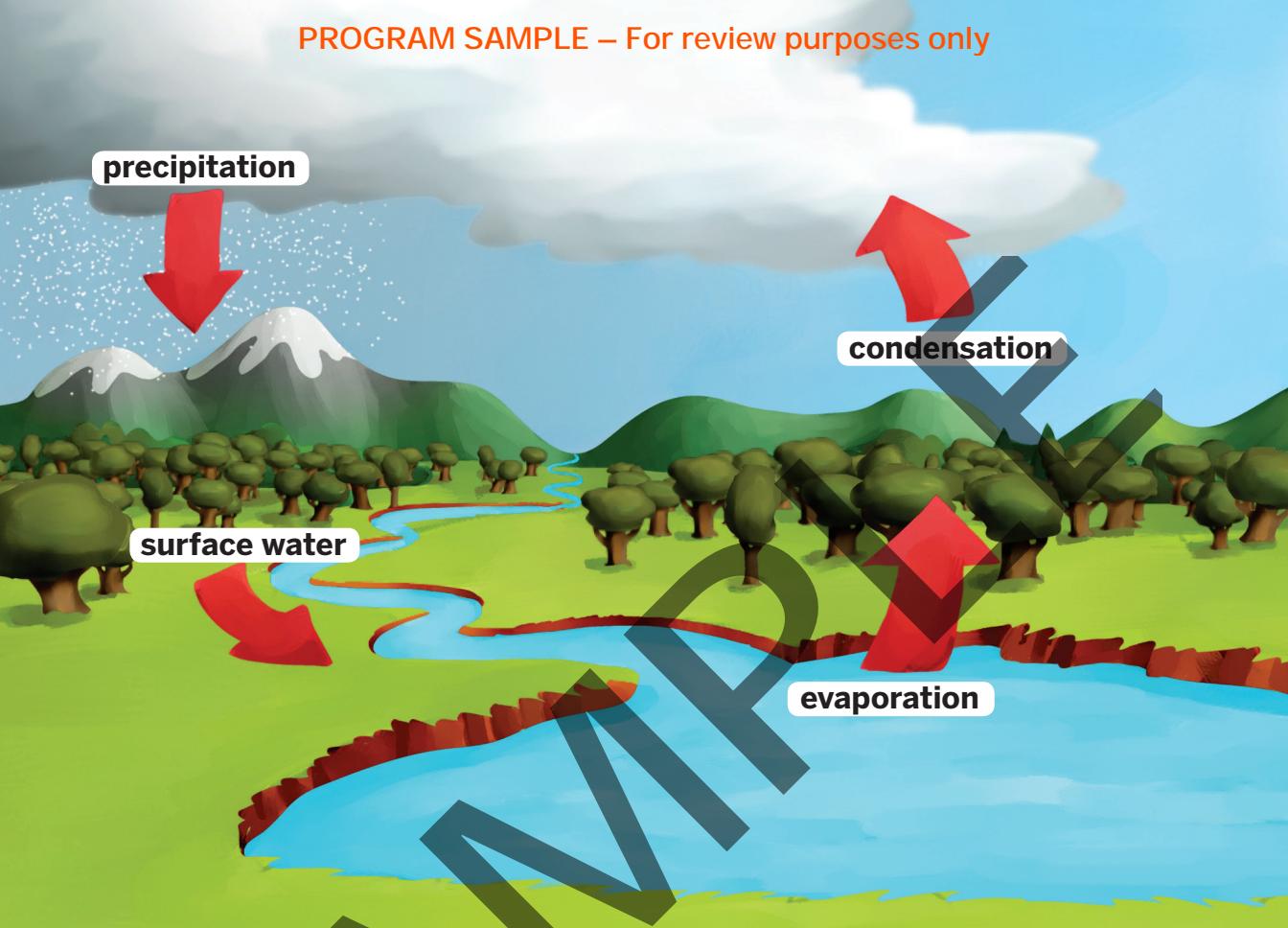
When liquid water falls to Earth as precipitation, a lot of it soaks into the ground and becomes **groundwater**. Groundwater is always moving slowly underneath us through tiny spaces in the soil and rocks. If you dig down deep enough, you will find groundwater—so wherever you go, there is groundwater beneath you.





Are you brushing your teeth with an iceberg?

Earth is much colder near the North Pole and the South Pole than it is on the rest of the planet. It is so cold that lots of water freezes into giant, solid blocks of ice. Pieces of these giant blocks of ice fall into the ocean and float. These are icebergs. When icebergs get warmer, they melt into liquid water. The liquid water from the icebergs may evaporate into water vapor in the air. The water vapor might condense into clouds. Then the water might fall as rain and flow across the land. That same water can be collected and cleaned for you to use to brush your teeth.



Did you know that the water in one little pond can move all over the planet?

Even the water in a quiet pond is always moving and changing. Liquid water everywhere is evaporating to become water vapor in the atmosphere. In the atmosphere, water vapor is condensing into liquid water to form clouds. The water in clouds is moving through the atmosphere and falling as precipitation. Water from precipitation is filling lakes, the ocean, and ponds like this one, becoming surface water. Then the water can evaporate again, and all of this happens over and over. We call this the water cycle.



Did you know that *you* are part of the water cycle?

The water that is in your body today has been in many other places—it has been in the ocean, underground, high in the air, and all over Earth's surface. Someday it will be in those places again. All of that water inside you is part of the water cycle, so you're part of the water cycle, too.





This picture shows water moving through the water cycle. Can you find examples of evaporation, condensation, precipitation, and surface water?

Do you know where that drop of water has been?

It's been in the air, in the ground, in ice, in clouds, and in living things. It has evaporated, condensed, fallen as rain, and flowed in rivers. It has frozen and melted over and over again. It has been around since Earth began, and it may even have been in *T. rex* spit or Cleopatra's tears!





Glossary

atmosphere: the air that surrounds Earth

condensation: when a gas turns into a liquid

condense: to turn from a gas into a liquid

evaporate: to turn from a liquid into a gas

evaporation: when a liquid turns into a gas

freeze: to turn from a liquid into a solid

groundwater: water that is found in soil and rock underground

melt: to turn from a solid into a liquid

precipitation: liquid or solid water that falls to Earth

water vapor: water in the form of invisible gas

Books for *The Earth System*:

Water Shortages, Water Solutions
Drinking Cleopatra’s Tears
Engineering Clean Water
How the Earth System Explains Dinosaur Extinction
Chemical Reactions Everywhere
Water Encyclopedia

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The Earth System

Do you know where the water in your glass has been?

This book helps you understand how water cycles around Earth. You will see that the water on Earth is always moving and changing. You'll find out that the water you drink may have been in fog, waterfalls, and even the tears of an ancient queen.

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