

# Questions and Answers about Bats

Students from across the United States sent in these questions during the May 17 webcast of BatsLIVE and experts provided the following responses. The May 17 webcast may be watched at [http://batslive.pwnet.org/webcast/webcast\\_page\\_may17.php](http://batslive.pwnet.org/webcast/webcast_page_may17.php).

## Flight

### **What is the length of the different bats' fingers?**

The finger length would depend on the overall size of the bat. The bat species with the smallest wingspan measures a little over 5 inches and the largest wingspan measures about 5 feet! In California, the average bat wingspan is likely less than 12 inches, so the average finger length for the bats around your area is probably around 3 inches or less. They do have long fingers!

### **How large is the wingspan on the largest bat?**

I think the largest bat, a flying fox species, has a wing span of about 6 feet!

### **If the wing membrane gets torn, does it heal by itself?**

Yes, a bats wing can heal, as it is living tissue. But, if the wing is torn too badly, and the bat can't fly, then the bat would not be able to feed itself. Those species of bats that do catch their insect prey with their wing membranes basically just scoop them into their mouths to eat them on the fly. Many bats will carry their bugs to a night roosting spot, where they can eat them while hanging!

### **Since bats' wings are made out of a thin membrane/skin, does it ever tear and make it hard for bats to fly?**

Yes, sometimes bats get tears in their wings, much like we might get a cut on one of our fingers. A small tear in the wing up to about an inch doesn't cause the bat much trouble in flight. Larger tears are very rare. Since the bat's wing is living tissue, it has all the components needed to heal itself. Often, after the wound heals, the bat has a scar on its wing. Some bat biologists do what's called "wing mapping." When they capture bats, they draw each of these scars and because the scars are unique, the biologists can identify individual bats based on their wing scars.

### **Why are bats able to fly when all other mammals cannot?**

That's a great question because the ability to fly is one of the characteristics that makes bats such interesting creatures and unique from other mammals. The scientific term for bats is "chiroptera", meaning hand-wing. Bats are the only mammals that have hands that have evolved into wings to allow flight. Bats have long, narrow fingers that are all connected by a thin membrane to create a light, elastic and strong wing, unlike any other mammals. Bats also have very strong chest and back muscles that they use to power flight. Being able to fly at night gives bats access to a plentiful food source that most other mammals can't catch—flying insects!

### **How are bat and bird skeletons alike and different?**

Both bats and birds have to find ways to keep their skeletons light to make it easier to fly. Bats have all the same bones in their wing as we have in our arms and hands. The wing membrane just surrounds all those bones. Bat bones are light because these same bones are much thinner than the equivalent bones in our skeleton, but they are filled with marrow, just like ours. Birds have lighter weight bones because there are hollow pockets within them.

Birds have a keeled sternum where their powerful breast muscles attach. Bats don't have a keeled sternum and use muscles on their chest and backs to power flight. Because they don't have a big keel on their chest, bats can squeeze themselves into small places to roost.

### **What is the top speed a bat can fly?**

You won't believe how fast bats can fly! The Mexican free-tailed bat, a species found here in the United States, can fly 40 mph, and when it's diving in flight, it has been recorded at speeds of up to 80 mph! Some species, like this one, are "built" for fast and long distance flying, others for slower, more maneuverable foraging and flight, so they would fly slower.

### **How long can a bat fly, in distance and time?**

That's a good question, and one that we don't have lots of information on, but I know that some species of bat, like the Mexican free-tailed bat, appear to fly almost all night long foraging for insects! Also, they could be flying as far as 30-50 miles each night!

### **How big can a bat's wings get?**

Well, for the bigger species of flying foxes, I think the wing span can reach about 6 feet! But some species of bats are smaller animals, so their wings don't get real big. Here in the US, our bigger species of bats would be more like 12 - 16 inches for wing spans.

### **Are bats able to fly upside down?**

Bats hang upside down but do not usually fly upside down. Bats are amazingly maneuverable though and can fly sideways and through tiny spaces. So it wouldn't surprise me if one of them occasionally went upside down... but it would turn over right away.

## **Bat Basics**

### **How many species of bats are there in the world?**

Bats make up about 20% of all mammal species and scientists know of over 1,200 bat species in the world!

### **How many colors do bats come in?**

Bats come in a variety of colors, from yellow and white to brown and black. One bat in the western United States is called the Spotted Bat. It is black with large white spots and the fur is very soft. The ears are really long so it can hear the night-flying insects that it feeds on. Bats have different colors of fur, and each has its own beauty. Check out some of the pictures here: <http://www.batcon.org/index.php/all-about-bats/species-profiles.html>.

### **How many species are there in the US?**

There are 47 species of bats in the United States. All of the bats we have here are microbats—that's one of the reasons it was such a special treat to see the flying foxes on the webcast today! Even though all of the bats in the USA are microbats, there are still many differences between the different kinds of bats, and each has its own beauty. Check out some of the pictures here: <http://www.batcon.org/index.php/all-about-bats/species-profiles.html>. Two of my favorites are the spotted bat and the hoary bat.

## **Size**

### **How long does it take for a bat to be fully grown?**

Bats are born weighing about 1/3 of their mother's weight and are furless. They grow fur, grow in size, and learn to fly over about a 3 week period. By then, they are basically the size of an adult and on their own to capture enough insects to feed themselves.

### **What is the smallest species of bat?**

The bumblebee bat, which is the size of a large bumblebee!

### **How big is the world's largest bat? And how do they get so big?**

The Large Flying Fox (*Pteropus vampyrus*), and giant golden-crowned flying fox (*Acerodon jubatus*) are 2 of the largest bats in the world. They can have wing spans of 5-7 feet and weight up to 3.5 lbs. They are flying foxes, a group of bats that does not echolocate and finds their food primarily using smell and vision. They have better night vision than us. The largest flying foxes are native to Australia, Southeast Asia, and the Philippines. They eat fruit, leaves and flowers. They are vegetarians. Think about the other largest land mammals. They all eat vegetarian diets and this allows them to be large. It is the same with the largest bats.

### **How much does a bat normally weigh?**

Bats vary greatly in size and weight. The smallest bat in the world, the bumblebee bat, weighs only 2 grams. And the largest bat in the world, the Malayan flying fox that you saw today, weighs up to 2 ½ pounds. Most of the bats we have here in the United States weigh about the same as a nickel. Isn't it amazing that such tiny animals can fly so far and eat so much!

### **How big can the biggest bat in the world get?**

The largest bat species in the world is called the giant golden-crowned flying fox and it lives in the Philippine Islands. Its wingspan is about 5 feet and it weighs about 3 pounds.

### **What is the average weight of the flying-fox?**

There are many different kinds of flying foxes and they average different weights. The straw-colored flying fox lives in Africa and its average weight is  $\frac{1}{2}$  to  $\frac{3}{4}$  of a pound. The Malayan flying fox is the largest bat in the world and weighs almost 2  $\frac{1}{2}$  pounds.

## **Diet**

### **How are they able to swallow when they are upside down?**

They have differences in their basic physiology that allow them to do so, and pump blood through their bodies, and bend their necks much greater than we can, so they can look around while hanging upside down!

### **How many teeth do bats have? Do they all have the same number or type teeth?**

Depending on the species, bats have between 20 and 38 teeth. The number of teeth and their shape varies according to what the bat eats. For example, bats that eat insects have sharp teeth to be able to bite through the hard shells (exoskeleton) of beetles, while bats that drink nectar and eat pollen have long tongues and dull teeth since they don't need to do much chewing.

### **Do bats dive into the water or eat water insects?**

No, bats don't dive into water or eat insects that are found in water. But, there is a bat that eats fish! It scoops them out of the water using its hind feet and claws to "hook" the fish, and then carries it away to eat it.

## **Development**

### **When a bat is born, is it born upside-down?**

That's a great question because bats are wonderful moms! Some bats give birth upside-down, like the gray-headed flying fox in this video (<http://www.youtube.com/watch?v=9NtsQfRCKSI>). The mother bat takes care to clean the pup's face and flaps her wings like a fan to keep the pup cool. When the pup comes out completely, its mother will help it snuggle up to her chest to begin feeding. Some other kinds of bats hang from their thumbs right-side up and when the pup is born, the mother uses her tail membrane to catch the pup and help it move up towards her chest to nurse.

### **How can you tell if it a boy or girl?**

Bats are mammals just like we are, so you can tell if a bat is a boy or a girl the same way that you can tell if humans or dogs or cows are boys or girls.

### **How do mother bats get food for their babies?**

Mother bats feed their babies milk, by nursing them. After the pups start flying, she starts reducing the amount of nursing she provides them, and they start learning to catch insects and feed themselves!

### **How old are bats when they become independent from their parents?**

Most of the small, insectivorous bats in the United States stay with their parents for 6-10 weeks before they become independent and can fly and hunt for insects on their own.

### **How old does the average bat live?**

The longest-lived bat we know of was a Brandt's myotis (a species similar to many of the small bats we have here in the United States) in Russia that lived to be at least 41 years old. The average life span of a bat in the wild here in the United States is closer to 20 years. We do know that little brown bats can live at least more than 30 years!

### **Why do bats hang upside down?**

Bats hang upside down because they only have toes and claws on their back feet. Their forelimbs (front paws) are modified to be wings. You can see their thumb sticking up from the wing, but hanging by 1 claw is not very safe. The muscles in the bats toes actually are relaxed when they are tightened around something (opposite of us). That way they can hang on without thinking about it or using energy.

### **How sharp are their claws?**

Their claws are kind of sharp, but not real sharp so that they would cut your skin or something. They use their claws on their toes to hang from roosting spots, so they most likely get somewhat dulled from that use of their claws. Species like the fishing bat likely have very sharp claws as they use them to "hook" fish from the water to eat!

### **Can bats swim?**

Yes, at least most can, but they don't swim very well, and I'm sure they don't like to have to swim! It would be only when they had to swim!

### **Can bats ever go blind?**

Well, I suspect that any bat could go blind, from some kind of accident or something, but bats are not blind in general.

## **Communication**

### **If a small bat has really big ears how does it fly? Keep balance?**

Some small bats do have really big ears. The ears are very lightweight. The biggest part of the ear is often made of just a few layers of skin. So they really aren't very heavy. But, the biggest eared bats in the US are more like 2+ inches or so long! Bats can also control their ears, change their angles and fold them back. Some scientists recently found that by holding their ears at certain angles, bats can actually increase their lift during flight. Having huge ears does have a "cost" to the bat. It probably does make them less aerodynamic and bats with the largest ears are often ones that fly the slowest. The species with the biggest ears for their size though have found that it is worth the "cost". The extra listening abilities make it easier for them to find the kind of prey (insects) that they like to eat. So they can get away with being slower and less aerodynamic.

### **How do bats communicate with each other?**

Insect-eating bats can make sounds that we can hear and they also use something called echolocation, which is a call that we can't hear. The call sound-wave will actually bounce off things like a tree or an insect and when the wave comes back to the bat, it can distinguish the difference and make adjustments as needed. All these varieties of calls, both within our hearing range and above our range, can be used by bats for them to communicate with each other.

### **How far can bats hear?**

How far bats hear depends on how loud the sound is. For example, when someone is whispering, we can only hear them from a few feet away, but if they are shouting we can hear them from quite a distance. When bats use echolocation to hear and "see" things, they vary their sound signals so they don't waste energy "shouting" when the insect they want to eat is only a few feet away. We suspect bats can hear things from at least 40 feet away, and perhaps further.

## **Nightlife**

### **Why are bats nocturnal?**

I think bats (most) are nocturnal because they have less competition for food at night since most other species of animals are more active during the day, particularly those animals (like birds) that also eat the things that bats eat, like insects.

### **How do bats see in the dark?**

Bats use both their eyes and ears to see in the dark. They are most famous for using their ears to listen for echoes of their calls off various objects and even off of insects. Depending on how fast the echoes come back to them the bats can determine how close they are to objects. Scientists think that they use these patterns of echoes to create a mental image of all the objects around them... that is sort of like what we see with our eyes.

If you know a place where you can hear echoes from, say, a wall, you can try to this yourself. Shout and listen to the echo. Move closer to the wall and shout again and see if it sounds different. Try to tell how close you are getting to the wall from the echoes. If you listen carefully, you can probably hear differences... but maybe not enough to navigate very well. You would need practice to do this. Bats are good at it because they have been doing it for thousands of years.

Most bats also have good eyesight. Their eyesight in the dark is better than ours, though in the light our eyesight is better. Some bats use echolocation to get the general vicinity of their roost or their prey and then use eyesight to make the final location.

## Bat History/Evolution

### Is there a particular scientist who began the detailed study of bats?

The earliest study of bats mostly involved trying to describe the various species on earth (starting in Europe). Carolus Linnaeus is considered the godfather of this work as his book *Systema Naturæ* <[http://en.wikipedia.org/wiki/Systema\\_Natur%C3%A6](http://en.wikipedia.org/wiki/Systema_Natur%C3%A6)> published in 1735 attempted to describe the whole spectrum of life on earth from plants to insects, birds, mammals, and bats. Lazzaro Spallanzani is recognized as one of the earliest bat scientists. He is the one who discovered that bats used their ears to navigate in complete darkness (though he did not know that they did it by producing echoes). He did all of this in middle of the 1700s.

### Do we have evidence of bats in fossilized rocks?

Yes, we do have some fossilized records of bats, but not very much compared to most other animals. I suspect because they are such small boned, fragile creatures that they don't preserve very well. Also, most species live in more tropical areas, an area that doesn't preserve fossils very well. I believe the oldest known complete bat fossil is from the Eocene period.

### What is the name of the first bats that were discovered?

The oldest known bat dates to the Eocene period—52.2 million years ago! Its name was *Icaronycteris* (it is extinct) and you can see a picture of its fossil here: <http://en.wikipedia.org/wiki/Icaronycteris>. It was about the same size as many of the bats that currently live in North America, 5 ½ inches long, with a 15 inch wingspan.

### From what organism did bats evolve?

We don't really know for sure about the origins of bats, but the two main choices are either from the insectivores (shrews, moles, hedgehogs) or from primates!

### What is the bats closest evolutionary relative?

That's an excellent question and you may be surprised by the answer. The bat's closest evolutionary relative is the shrew! Like bats, shrews are nocturnal, insectivorous small mammals, and some even use very basic forms of echolocation.

### How far back in time is there history of bats? What is the oldest fossil ever found?

I'm not sure how far back some evidence is available, but the oldest know complete fossil record of a bat is from the Eocene period.

## Behavior & Hibernation

### Do bats hibernate?

That's a very important question, especially because bats are vulnerable to White-Nose Syndrome when they are in hibernation. Yes, bats hibernate to conserve energy during the parts of the year when insects aren't available. During hibernation, a bat's heartbeat slows down to about 10 beats per minute, compared to 300-400 beats per minute when it's active. Hibernation is an excellent strategy for conserving energy, but unfortunately, it's also what makes bats susceptible to White-Nose Syndrome. *Geomyces destructans*, the fungus that causes White-Nose Syndrome only grows in cold temperatures and so bats are at risk of developing the disease during the times of year when they hibernate.

### Do bats hibernate alone or with their families?

Most species of bats hibernate with other bats. The other bats include their families, distant relatives, and even some bats that they may never have had contact with before. Bats often return to the same hibernation spot year after year.

**Where is the biggest population of bats in the world?** The biggest population of bats that we know of in the world is in Bracken Cave, outside of San Antonio, Texas. Millions of Mexican free-tailed bats live in this cave, making it not just the biggest population of bats we know of, but also the biggest concentration of mammals in the world! There are so many bats that they can be detected in the sky by the same radar that's used to track airplanes.

### About how many bats live in one cave?

It depends on the type of bat and cave. There are many caves that just have a few bats. There are a few caves that have ideal conditions for bats and many bats use them. The biggest hibernation sites can have hundreds of thousands of bats in them. Bracken Cave in central Texas has millions bats residing there in the summer. It takes several hours just for all the bats to get out of the cave. What a traffic jam!

#### **How many types of caves do bats live in?**

Bats live in many different types of caves. The exact number of types is unknown, but what we do know is that bats look for very specific characteristics in caves they use for hibernation. The caves need to be just above freezing temperature so that the bats can lower their body temperature to the same temperature as the cave to use as little energy as possible, but avoid freezing.

#### **How far do bats travel? From state-to-state or do they stay within a smaller local area?**

Bats travel a variety of distances. Some bats migrate across all of North America! Check out this short animation of the movements of the hoary bat (<http://gallery.usgs.gov/videos/171>). They travel from Mexico and the southern United States all the way to Canada in the summer, and then back south for the winter.

#### **Do bats ever leave their cave during the day?**

Bats very rarely come out of caves during the day because they have a number of unique adaptations that make them especially well-suited to being active at night. With their echolocation, bats can “see” very well at night, but not too many things can see them. If they were out during the day, a number of predators, like hawks, snakes, cats (house cats and bobcats), foxes and other animals could hunt them with ease. At night, the only predator that bats really need to be concerned about is owls. Bats are excellent hunters of insects, and at night there are lots of insects out and few other animals who want to eat them. During the day, there are typically fewer insects out, and other animals like birds are busy hunting the insects, so it would create competition for the food source. So with all the advantages of being active at night, bats don’t need to leave their cave during the daytime.

## **Predation**

#### **What are the major predators for the bats in the southeast (Florida)?**

Likely the major predators of bats in Florida are raptors and snakes. In some parts of the world, sometimes bats will eat other bats. In some places, even people eat bats, so that would make people the predators of bats.

#### **What animals eat bats?**

Lots of different kinds of animals will eat bats like owls, hawks, skunks, raccoons, snakes, rats, foxes, and basically, any animal that can reach them in their roost site, or catch them in the air, will try and do so if the opportunity pops up!

#### **How do bats survive against their predators?**

They survive mostly by hiding from them. Most predators are active during the day or the evening and often hunt by use of vision. Bats come out in the evening and spend most of their active period in the dark when few other animals are active that could catch a bat. When flying predators (owls or hawks) do find a bat, a bat tries to escape by being more maneuverable than the predator. If you have ever seen a bat fly, you know they can change direction very quickly . . . even more quickly than an owl. So even if the predator is faster, they often can't capture the bat. During the day bats are in their roosts. They choose places that are dark and not easy for predators to get into. If they are in a cave, they roost on the ceiling so even if a predator discovers them, they can't get close to the bats. When they roost in trees, they often roost under pieces of loose bark where it's hard for predators to find them.

## **White-Nose Syndrome**

#### **Is White-Nose Syndrome something that affects humans?**

That's an excellent question because as you learned in the May 17 webcast, White-Nose Syndrome is the greatest threat to bats in North America. The fungus that causes White-Nose Syndrome, *Geomyces destructans*, is a cold-loving fungus. That means that it doesn't like warm temperatures like on the bodies of humans, dogs, and cats. The fungus can't grow in environments above 70 degrees Fahrenheit, and as you probably know, humans have an average body temperature of 98.6 degrees Fahrenheit, so we can't get White-Nose Syndrome. Thanks for your interest in bats!

### **How did the White-Nose Syndrome start?**

That's an excellent question because as you learned in the May 17 webcast, White-Nose Syndrome is the greatest threat to bats in North America and understanding how it started may help lead to curing the disease. When the disease first appeared in a cave in northern New York, scientists did not know where it had come from. They used the scientific method to develop and test their hypotheses. Just this spring, they figured out that the fungus that causes the disease came from Europe. The cave where the disease was first found in the US is a popular tourist site that receives thousands of visitors each year, and scientists suspect that the fungus arrived on the boots or gear of one of the visitors. Many caves in the US are now closed to the public, or require decontamination of shoes and gear before entering them, in an attempt to slow the spread of the fungus.

### **How does the White-Nose fungus get in the bat's tissue?**

The fungus spreads by tiny spores. When the spores land on the bat and the conditions are good, the spores develop into Hyphae, threadlike structures that can invade the skin tissue of the bat.

### **When the bats get the white fungus, does it mean certain death?**

In most cases, when a bat comes in contact with the fungus (called *Geomyces destructans*) that causes White-Nose Syndrome, it will eventually die. However, there was a case in Oklahoma where a bat was found with the spores of the fungus on its body, but the fungus had not developed into the disease. In caves in the eastern United States where the fungus has been found, the majority of bats have died, but some individuals have survived. White-Nose Syndrome is a complicated disease and scientists are working very hard to learn about it and how we might be able to prevent its spread and help bat populations recover in places that have been impacted.

### **If people spread the disease to the cave floors, how does it get up to the bats?**

White-Nose Syndrome is the greatest threat to bats in North America. Although it may appear still inside of a cave, caves actually "breathe" because of the airflow between their entrances and exits. The spores of the fungus *Geomyces destructans*, which cause White-Nose Syndrome, are extremely small and can circulate in the cave as it "breathes" or when people and animals walk inside and stir up the soil on the cave's floor. As the spores circulate, they land on the bodies of the bats in the cave.

### **Do bats in captivity contract White-Nose Syndrome?**

Bats that are typically in captivity are not very susceptible to White-Nose Syndrome, because they are not exposed to the fungus spores or other bats that may be carrying the fungus. Also most bats in captivity are kept at temperatures and humidities that are warmer and drier than the conditions in caves where white-nose typically grows. Most captive insectivorous bats in the United States are in captivity because they are injured and can't fly and feed themselves. Rehabilitators try to nurse injured bats back to health and release them. With the advent of White-Nose Syndrome rehabilitators need to be very careful to quarantine new bats they get in to make sure they do not carry white nose fungus that could infect their other bats.

### **What can we do to limit the White-Nose Syndrome in the northeast?**

That is the question that has been keeping many bat biologists, fungus biologists, and immunologists very busy for the past few years. Unfortunately we are still seeking the answers. The only thing we have come up with yet is to limit human transmission of the fungus and spores. So we ask people to "decontaminate" before and after they go in a cave. We also take precautions when handling bats to be sure we don't spread spores from bat-to-bat or from a bat to our equipment and then to another bat.

### **Would it help to make bat houses, because usually the bat houses are big enough for one bat, so White-Nose Syndrome won't spread so easily?**

Most bat houses are built for multiple bats. They are also used mostly to give bats a home in the summer. During the summer bats often like to roost in groups, it helps them stay warm and we think they are social creatures. So a bat house built for one might not be used....though some bats do like to roost alone.

I like the way you are thinking though: you are trying to think of ways to isolate bats so that cannot spread disease. This is what we often call a quarantine. As you probably saw bats also like to roost in clumps during the winter. They also like to roost in caves. Maybe you were thinking about placing tiny, single bat, houses in a cave....like little dog houses. This might slow the spread from bat to bat, but the spores of the fungus are tiny and could travel up and into each of the little bat houses.

### **Maybe a hybrid bat could resist the white nose fungus. Has anyone tried to cross breed bats so the white nose fungus doesn't kill them?**

Not yet, but there would be many problems to try and work out with that type of approach. Hopefully, we have some bats that have a natural resistance to the disease, and can get the immunity process started!

### **How do conservationists help control pollution and fungus that can affect bats?**

By study, research into the problems, and education of everyone to help them understand the issue, and promote the benefits of bats, so that people support our efforts.

## **How to Help Bats**

### **What can I do to help save the bats?**

I think one of the best things you can do right now is to help spread the word to other students, family, and friends that bats are very important animals to all of us, and that they are not the scary things that most people think they are! Most people don't really understand bats and are afraid of them. You can tell them how bats are helpful to us, they eat lots and lots of insects, which are pests to us humans, and that's a good thing! Also, bats in different parts of the world help keep fruit trees around, pollinate some of our cactus, and all kinds of other things that are good for us. Bats aren't bad: spread the word!

### **If you find an injured bat in New York state, who should you call? Or is it legal to rehabilitate it yourself?**

That's a great question because it's always good to try to get injured animals healed and back in the wild. First thing, don't touch a wild bat if you don't have to, but if you must in order to get it into a shoe box or other temporary container, wear leather gloves. It is not legal to rehabilitate a bat on your own, but fortunately there are a number of people that will be happy to take bats. For NY, check out this website:

<http://www.nyswrc.org/counties.htm>. One other consideration is that if there is any chance you were bitten by a bat—for example, if you woke up in bed and there was a bat near you, it's important to collect the bat and have it sent to your public health department to be tested for rabies. While less than 1/2 of 1% of wild bats carry the rabies virus, it's such a serious disease that every precaution must be taken.

### **What is the best way to get a bat out of your house?**

The best way to get a bat out of the house is to simply open the doors and windows and let it fly out of the house. This can sometimes take a while. A bat in a house may be disoriented and as anxious to get out as the people are to have it out. There are other ways to get bats out your house that are safe for the bat. This should be done by an adult wearing gloves. Here is a video:

<http://www.batcon.org/index.php/bats-a-people/removing-a-bat.html>

If you are asking about removing a large number of bats from a house, a professional should get involved. This professional should do it without harming the bats.

### **How can you attract bats to your yard?**

That's a great question—lots of us would like to attract bats to our yards to receive the benefits of insect control and simply to watch the beauty of bats in flight at dusk. Building a bat house and providing bats with a safe place to roost is a great way to attract bats and is also an important way to help bats. You can build a bat house on your own using some basic materials like wood and caulking. Detailed bat house plans and a video about the steps are at: [http://www.batconservation.org/drupal/free\\_plans](http://www.batconservation.org/drupal/free_plans). Information about where to install the bat house is at [http://batconservation.org/drupal/where\\_to\\_hang](http://batconservation.org/drupal/where_to_hang). Bats like it to be very warm in the bat house, as high as 100 degrees Fahrenheit or more, so in most northern places, it would be good to paint your bat house black. Good luck!

### **What's best placement for a bat box? Could we put one on the side of an apartment?**

Yes you could put one on an apartment. The best place is on one that gets lots of solar exposure... usually the south side. If the building is near a pond or creek or other area where you see lots of bats in the evening the chances that bats will find it are higher. Even perfectly constructed and perfectly placed bat houses can take some time to be occupied, and sometimes never at all.

### **Where is a good place to put a bat house?**

A good place to put a bat house is up at least 15 feet above the ground, facing south or southeast to get maximum sun exposure, and clear of obstructions so the bats can easily fly in and out of the entrance. For

more information about building and installing bat houses, please check out:  
[http://www.batconservation.org/drupal/free\\_plans](http://www.batconservation.org/drupal/free_plans) and [http://batconservation.org/drupal/where\\_to\\_hang](http://batconservation.org/drupal/where_to_hang).

### **Would our school be a good place to install a bat house?**

Noise is not a primary consideration the biggest ones are in order 1) Properly constructed bat house (find them at batcon.org), 2) Orientation: they are usually looking for one that stays nice and warm (good solar exposure), 3) proximity to an area where bats like to drink or forage. Your garden area might be great. Have you ever seen bats there in the evening? If you have seen bats, the chance is highest. 4) Some luck: even with 1-3 it may take awhile for the bats to find it or they may never find it. Noise is not really a big concern if you have 1-4.

### **If you did own a bat, would you have to feed it just fruit or is there something else it needs?**

Bats should be left in the wild not be kept as pets. In the wild they are free to fly around and do all the things a bat is supposed to do. There are good reasons for bats to be kept in captivity: for instance to show people up close how beautiful, smart and interesting they can be or to study something about their behavior. When fruit bats are in captivity they do need to eat something more than fruit. They are given dietary supplements, like vitamins, to make sure they are getting all the minerals and proteins that they would normally get in the wild. In the wild, even though they eat fruit they consume small amounts of insects and leaves as they pick and eat wild fruit. The leaves and insects have nutrients that they need and wouldn't get just from the fruit.

### **How much do bat houses cost? What's the best place for me to put one if I live in a city?**

I suspect there is a wide range of prices for a bat house, but you could build one yourself if you wanted! Go to Bat Conservation International on the internet, and look at their page with bat house info. You can buy one there, or get the directions on how to build one yourself! I would put it in a place where it would get plenty of sunshine on it, up off the ground as much as possible, and not in a tree. BCI will have advice on where to best place the bat house too. Good luck!

## **Vampire Bats**

### **Why can vampire bats walk when no others can?**

Vampire bats are really fascinating. They can walk around because of their unique bone structure. Other bats can walk as well, but it looks more like a scuffling waddle - it's funny to watch. Vampire bats can actually walk quickly in comparison.

### **Do vampire bats only eat blood or do they eat other things?**

The only eat blood. There are only 3 species of vampire bats among over 1000 species of bats in the world and they are only found in Central and South America. Vampire bats eat the blood of birds and mammals. It is thought that populations of vampire bats are spreading because cows are now in more places in Central and South America and they are a favorite animal to tap for blood.

### **Where the vampire bat lives?**

All three species of vampire bats in the world live in Central and South America. There are no vampires in the US! So, you'd have to go at least to Mexico to see one!

### **What kind of animals do vampire bats suck blood out of?**

There are 3 different species of vampire bats; one of them feeds on the blood of mammals, like cattle, horses, while the other 2 species feed on the blood of birds, like chickens. I actually have caught vampire bats before! The kind that feed on mammals; Really COOL!

### **How much blood does a vampire bat suck?**

A vampire bat licks up about a tablespoon of blood during each feeding. Vampire bats have a substance in their saliva that keeps blood from clotting, so when they make a tiny cut in a cow or whichever animal they will feed on, they don't need to actually "suck" the blood, they can simply lick it as it trickles out.

### **What is the most dangerous species of bats?**

No specific bat species is actually dangerous and each species is important ecologically. You could say that bats are dangerous to some insects, because those insects get eaten by the bats. Some bats even eat frogs and fish. The bats in your area in Texas eat insects. And just like any animal, sometimes bats get sick. If you find a bat or any wild animal that is in an area where it shouldn't be, leave it alone and find an adult to help you.

# Bats in Captivity

## **If a bat is kept as a pet or in captivity will it live longer than in the wild?**

Healthy bats shouldn't be kept as pets, they are wild animals meant to fly free. That said, bats can be kept in captivity for educational purposes or when they are injured and can't fly or feed themselves. The average bat in the wild has a lifespan of 5-6 years. Bats in captivity can live longer (up to 20 years) because they are well fed, have no predators, and aren't susceptible to accidents, bad weather etc. The record for longest lifespans though are for wild bats that hibernate. There have been several animals that have lived into their mid-30's and a tiny bat in Siberia was recently discovered to be 41 years old!

## **Where did they find all the bats on the show?**

The live bats are bats in captivity... originally they came from the wild so that scientists could study them and so that they can be used to educate kids and the public. The first step to making sure that bats are taken care of in the wild is to show people how amazing they are and teach them about the important roles bats play in nature. Keeping a few bats in captivity is one of the best ways to do that.

## **Are bats endangered? If so, why do zoos have them?**

Yes, some bat species are considered endangered, including various species all over the world. Some zoos house endangered bats for breeding programs to increase their populations to hopefully have enough bats to return them to the wild.

## **Can you keep bats as a pet?**

That's a great question because bats are awfully cute and seem like they might make good pets, but they don't. It's illegal to keep bats as pets in the United States, just like you can't keep a squirrel or a crow as pet because they are all wild animals. Plus, since bats are nocturnal and sleep all day, they wouldn't be much fun!

# Miscellaneous

## **What kind of impact on the environment will occur if bats became extinct?**

Let's hope that our bats don't go extinct because they help us in so many ways. Some bats eat lots of night-flying insects and this helps keep our agricultural crops healthy. Some bats drink nectar and help pollinate plants, such as cacti. And some bats eat fruit and then the seeds are dispersed when the bats fly around.

## **Do people make women's makeup from bat guano?**

No. Make-up often does have a substance that is used to create a shiny or shimmery effect. This made from guanine. Guanine and Guano look similar but are very difficult. Guanine is not my specialty but I understand it is made from fish scales, which makes sense because fish scales are shiny.

## **How long can a bat survive with pesticide in its body?**

A large dose of pesticides could kill a bat relatively quickly. Smaller doses, especially those that accumulate over time, may never kill a bat directly. But they can have other impacts such as making the bat disoriented or making it more susceptible to disease. In both of these cases, we may never know that long-term exposure to pesticides is what killed the bat. There is much to be learned about bats and pesticides. Maybe this would be a good thing for you to study when you are older.

## **What made you want to become a bat scientist?**

I had a couple field biology jobs before I got into bats. Once I started working on a bat study I was stunned to find out how little was known about bats. I thought that it seemed like a field where I could quickly make a contribution. Like a lot of scientists, the longer I study something the more questions I have. This is especially true with bats... there is so much we need to learn about the ecology of bats in the U.S., yet these 45 or so species make up a small fraction of the >1000 species in the world. Most of them are in tropical areas and all we might know is the name of the species and perhaps what they eat. There are many lifetimes of interesting questions to answer about bats.

## **Have any of the bats ever hurt anyone?**

Bats, like any wild animal (or humans for that matter) will try to fight back when something grabs them and they think that they may be harmed or eaten. Bats defend themselves by trying to bite their captors, just like birds, mice, chipmunks, lizards and all kinds of animals. The important thing to remember is that bats are not mean or intentionally trying to hurt anyone. When humans are around, bats generally try to avoid them.

## **What kind of bats live in California?**

California has around 24 species of bats and almost all are insect-eaters. One nectar-drinking bat species is known to visit the southern tip of California.

## **Can bats get cancer?**

Yes, bats can get cancer just like humans. Scientists very rarely find bats with cancer in the wild. Bats at zoos and nature centers that develop cancer may be treated by a veterinarian.