

EXTREME LIFE



Arizona Astrobiology
Center

A detailed illustration of a wood frog in its natural habitat. The frog, with brown and tan mottled skin and a white stripe along its side, is perched on a dark grey rock in the foreground. It is looking towards a small, clear blue pond in the middle ground. The pond is surrounded by lush green grass, reeds, and lily pads. In the background, there are several tall trees with vibrant green foliage under a bright blue sky with soft white clouds. The overall scene is a peaceful forest environment.

WOOD FROG

Wood frogs live in forests and ponds that are warm and temperate during the summer, but are frozen all winter. Some animals have strategies to stay warm during the cold winters, but wood frogs do the opposite. Their bodies are able to completely freeze during the winter. Then in the spring they, wake up and go back to being regular active frogs.

THORNY DEVIL

These small spiny lizards live in Australia's Outback desert, where there is very little water. Thorny devils have a very unique way of drinking that helps them get all the water they can.

Grooves between their scales form a network of channels leading to their mouth, so if they step in a small puddle or if droplets of water land on their back, the water can be transported to their mouth along their skin. Their tough scales also protect them and keep them from losing water.

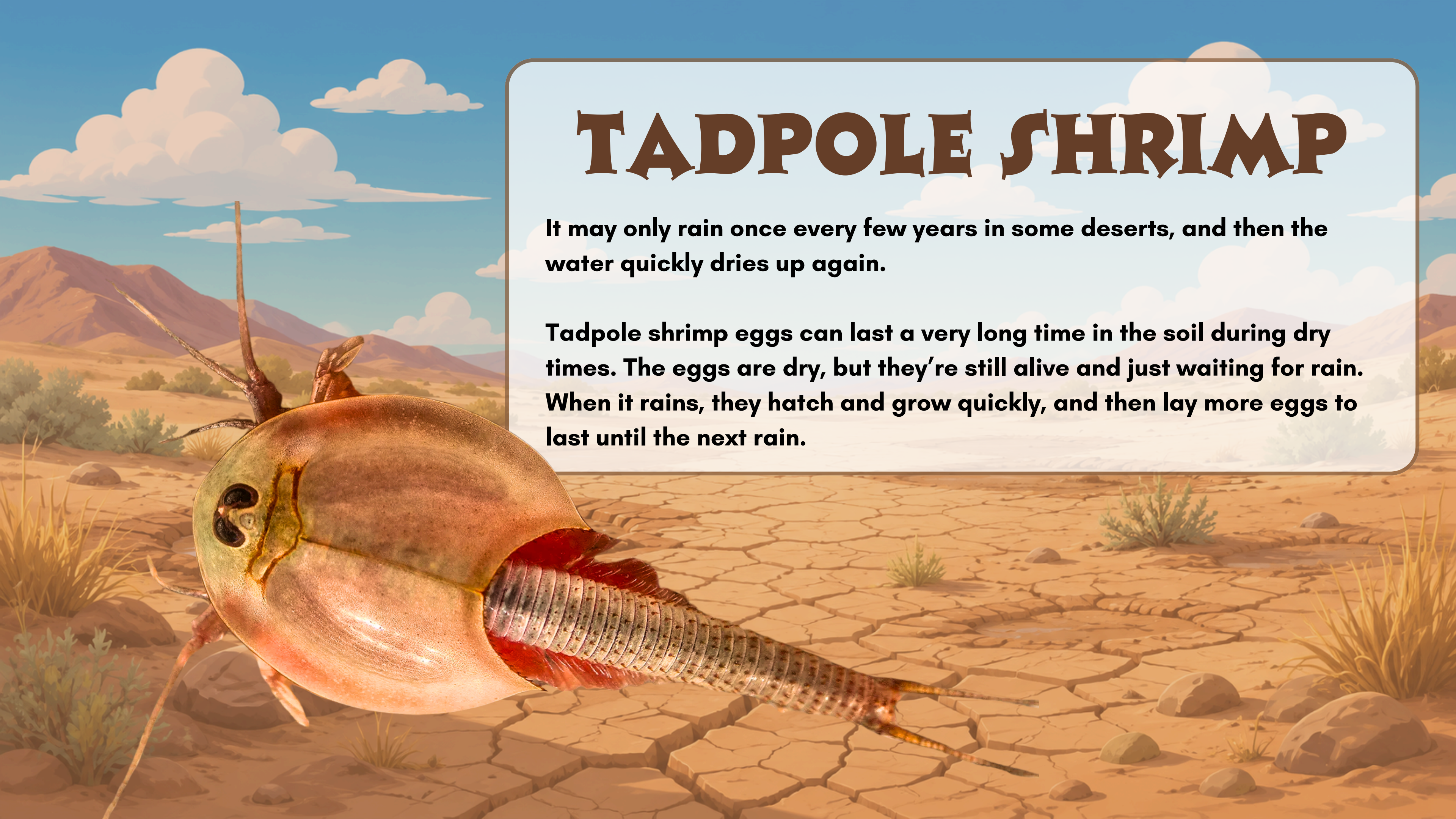


EMPEROR PENGUIN

Emperor penguins live on the frozen ice sheets of Antarctica and swim in the freezing cold ocean surrounding it. In the winter, the temperatures in Antarctica can get down to -50°F , so the penguins really need to stay warm.

They have a thick insulating layer of fat, a layer of soft feathers to trap warm air close to their skin, and a protective layer of waterproof feathers on top. They also huddle together in large groups to keep warm.



An illustration of a tadpole shrimp (Triops) in a desert environment. The shrimp is shown in the foreground, resting on cracked, dry earth. It has a large, rounded, copper-colored carapace with a greenish-yellow patch near its eye. Its long, segmented tail is visible, and its long antennae extend forward. The background features a desert landscape with sparse green shrubs, small rocks, and distant reddish-brown mountains under a blue sky with fluffy white clouds.

TADPOLE SHRIMP

It may only rain once every few years in some deserts, and then the water quickly dries up again.

Tadpole shrimp eggs can last a very long time in the soil during dry times. The eggs are dry, but they're still alive and just waiting for rain. When it rains, they hatch and grow quickly, and then lay more eggs to last until the next rain.

A Sifaka lemur is shown climbing a tree trunk on the left side of the image. The lemur has a white body with a black collar around its neck and a black face. Its long tail is visible. The background is a savanna-like environment with orange-brown soil, scattered rocks, and several tall, spiny trees with green, star-shaped leaves. The sky is blue with white clouds.

SIFAKA LEMUR

The island of Madagascar has forests full of spiny plants, which would normally be impossible to climb because of all the spines, but not for sifaka lemurs.

They have thick pads on their hands and feet to protect them from the spines and they're excellent at maneuvering around the spines too. They can even jump huge distances from one plant to another.



VOLCANO SNAIL

These unique snails live around hydrothermal vents deep in the ocean. At the depths where they live, there is very high pressure from the water above. To protect the snails from the pressure, they have extremely tough shells made of iron minerals. No other animals on Earth have a shell or skeleton made of iron!

An illustration of a platypus swimming in a stream. The platypus is shown from the side, with its head and bill pointing towards the bottom right. Its body is dark brown and covered in fur. The stream is surrounded by green grass and trees. A large log is visible in the background. A text box is overlaid on the right side of the image.

PLATYPUS

Platypus forage for food in cloudy streams and rivers, where it can be very hard to see. This would make it very challenging to find food, since the water makes it nearly impossible to see.

Platypus are able to find food there because they have an additional sense that we don't have. When they swim, they close their eyes, nose, and ears, and instead use electroreceptors on their bills to forage, sensing tiny electric currents produced by their prey.

A detailed illustration of a Yeti crab in its natural habitat. The crab, with its white, feathery appendages and white carapace, is positioned in the center-left. To its left is a tall, rocky hydrothermal vent chimney with orange and yellow mineral deposits. The seafloor is covered in dark, porous rocks and various colorful deep-sea organisms, including purple and yellow sponges and coral. The background is a deep blue ocean with small, glowing bubbles.

YETI CRAB

These fuzzy crabs live in deep parts of the ocean where there are no plants because there's no sunlight. Because of that, life there gets its energy from bacteria that use chemicals from hydrothermal vents.

Yeti crabs use their long furry arms to grow bacteria by waving their arms over the mineral-rich water from the hydrothermal vents. Then they eat the bacteria.



MUSSELS

Mussels live along coastlines where the waves are constantly crashing against rocks. To keep themselves from being pulled off the rocks by the waves, mussels attach themselves to the rocks using many thin threads.

Since the water goes up and down throughout the day, mussels are out of the water sometimes, so they have to keep themselves from drying out. They prevent water loss by closing their shells when they're out of the water.

A detailed illustration of a lungfish in its natural habitat. The lungfish is dark grey with a lighter, mottled pattern on its head and neck. It is positioned in the foreground, partially submerged in murky, brown water. The background features a dense, lush green forest with various trees and plants, including large, broad-leafed plants in the immediate foreground. The sky is a clear blue with a few white clouds. The overall scene is a vibrant, naturalistic depiction of a swampy environment.

LUNGFISH

Lungfish live in streams and lakes. Sometimes these habitats can become low in oxygen or can dry out. Lungfish have adapted to this by being able to breathe air. If there's not enough oxygen in the water, they can get more from the air. If the water dries out, they can burrow and stay in the soil breathing air for up to two years until the water comes back.

Lungfish are more related to us than any other fish!

JAVELINA

Water is scarce in the Sonoran Desert, but there's a lot of it stored inside cacti. The problem is cacti protect their water with lots of spines.

Javelinas can easily get through the spines using their large teeth and tough skin in their mouths, so they can get the water they need.





CREOSOTE BUSH

Plants in the Sonoran Desert need to have strategies to retain water so they don't dry out. Plants can lose water through their leaves, so having specialized leaves can help reduce this.

Creosote bushes have very small leaves to reduce the surface area that water can evaporate from. The leaves also have a waxy coating to help retain water.



ELF OWL

The Sonoran Desert is hot, so animals need ways to stay cool and find shelter from the heat.

Elf owls are the smallest species of owl and they live in holes in saguaro cacti. The inside of the cactus is cooler and protects them from the sun.





SAGUARO CACTUS

Like everything else in the Sonoran Desert, saguaros need to make sure they don't get too dehydrated. They do this by storing lots of water inside their trunks. The insides of saguaros are spongy and are able to expand when it rains to hold large amounts of water and keep it for when the weather is dry.