

## Are bats really blind, and can they fly in the rain?

Garrett and Eli C., Augusta, Georgia

Bats are not blind — their sight is just dandy. The reason we erroneously think they might be blind is that bats use a unique system called echolocation to manoeuvre in the dark. It is like a sonar system — bats send out short high-frequency sounds, many of which we can barely pick up. The sound waves bounce and echo off objects and reflect back to the bat. The reflected frequencies are slightly different and the bats can determine from this change in frequency where to locate the objects. But this system only works for up to 40 metres, so bats rely on their sight too.

Bats have been given a bad rap — just think of rabies fears, even of Dracula! They are sometimes called flying mice, but the truth is that they are closer to primates or humans than to mice. Check out their arms and fingers! Because bats seem like flying rodents, they tend to creep people out, but many of them are really important in keeping the night-flying insect population down.

There are around 1000 species of bats, which make up a quarter of the mammal population on Earth. We still have to work hard to preserve bats, though, because they are so important in the food chain, and because they produce more slowly than any mammals their size on Earth — most have only one young a year!

To answer your second question, bats are the only mammals that fly, and, according to Bat Conservation International, bats *will* fly in the rain. However, the high humidity that comes with rain can affect the movement of sounds through air, so bats might have more of a problem flying then.

The wildlife department of the Toronto Humane Society sometimes houses bats in the refrigerator to keep them in hibernation until they can be safely released back outdoors.

## 2. How much water can a camel hold in its back?

Alex C., Ajax, Ontario

The idea that a camel might be able to hold *any* water in its back is pretty amazing. Amazing, but not true.

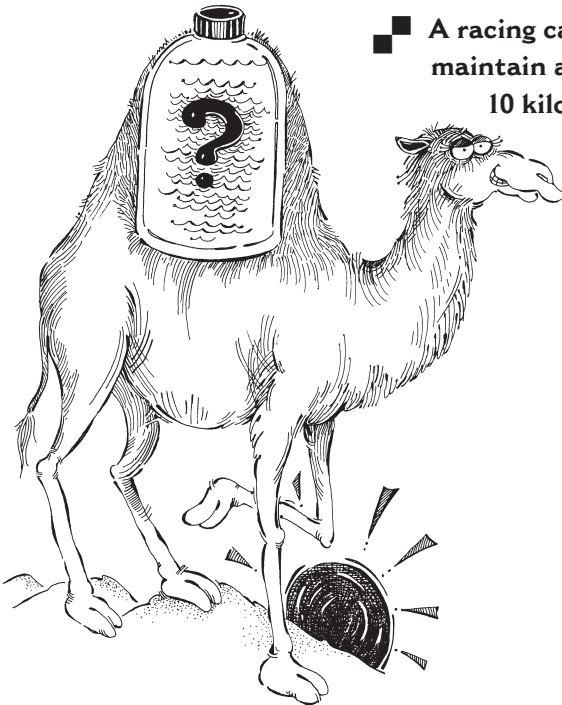
The hump is a very good example of adaptation. Camels need some way to survive the desert's extreme climate, since camels are huge, and the desert is hot and dry, with little food to be found. Camels get water from food and from whatever actual water they can find. But the amazing thing is that the camel can go a long time without a drink of water — a week in really hot weather and up to a couple of months when it is cool. If we humans lose more than 12% of our weight in fluids, we die, but camels can hold on even if they lose 40%.

This is partly because they have some built-in water conservation systems — what water they take in they use very carefully. Camels don't sweat much, and if they do their fur holds onto the sweat and uses it to help cool them down. Their very stinky urine is hugely concentrated, which means that they don't pass much water through that way either. And they have particularly small and clever blood cells, which continue to work and circulate even when dehydration causes a camel's blood to get really thick.

So is the camel's hump the key? Not for water storage — that is a myth. The truth is that the hairy, floppy “canteen” on the back of the camel holds fat, not water — up to 45.5 kilograms. It's there to live off when there is no food around. When it is really difficult to find a meal, the humps shrink, get flabbier and flop over to the side. That would take about two weeks. Amazingly, camels can regain their weight in mere minutes by drinking a huge amount (up to 100 litres) of water.

## Camel Facts

- **Think goat:** a camel will also eat almost anything.
- **Can you close your nostrils?** Camels can. They need this trick to keep sand from blowing up their noses.
- **A racing camel has to be able to maintain a speed of 35–40 kph for 10 kilometres.**



# 3.

## Do fish ever sleep?

Karen F., by e-mail

For sure fish don't yawn, because you would need lungs and a diaphragm to do that. But sleep? That depends. If you believe that sleep means you have to have your eyes closed, then fish don't sleep, because they have no eyelids. But they can restore energy and save energy by resting. Scientists measure sleep by looking at brain waves. They know fish sleep because they can see the fishes' brain waves getting slower, and the frequencies getting lower, as they fall asleep.

Some fish hang around logs or on rocks so they even look like they are sleeping. Some sharks have to keep moving even when they're resting, because their method of breathing requires them to push water through their gills. From a human's point of view, none of these options sounds terribly restful.

- **A dolphin — which of course is a mammal and not a fish — can turn off half its brain and rest it, but keep the other half agile enough to watch out for predators. There is even a word for this kind of resting — unihemispheric deep sleep. It isn't deep by our standards, though some species of dolphin manage to cobble together 7 hours of sleep a day, with the longest “nap” with half a brain taking all of 60 seconds!**
- **And dolphins don't just “wake” to watch out for predators. They have to stay alert enough to surface every once in a while to breathe — otherwise they would drown. Young dolphins have to surface every 2 minutes or so; mature dolphins can hold out for up to 10 minutes.**