Name: _____ Date: _____

How Bats Find Their Way

Circle group

Bats are famous for flying at night, but most of them are not blind. Their eyes work well. Still, in the dark, eyesight is not enough. Many bats find their way and hunt with a skill called echolocation. It lets them build a picture of their world from sound.

Here is how it works. A bat makes a series of very high calls. They are usually too high for people to hear. Each call travels out as a sound wave. The wave hits an object, such as a branch or a flying moth. Part of the wave bounces back as an echo. The bat's big, sensitive ears catch the echo. Its brain compares the echo with the call it sent.

The echo tells the bat a lot. The time between the call and the echo shows how far away the object is. Sound travels at a steady speed. So a longer delay means the object is farther away. The pitch and loudness of the echo help the bat judge the size, shape, and even the texture of the object. If the object is a moving moth, the echo also shows which way it is flying.

When a bat gets close to its prey, it makes its calls faster. In the last moments of a chase, it may make more than one hundred calls each second. This gives the bat quick updates, so it can change its path. Many bats eat huge numbers of insects. Some are pests that harm crops. So bats are good neighbors for farmers.

Questions

1. What is echolocation?

_____

_____

2. What does a bat's ear catch after it makes a call?

_____

_____

3. How does a bat learn how far away an object is?

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_____

4. Why does a longer delay mean the object is farther away?

_____

_____

5. Why are bats good neighbors for farmers?

_____

_____

Words to know

echolocation: finding things by sending out sounds and listening for echoes
pitch: how high or low a sound is
echo: a sound that bounces back after hitting something
texture: how the surface of something feels or looks

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How Bats Find Their Way

Triangle group

Bats are famous for flying at night, but most of them are not blind. Their eyes work quite well, yet in complete darkness, eyesight alone is not enough to catch a flying insect. Many bats navigate and hunt with a remarkable skill called echolocation, which lets them build a picture of their surroundings from sound.

The process begins with sound. A bat makes a rapid series of very high-pitched calls, which are usually too high for human ears to hear. Each call travels outward as a sound wave. When the wave strikes an object, such as a tree branch or a flying moth, part of it bounces back as an echo. The bat's large, sensitive ears catch the echo, and its brain compares it with the call that was sent.

The echo reveals a surprising amount of information. The time between the call and the echo tells the bat how far away the object is, because sound travels at a steady speed. A longer delay means the object is farther away. Differences in the echo's pitch and loudness help the bat judge the size, shape, and even the texture of what it has found. If the object is a moth that is moving, the echo also shows which way it is flying.

As a bat closes in on its prey, it speeds up its calls, sometimes making more than one hundred each second in the final moments of a chase. This gives the bat a rapid stream of updates so it can adjust its path. Many bats eat enormous numbers of insects, including pests that damage crops, which makes them valuable neighbors for farmers, who benefit from this natural pest control.

Questions

1. What is echolocation?

_____

_____

2. What does a bat's ear catch after it makes a call?

_____

_____

3. How does a bat learn how far away an object is?

_____

_____

4. Why does a longer delay mean that an object is farther away?

_____

_____

5. Why are bats valuable neighbors for farmers?

_____

_____

Words to know

echolocation: finding things by sending out sounds and listening for echoes
navigate: to find your way from place to place
pitch: how high or low a sound is
echo: a sound that bounces back after hitting something
texture: how the surface of something feels or looks

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How Bats Find Their Way

Square group

Bats are famous for flying after dark, yet the majority of them are not blind at all. Their eyes function perfectly well, but in the darkness, eyesight alone is insufficient. Many species navigate and hunt using a remarkable ability called echolocation, which enables them to construct a detailed picture of their surroundings from sound.

The process works as follows. A bat emits a rapid series of extremely high-pitched calls, which are usually pitched too high for human ears to detect. Each call travels outward as a sound wave. When the wave strikes an object, such as a tree branch or a flying moth, part of it bounces back as an echo. The bat's large, sensitive ears capture the echo, and its brain compares it with the call that was originally sent.

The echo reveals an astonishing amount of information. The interval between the call and the echo tells the bat how far away the object is, because sound travels at a steady speed, so a longer delay indicates a greater distance. Differences in the echo's pitch and loudness help the bat judge the size, shape, and even the texture of whatever it has located. If the object is a moth in motion, the echo also reveals the direction in which it is flying.

As a bat closes in on its prey, it accelerates its calls, sometimes producing more than one hundred each second during the final moments of a chase. This provides the bat with a rapid stream of updates so that it can adjust its path. Many bats consume enormous numbers of insects, including pests that damage crops, which makes them extremely valuable neighbors for farmers, who benefit greatly from this natural form of pest control, since fewer pests means fewer damaged plants.

Questions

1. How does the passage define echolocation?

_____

_____

2. What do a bat's large ears capture after it emits a call?

_____

_____

3. How does a bat determine the distance to an object?

_____

_____

4. Why does a longer delay indicate a greater distance?

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_____

5. What makes bats valuable to farmers?

_____

_____

Words to know

echolocation: finding things by sending out sounds and listening for echoes
navigate: to find your way from place to place
pitch: how high or low a sound is
echo: a sound that bounces back after hitting something
texture: how the surface of something feels or looks

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: How Bats Find Their Way

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: How Bats Find Their Way

Easier · 257 words · Flesch-Kincaid grade 2.7

1. A skill that lets a bat build a picture of its world from sound.
2. The echo, which bounced back from an object.
3. It checks the time between the call and the echo.
4. Sound moves at a steady speed, so a longer trip takes more time.
5. They eat many insects, including pests that harm crops.

Triangle: How Bats Find Their Way

This passage · 282 words · Flesch-Kincaid grade 7.1

1. A skill that lets a bat build a picture of its surroundings from sound.
2. The echo of the call, bounced back from an object.
3. It measures the time between the call and the echo.
4. Sound travels at a steady speed, so a longer trip takes more time.
5. They eat huge numbers of insects, including pests that damage crops.

Square: How Bats Find Their Way

Harder · 295 words · Flesch-Kincaid grade 9.8

1. A remarkable ability that lets bats build a detailed picture of their surroundings from sound.
2. The echo that bounces back from an object.
3. By measuring the interval between its call and the returning echo.
4. Sound travels at a steady speed, so a longer delay means the sound traveled farther.
5. They eat enormous numbers of insects, including pests that damage crops.