

Could a Polar Bear Survive in the Desert?



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by Sharon Kahkonen

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Living in the Arctic

Suppose that you're floating on a big piece of ice. Icy water is all around you. To find food, you have to swim in the cold water. Can you survive? Of course you can, if you're a polar bear! Very few animals can survive in this harsh environment. A polar bear, however, feels right at home.

How does a polar bear stay warm? Its large body can hold in a lot of heat. The bear's long nose warms and moistens the cold, dry air before it reaches the bear's lungs. The bear's tail and ears are stubby and close to its body. This keeps the bear from losing too much heat.

A polar bear has a thick fur coat with two layers. The first layer is an undercoat of thick, woolly fur close to the skin. The second layer is made up of glossy hairs called guard hairs. These are the hairs that make a polar bear look white. However, guard hairs are really clear, not white. Sunlight reflecting off these hairs makes the bear look white. Most sunlight, though, goes right through the hairs and strikes the bear's skin, which is black. The black skin absorbs the heat of the sun, which helps keep the bear warm. Then, under its skin, a polar bear has a layer of fat that is two to four inches thick. The fat insulates the bear's body and keeps it from losing heat.

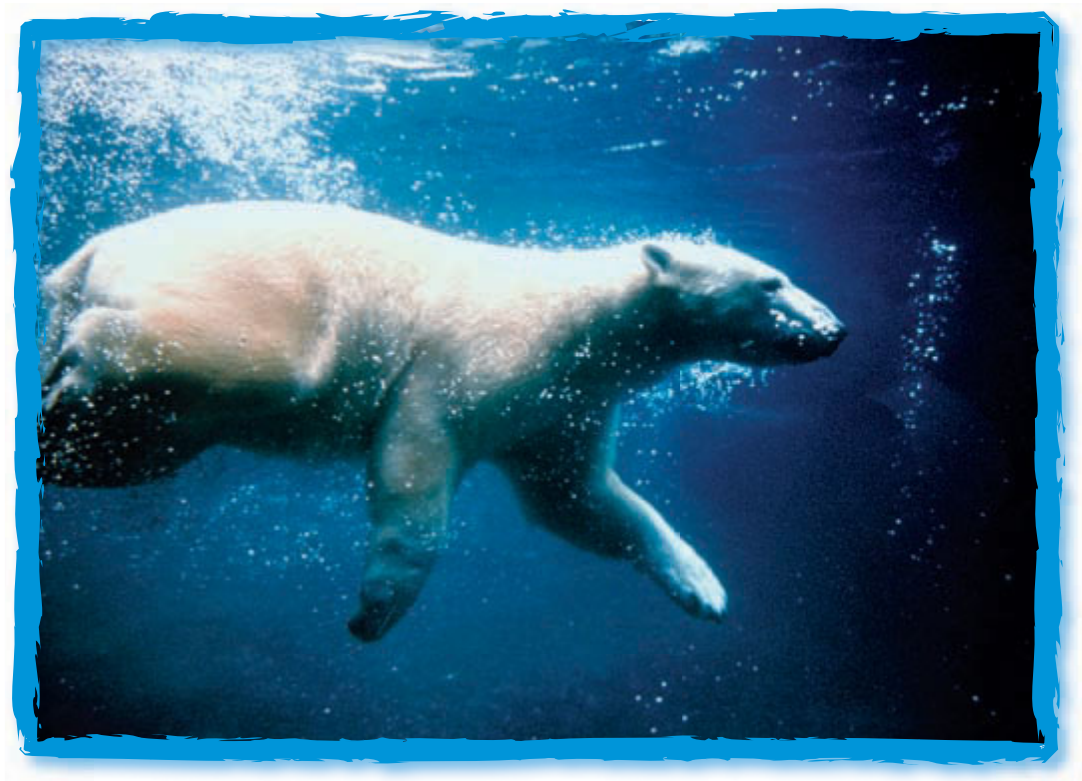
What's for dinner? Ringed seal! Seals swim in water that is covered with ice. They must come to the surface to breathe. When seals come to the surface, they swim up to holes in the ice.

🔊 A polar bear depends on its long, sensitive nose for hunting. It can detect a seal's breathing hole in the ice from as far as a kilometer away. When the bear finds a hole in the ice, it lies down next to it and waits, sometimes for hours. When a seal comes up for air, the polar bear grabs the seal with its sharp claws and teeth. Dinner!

🔊 A polar bear lives on the ice, which is a great place to hunt seals. During summer, when there is little sea ice, polar bears often live on land. They can live off the fat stored by their bodies from seals they ate during the winter. When the sea freezes over again in the fall, the polar bear leaves the land and goes back on the ice.



Ice can be very slippery, but a polar bear doesn't slip on it. Its feet are adapted for walking on ice. Its huge feet, or paws, spread out the bear's weight and keep the animal from breaking through the ice. The soles of the bear's feet are covered with small bumps and cavities that act like suction cups. They help keep the bear from slipping on the ice. Also, it's easy for a polar bear to climb onto the ice from the water. The bear uses the sharp, curved claws on its front paws like hooks to grab the edge of the floating ice and pull itself up.



■ A polar bear is an excellent swimmer. It uses its large front paws to paddle through the water. Its rear paws trail behind and are used for steering. Its smooth body shape is well adapted for swimming. Its very long neck helps the polar bear keep its head above water when it swims. When the bear is below the surface, its nostrils can close to keep out the water.



■ The water surrounding the polar bear is salt water. Bears can't drink salt water. This is not a problem for the polar bear, though. It doesn't need to drink water! The bear's body makes the water it needs as it digests the fat from the seals it eats.

■ When a polar bear eats a seal, it eats only the blubber, which is mostly fat. The polar bear leaves most of the seal's protein-rich meat behind. Other animals often wait for the bear to finish. Then they eat what's left.

■ You may think that the Arctic is one of the hardest places in the world to live. But the polar bear has adaptations that make it perfectly suited for living in extreme cold.

Living in the Desert

- Now suppose that you're instantly transported to a scorching desert. The hot sand stretches for hundreds of miles around you. The wind can whip the sand into a blinding sandstorm.
- You need to protect yourself quickly to survive in this harsh desert environment. You might cover your body with lightweight clothing and look for shelter from the blistering sun. You will need to drink plenty of water to keep your body from drying out.
- But what could a polar bear do in the desert? A polar bear is well adapted to life in the cold Arctic. It would have a very hard time surviving in a hot, dry desert, though!
- A polar bear would not be able to remove its four inches of insulating fat or its two coats of fur. It would probably not survive on its own for very long in the extreme desert heat.



It would not have an icy ocean to cool itself in, or seals to eat, or snow and ice for camouflage.

What kind of animal could survive in a desert? Such an animal would have to be able to live in intense heat and baking sun with little water and little food. Most large animals are not adapted to desert life. Their size prevents them from finding enough food and water. They are too big to find shelter from the sun under plants or rocks or in burrows under the ground. Therefore, most desert animals are small.

One large animal is adapted to survive in a desert, though. The dromedary camel was domesticated more than 4,000 years ago. It is still used for transportation through big deserts, such as the Sahara in Africa. In big deserts, the camel may have to walk for days without food or water. It often carries heavy loads over the hot sand, keeping a slow but steady speed.



Without water, most mammals cannot survive for very long. They lose a great deal of water as they sweat or pant to help cool their bodies. A camel cannot afford to sweat or pant away its precious reserves of water.

One thing that a camel does to save its body's water is lie down in the sand with its legs folded under it. In this position, less body surface is exposed to the heat of the sun. Its thick woolly fur serves as a layer of insulation. Instead of keeping the animal warm, as the polar bear's fur does, the camel's fur helps the camel stay cool. The fur slows the rate of heat absorption from the sun.

Even if a camel's body starts to overheat, the temperature has to be pretty hot, about 41°C (106°F), before the animal needs to sweat. At night, a camel's body cools down to about 34°C (93°F). The next day, its body takes a long time to get hot again. Most other mammals could not tolerate such changes in body temperature.



Even a camel's nose is adapted for saving body water. Any water vapor from the camel's lungs condenses on the inside of its long nose instead of being breathed out. Any dribbles of moisture that escape from the nose are channeled back into the mouth by the groove in the camel's upper lip.

Of course, it is impossible to prevent water loss entirely. This is especially true in a hot, dry desert. However, a camel can survive even after losing one-third of its body weight in water. Camels have been known to survive for ten months without drinking! When they do drink water, they can drink 118 liters (31 gallons) of water in just a few minutes. That would be like your drinking about 480 glasses of water in only ten minutes!

A camel has adaptations from head to toe for surviving in a desert. When you walk through loose sand, your feet sink into the sand at every step. It takes a lot of energy to walk in sand. A camel's feet are as big as pie plates, and they are fleshy. The camel can easily walk on sand without sinking, because its weight is spread over a large area.

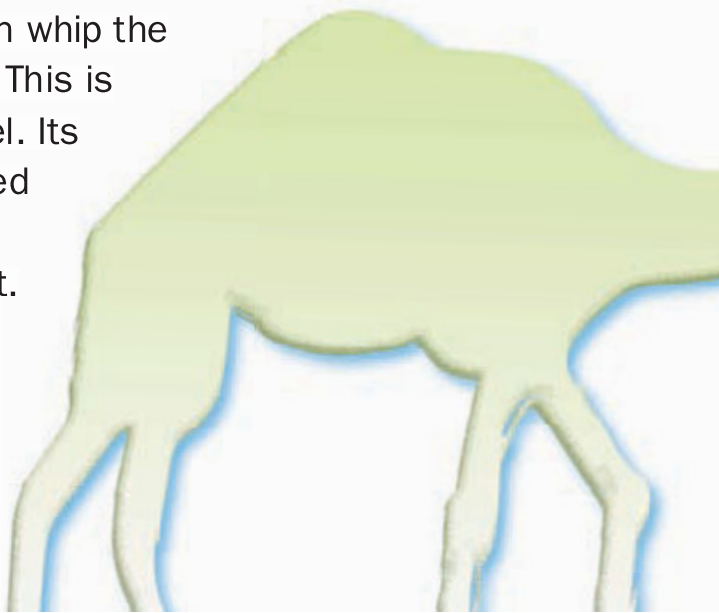




▶ Desert sand can be scorching hot, but that doesn't bother a camel. Hard, thick skin on the bottom of its feet and on its knees protects the camel from the hot sand.

▶ The desert sun can be blinding. However, a camel has a built-in sun visor to keep the bright sunlight out of its eyes. The broad ridges of bone above each eye shield the eyes when the sun is overhead.

▶ Wind in the desert can whip the sand into a blinding fury. This is not a problem for a camel. Its nose and ears are covered with long hairs to protect them from sand and dust. The camel can close its nostrils to keep out dust and sand during storms.



It has a double row of extra-long eyelashes to protect its eyes. If sand gets into an eye, a camel has an extra eyelid to help get it out. The eyelid moves from side to side like a windshield wiper to wipe the sand away. This eyelid is very thin, so a camel can see through it. As a result, a camel can close the extra eyelid and keep walking in a sandstorm.

You would not find much to eat in a desert, but a camel can eat almost anything that grows there. Its diet consists primarily of thorny plants, dried grasses, and saltbush. A camel needs from six to eight times as much salt as other animals because salt helps its body store water. A third of the camel's diet is salty plants that most other animals don't eat.



🔊 A camel has tough lips so that it can eat thorny plants, which can't be eaten by most other animals. With its long neck, a camel can reach up



to a height of 3.5 m (11.5 ft) to break off branches or strip leaves. With the 22 teeth behind its biting teeth, it chews each bite 40 to 50 times. This helps break down tough plant material so that the camel's digestive juices can work on it.

🔊 One obvious adaptation that the camel has for surviving in the desert is its hump. A camel's hump stores fat. If the camel can't get food in the desert, it can live off this fat. As the camel uses the fat, the hump gets thin and flabby. The camel can go for many, many days without eating, because of its stored fat.

🔊 Just as a polar bear is perfectly adapted to the frigid weather of the Arctic, a camel is perfectly adapted for surviving in the harsh environment of a desert. A polar bear certainly couldn't last very long in a desert. Could a camel survive in the Arctic?

Think and Write

1. How do both the camel and the polar bear live for long periods without food?
2. Both desert regions and arctic regions have very dry climates. What adaptations do both camels and polar bears have, to survive in a dry climate?
3. Why are humans able to survive in most any climate, whereas wild animals can live well only in climates to which they are uniquely adapted?
4. **Persuasive Writing** Write an advertisement for selling a camel. In your advertisement, explain the advantages of having a camel to ride and to carry burdens in the desert.

Hands-On Activity

Keeping Warm Try this experiment to find out whether fat can act as insulation to keep you warm. You need a bowl of ice water and some vegetable fat. Mold vegetable fat around one of your index fingers. Completely cover the finger with a layer of fat at least 1 cm (0.5 in.) thick. Then hold both of your index fingers in the ice water. How long does it take for each finger to get cold?

School-Home Connection

Local Adaptations Share this book with a family member. Choose an animal that is native to your area. Describe how it is adapted to the local environment. Draw a picture of it, and label its adaptations.

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