



One Well

The Story
of Water on
Earth

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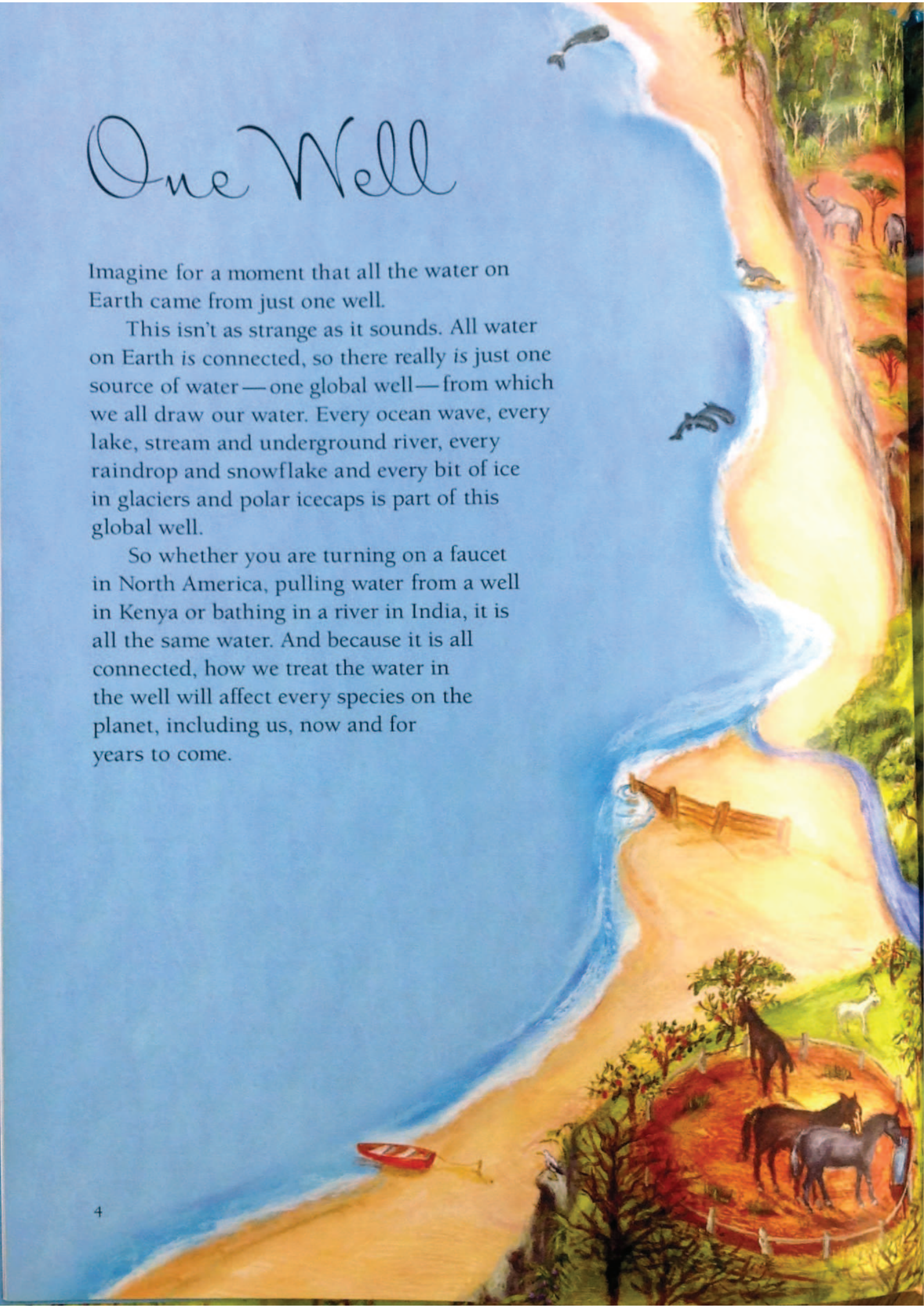
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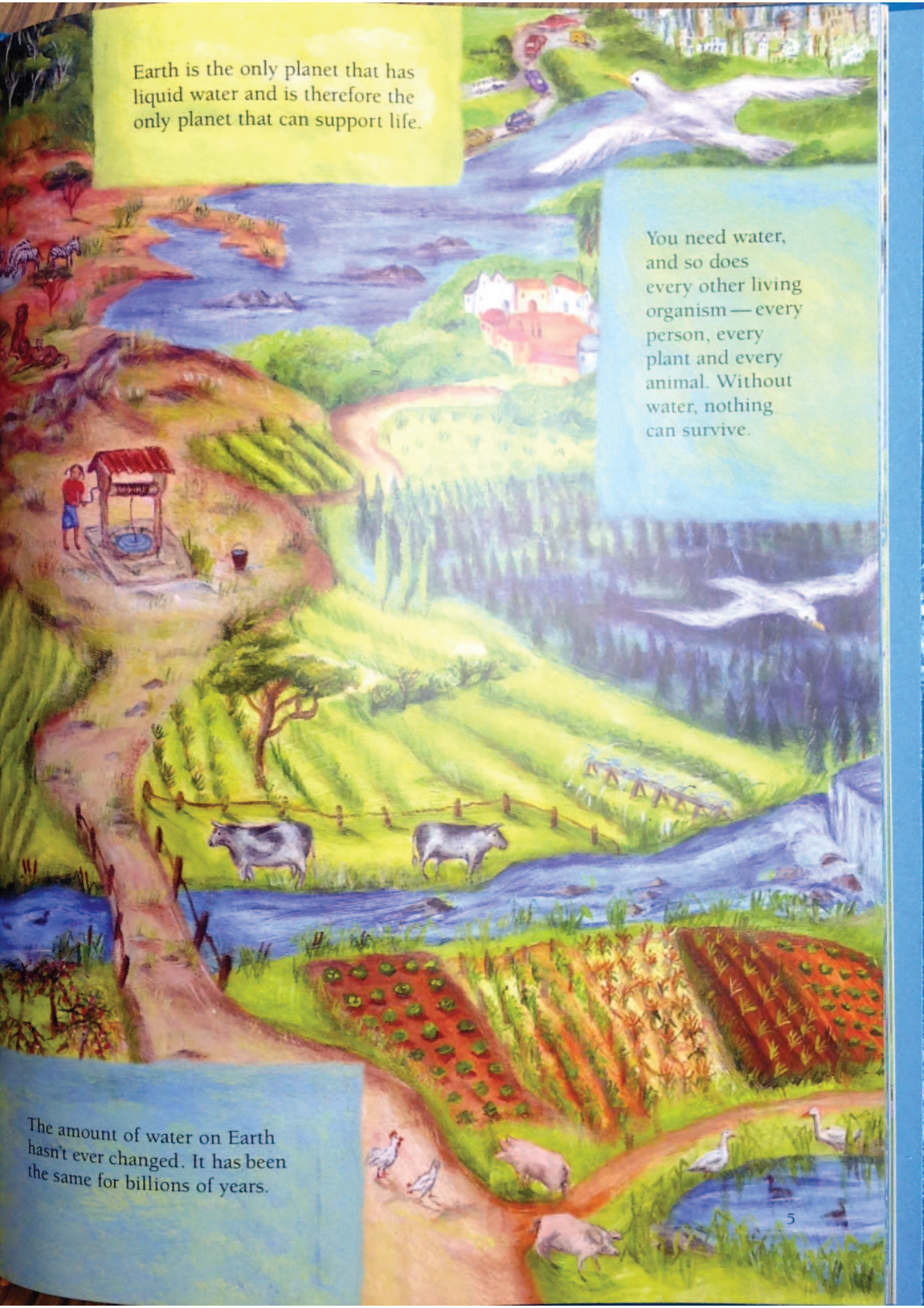
One Well

Imagine for a moment that all the water on Earth came from just one well.

This isn't as strange as it sounds. All water on Earth is connected, so there really is just one source of water — one global well — from which we all draw our water. Every ocean wave, every lake, stream and underground river, every raindrop and snowflake and every bit of ice in glaciers and polar icecaps is part of this global well.

So whether you are turning on a faucet in North America, pulling water from a well in Kenya or bathing in a river in India, it is all the same water. And because it is all connected, how we treat the water in the well will affect every species on the planet, including us, now and for years to come.





Earth is the only planet that has liquid water and is therefore the only planet that can support life.

You need water, and so does every other living organism — every person, every plant and every animal. Without water, nothing can survive.

The amount of water on Earth hasn't ever changed. It has been the same for billions of years.

The Water in the Well

We live on a watery planet. Almost 70 percent of Earth's surface is covered with water. This surface water is found in oceans, lakes, rivers, streams, marshes, even in puddles and the morning dew. There is so much water that if you looked down at Earth from space, it would appear blue.

But there is also water we can't see, beneath the Earth's surface. This "groundwater" can be found just about everywhere — it fills the cracks in rocks and the spaces between rocks, grains of sand and soil. Most groundwater is close to the Earth's surface, but some of it is buried quite deep. Water is also frozen in glaciers and polar icecaps. And there is water in the atmosphere.

Every one of these water sources feeds Earth's One Well.

WHERE IS THE WATER ON EARTH?

Oceans	97.23 percent
Icecaps and glaciers	2.14 percent
Groundwater	0.61 percent
Freshwater lakes	0.009 percent
Inland saltwater seas	0.008 percent
Moisture in the soil	0.005 percent
Water in the atmosphere	0.001 percent
Rivers	0.0001 percent

Yes, there is more water in the atmosphere and soil than in all of Earth's rivers.

Recycling Water in the Well

The water you drank today may have rained down on the Amazon rainforest five years ago. A hundred years ago, it may have been steam escaping a teapot in India. Ten thousand years ago, it may have flowed in an underground river. A hundred thousand years ago, it may have been frozen solid in a glacier. And a hundred million years ago, it may have quenched the thirst of a dinosaur.

The amount of water on Earth doesn't change — there's no more water now than when the dinosaurs walked the Earth. The same water just keeps going through a cycle over and over again. This constant movement of water is called the water cycle.


During the water cycle, water

evaporates from oceans, lakes, rivers, ponds and puddles, even from plants and animals. It rises into the air as water vapor.

As water vapor rises, it cools into tiny water droplets. This is called condensation. These droplets form clouds. Gradually, clouds collect more and more water droplets. The average white cloud weighs about twice as much as a blue whale.

When water droplets get too heavy, they fall from the clouds in the form of hail, snow or rain. This precipitation returns to oceans, lakes and rivers. It also seeps into the soil and down into the groundwater. Year after year, water continuously circulates through the water cycle.

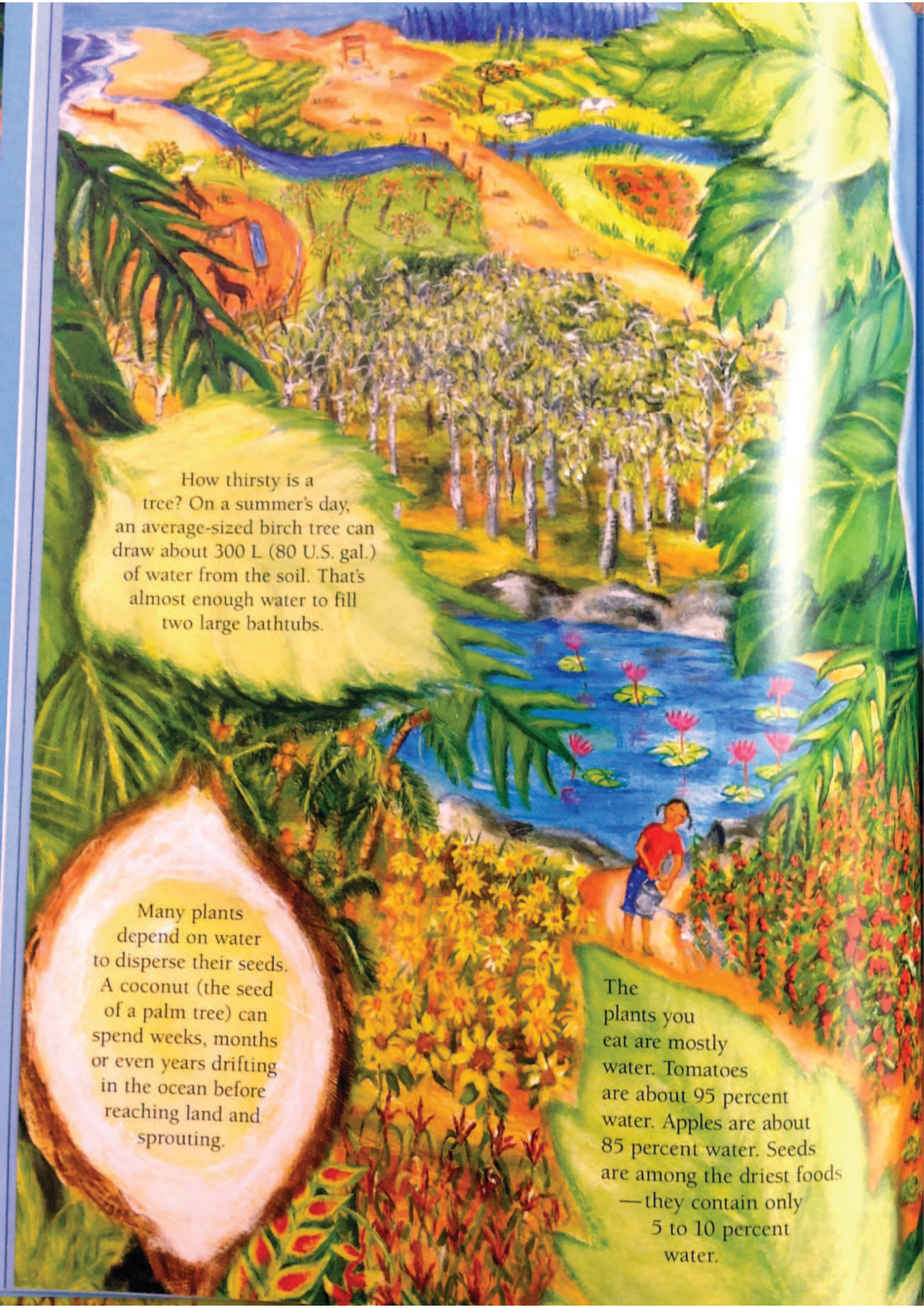




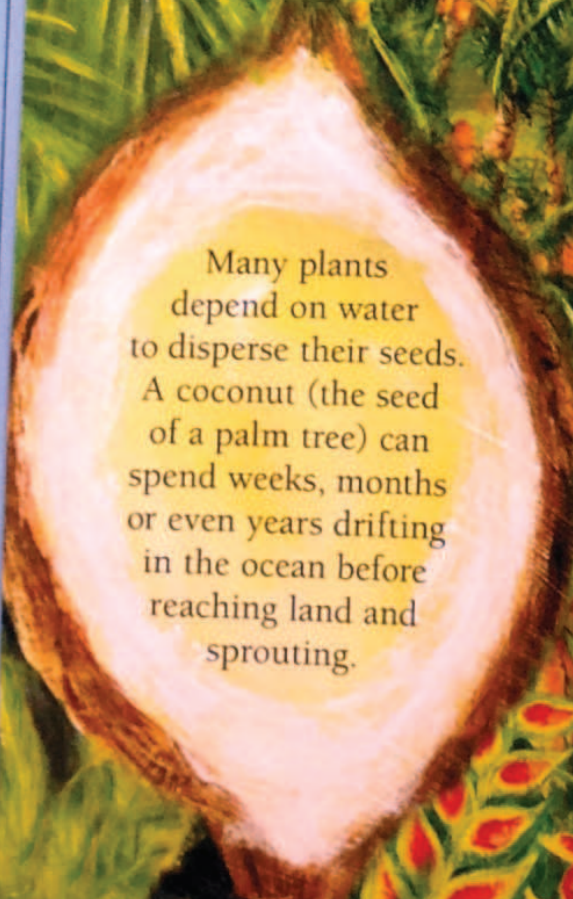
In one year, an area of rainforest the size of a football field pumps over 75 000 L (19 700 U.S. gal.) of water vapor into the atmosphere—more than enough to fill a backyard swimming pool.

It takes about one million tiny water droplets to make just one raindrop.

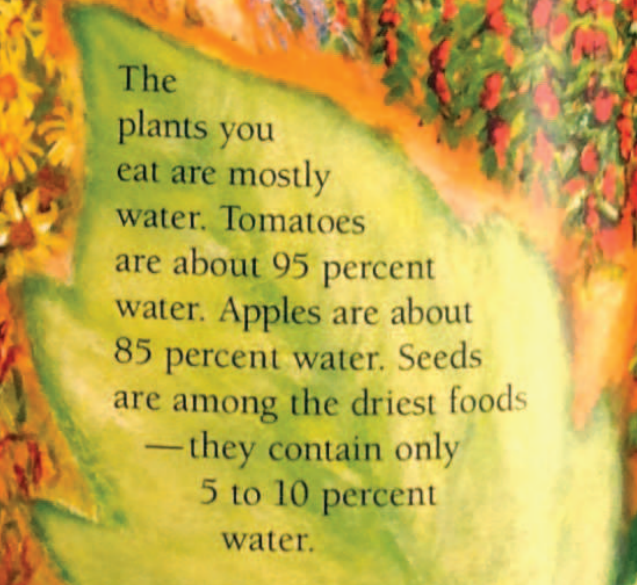
Why are the oceans salty? Rivers flow into the sea, collecting salt from rocks and soil and adding it to the ocean. As ocean water evaporates, the salt is left behind.



How thirsty is a tree? On a summer's day, an average-sized birch tree can draw about 300 L (80 U.S. gal.) of water from the soil. That's almost enough water to fill two large bathtubs.



Many plants depend on water to disperse their seeds. A coconut (the seed of a palm tree) can spend weeks, months or even years drifting in the ocean before reaching land and sprouting.



The plants you eat are mostly water. Tomatoes are about 95 percent water. Apples are about 85 percent water. Seeds are among the driest foods — they contain only 5 to 10 percent water.

Plants at the Well

The first plants on Earth began life in the water. About 450 million years ago, some were washed ashore. At first they could live only in wet areas. Gradually they developed root systems that allowed them to tap into water in the soil.

Water is essential to plants. In fact, plants are mostly water. It's the water in their cells that gives them their shape and form — without it, they droop and shrivel.

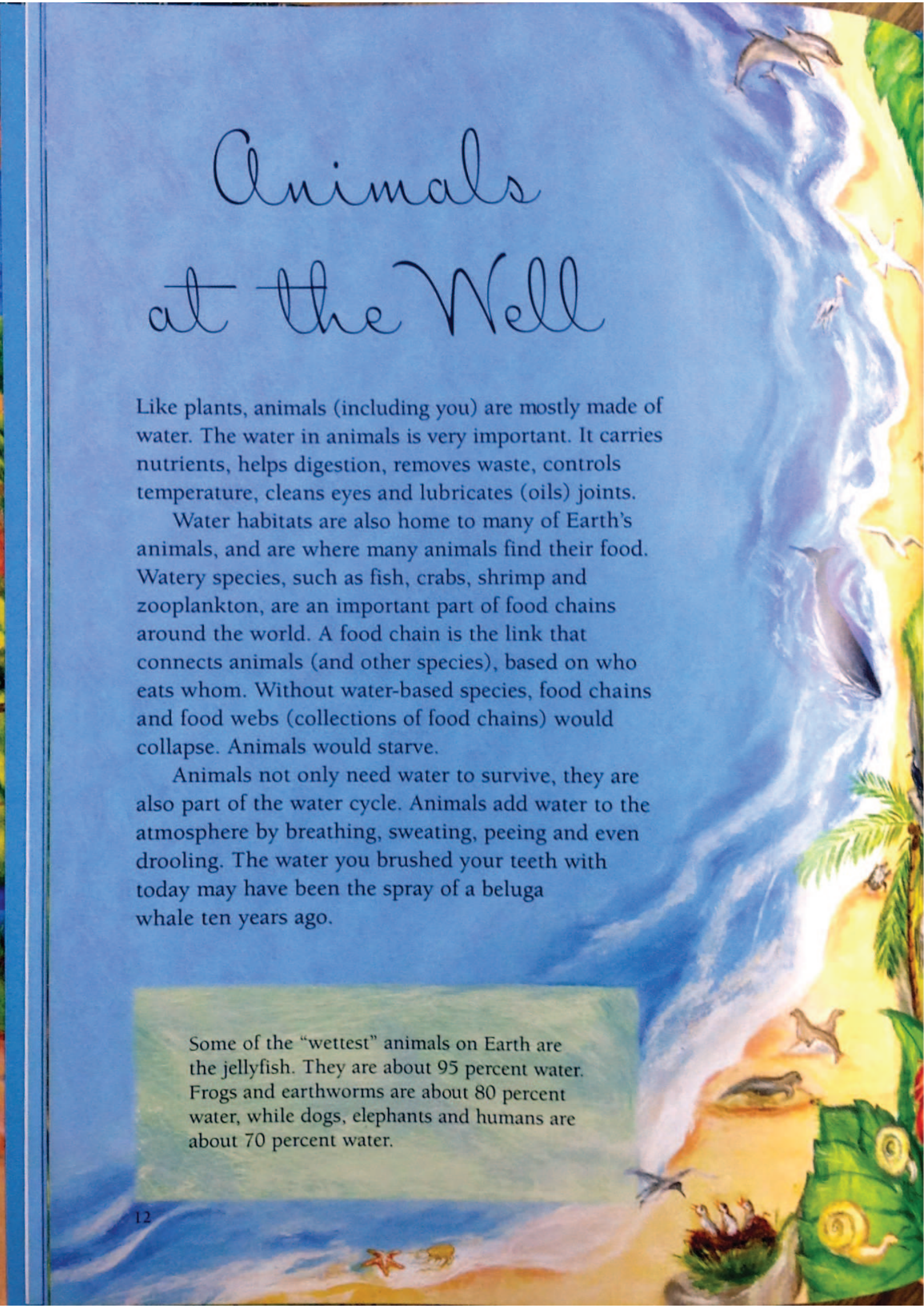
Water also helps plants make food for themselves. Plants use the sun's energy to change water and carbon dioxide into simple sugars that feed the plant. This process is called photosynthesis. Water then helps carry this food throughout the plant.

During photosynthesis, plants also release water vapor into the air. Roots absorb water, which is carried to the

stem. The stem acts like a water pipe in your house, moving water through the plant to the leaves. From the leaves, water is released back into the atmosphere. This is called transpiration. The water that is transpired is added to the cycle of water on Earth.

Water is important to plants, but plants are also important to water. Plant roots anchor soil and stop it from blowing or washing into lakes and rivers. Leaves and branches trap rainwater, allowing it to seep slowly into the soil instead of flowing quickly away. And trees provide shade, which helps keep moisture in the soil.

Plants depend on water from the well for survival, and the well depends on plants to help move water through its cycle. Without plants, the water cycle would be disrupted. Without water, plants could not survive.



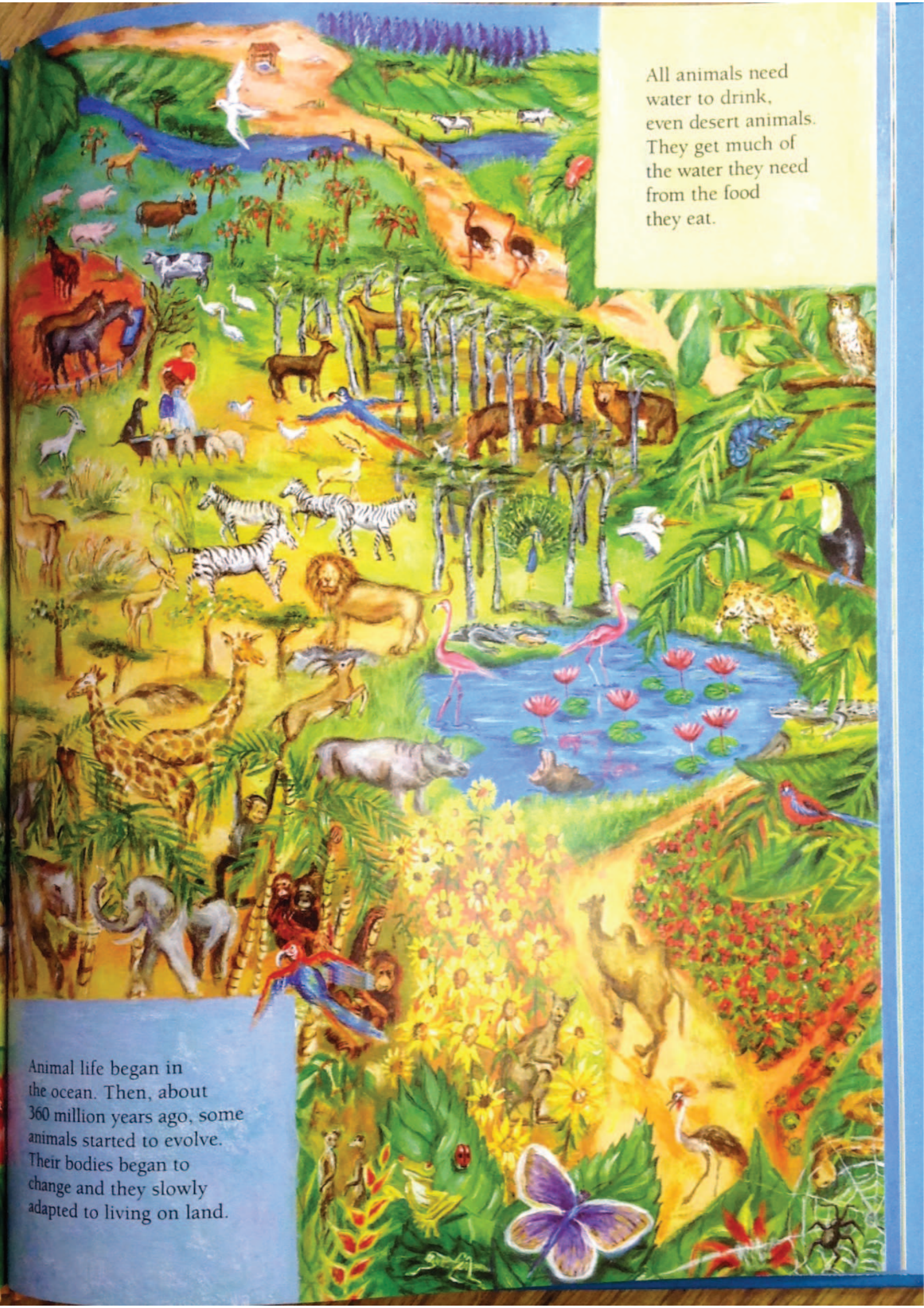
Animals at the Well

Like plants, animals (including you) are mostly made of water. The water in animals is very important. It carries nutrients, helps digestion, removes waste, controls temperature, cleans eyes and lubricates (oils) joints.

Water habitats are also home to many of Earth's animals, and are where many animals find their food. Watery species, such as fish, crabs, shrimp and zooplankton, are an important part of food chains around the world. A food chain is the link that connects animals (and other species), based on who eats whom. Without water-based species, food chains and food webs (collections of food chains) would collapse. Animals would starve.

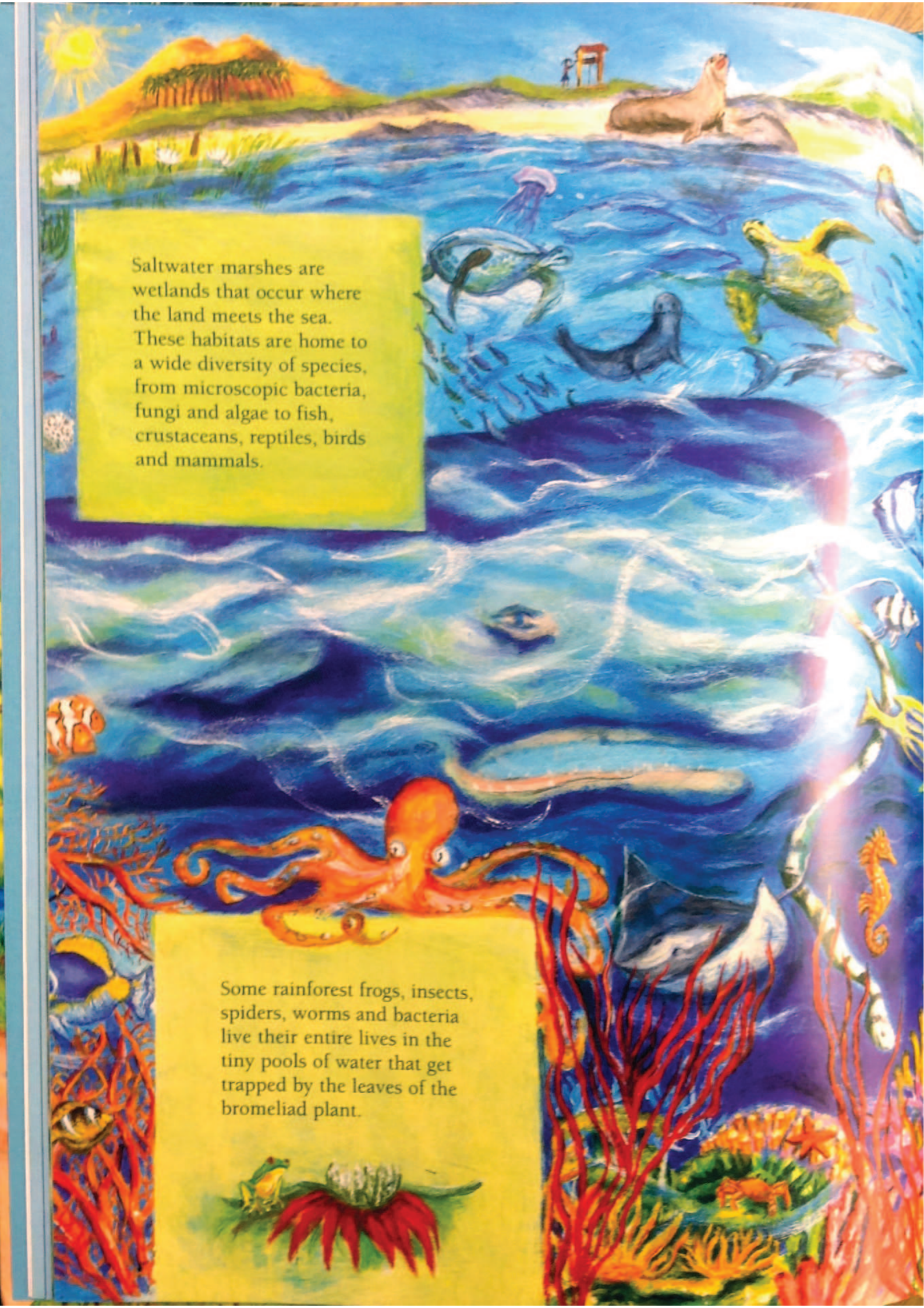
Animals not only need water to survive, they are also part of the water cycle. Animals add water to the atmosphere by breathing, sweating, peeing and even drooling. The water you brushed your teeth with today may have been the spray of a beluga whale ten years ago.

Some of the "wettest" animals on Earth are the jellyfish. They are about 95 percent water. Frogs and earthworms are about 80 percent water, while dogs, elephants and humans are about 70 percent water.



All animals need water to drink, even desert animals. They get much of the water they need from the food they eat.

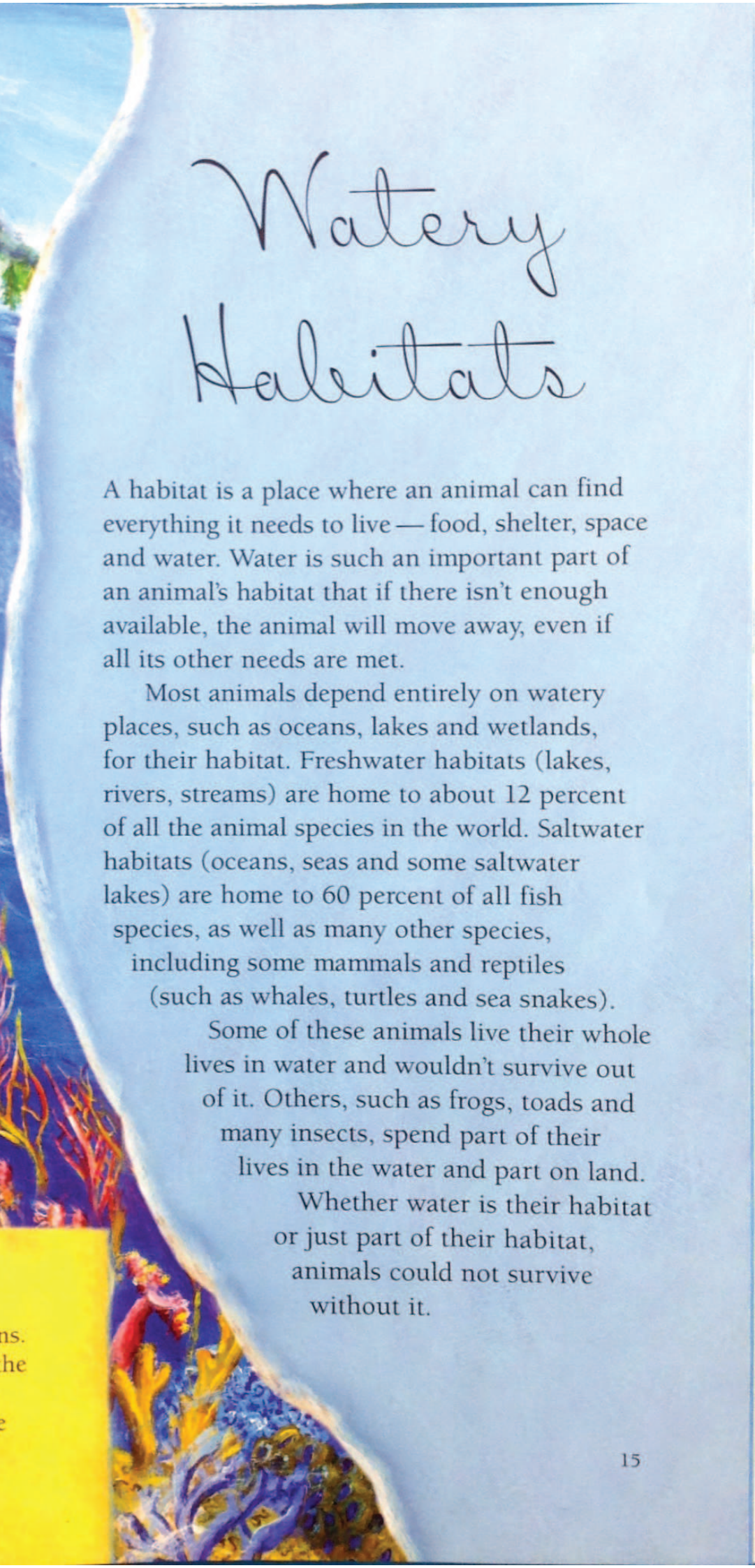
Animal life began in the ocean. Then, about 360 million years ago, some animals started to evolve. Their bodies began to change and they slowly adapted to living on land.



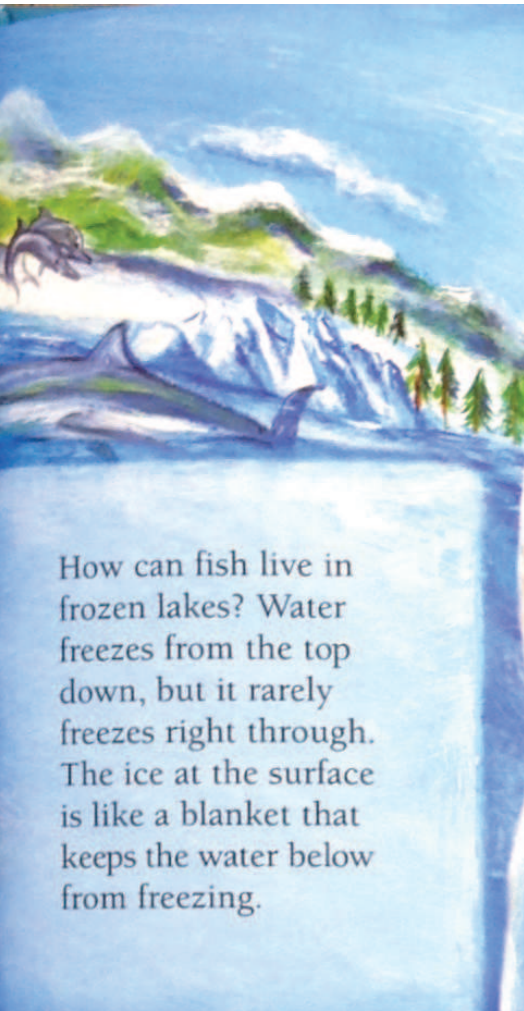
Saltwater marshes are wetlands that occur where the land meets the sea. These habitats are home to a wide diversity of species, from microscopic bacteria, fungi and algae to fish, crustaceans, reptiles, birds and mammals.

Some rainforest frogs, insects, spiders, worms and bacteria live their entire lives in the tiny pools of water that get trapped by the leaves of the bromeliad plant.





Watery Habitats




How can fish live in frozen lakes? Water freezes from the top down, but it rarely freezes right through. The ice at the surface is like a blanket that keeps the water below from freezing.

A habitat is a place where an animal can find everything it needs to live — food, shelter, space and water. Water is such an important part of an animal's habitat that if there isn't enough available, the animal will move away, even if all its other needs are met.

Most animals depend entirely on watery places, such as oceans, lakes and wetlands, for their habitat. Freshwater habitats (lakes, rivers, streams) are home to about 12 percent of all the animal species in the world. Saltwater habitats (oceans, seas and some saltwater lakes) are home to 60 percent of all fish species, as well as many other species, including some mammals and reptiles (such as whales, turtles and sea snakes).

Some of these animals live their whole lives in water and wouldn't survive out of it. Others, such as frogs, toads and many insects, spend part of their lives in the water and part on land.

Whether water is their habitat or just part of their habitat, animals could not survive without it.



Coral reefs are found in the warm, shallow waters of oceans. They have been described as the rainforests of the sea because they are home to an incredible diversity of species.

People at the Well

Since the beginning of time, people have depended on water—for drinking, for food, for bathing and for watering their crops. Water has always provided a highway to move people and products from place to place. As cities and societies grow, so does their need for water.

Today, water is essential in our homes, in industry and in agriculture. At home we use water for cleaning, cooking, drinking, flushing toilets and for bathing. But homes account for only 10 percent of all the freshwater used.

About 21 percent of the water we use goes to make everything from computers to cars. Water is used in hydroelectric plants to generate electricity and in petroleum plants to

make gas. In factories, water is used to heat things up or cool things down and to wash away waste. Water vapor (steam) even runs machinery. Water is also an ingredient in many products, such as lotions, shampoos, chemicals and drinks.

The remaining 69 percent of the freshwater we use goes into agriculture. Farms use huge amounts of water for crops and livestock.

Look around—almost everything you see was made using water. It took about 130 L (34 U.S. gal.) of water to make your bike. Water was used to grow and make the food you eat and the clothes you wear. Water was even used to make the paper for this book—and the ink used to print the words.

