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THE WORLD OF BATS



OVERVIEW

In this activity, students will build a bat box and learn about the habitat preferences and shelter needs of the little brown bat. After building bat house in groups (or as a class), students can use the criteria for good bat house placement to choose the best spot for their bat house(s).

This activity is particularly timely as bats need our help right now! They are experiencing large population declines due to a fungus. For more information about this fungus, please see this site: <http://www.batcon.org/index.php/what-we-do/white-nose-syndrome.html>

Skills: Construction and following plans, observation, planning

Range: Grade 1-4



THE SCIENCE IDEA

Bats are an extremely diverse group of mammals that play an important role in their environment. Bats have a diverse diet and use special techniques such as echolocation for hunting and to avoid predators. Many bat species are suffering from the effects of habitat loss, reduced food sources, and diseases that are decimating their populations. Little brown bats are common across most parts of North America. Currently their population numbers are severely threatened in North America due to the fungus that causes White Nose Syndrome. By building bat houses and learning about the shelter needs and diets of bats like the little brown bats, students will develop a depth of knowledge about these amazing animals and how we can help them survive!



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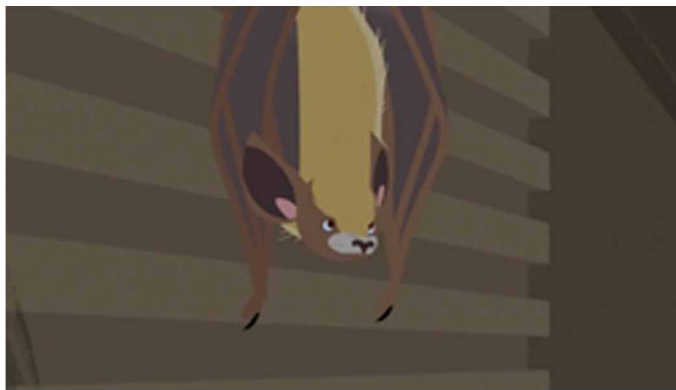
THE WORLD OF BATS



WHAT TO DO

BUILDING A BAT HOUSE

Bats don't always live in caves and abandoned mines. In colder regions, bats spend winter months in caves and abandoned mines in order to hibernate through the winter (these are called a hibernaculum), but in the spring and summer bats spend their time in trees, under bridges, and in old buildings where they give birth and rear young. Bats love tight spaces where they can crowd in and use their combined body heat to help keep warm. There are several factors that make a good summer home for a bat, and it starts with the building of the bat house!



What you need:

There are several commercial bat house kits (also called bat box) available that contain pre-cut wood and only require assembly. These are certainly an option for a class project and can be found from many sources. As well, it is possible to make a bat house from scratch. Both options are outlined in this section.

Detailed instructions on building a bat house from scratch can be found at <http://www.batcon.org/pdfs/bathouses/SingleChamberBHPlans.pdf>

Not all commercial bat house kits are the same. Often the less expensive kits are actually only decorative and at the very least would be unusable by bats. If choosing a commercially available bat house kit, be sure to purchase one that is certified by Bat Conservation International: <http://www.batcatalog.com/scripts/prodView.asp?idproduct=335>.

Bat Conservation International also publishes The Bat House Builder's Handbook which includes the most recent bat-house research data and up to date bat box designs and tips for success. This book is available on their website here: <http://www.batcatalog.com/scripts/prodView.asp?idProduct=193>

Note that for all options students will need to be closely supervised as the use of hammers, nails, screwdrivers, and screws are necessary. For some options a saw may also be needed. It is recommended that one adult supervise each bat house being built.



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WHAT TO DO

BUILDING A BAT HOUSE (CONTINUED)

Once students have successfully built their bat house they will need to decide where to place them. The following criteria are important to keep in mind: (adapted from Bat Conservation International bat house criteria sheet)

1. Sun exposure: Bat houses where high temperatures average 80° F (27° C) should received at least 10 hours of direct sunlight and more is better. At least six hours of direct sun is recommended for all bat houses where July's daily highs are between 80° F and 100° F (27° C and 38° C). To create favorable conditions for maternity colonies in the summer, internal bat-house temperatures should stay between 80° F and 100° F as long as possible.
2. The greatest bat house success has been achieved in areas of diverse habitat, especially where there is a mixture of varied agricultural use and natural vegetation. Placement should be within ¼ mile of water (preferably a stream, river, or lake).
3. Bat houses should be mounted on buildings or poles. Houses mounted on trees or metal siding are less used. Wood, brick or stone buildings with proper solar exposure are excellent choices, and houses mounted under eaves are often successful. Mounting two bat houses back to back on poles is one option that is ideal. Houses should be placed ¾ inch apart and cover both with a galvanized metal roof to protect the centre roosting space from rain. Bat houses should be mounted at least 12 hours above ground, and 15 to 20 feet is better. The house should not be in a location where it is lit by bright lights.
4. Houses mounted on the sides of buildings or on metal poles provide the best protection from predators. Bats may find houses more quickly if they are located along forest or water edges where bats tend to fly. However they should be placed far from tree branches or other perches where aerial predators can land.
5. Open-bottom houses greatly reduce problems with birds, mice, squirrels or parasites entering the house, and guano (bat excrement) does not accumulate inside. If wasps nests accumulate, they should be removed in late winter or early spring.
6. Bat houses can be installed any time of the year.



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TAKING IT FURTHER

Extend learning with additional ideas for your classroom

Echolocation

Play a game to learn about echolocation! Bats use echolocation in order to locate prey and to avoid objects when flying at night. Echolocation works when bats emit a sound and then listen for the interference (or echo) from the object.

For this activity, be sure to move all objects to the edges of the room so there is lots of space in the middle. Have students form a circle in the middle of the room or outside in a field. Choose one student to be the 'bat' and blindfold him or her. Then have every second student in the circle become an 'insect'. The 'bat' flaps around randomly in the circle and says "beep beep". The insects will all reply "buzz buzz" as they move around randomly around the bat. Be sure that everyone moves safely and does not cross the path of the 'bat'. The 'bat' will attempt to locate the insects and tap them on the arm, 'catching' them. Once the 'insect' is caught he or she stands back in the circle with the rest of the students who are not playing this round of echolocation. After 1-2 minutes switch the teams and try the game again. Have the 'bats' talk about their experience as bats and how they used sound to locate the insects.



A bat's favorite food

There are over 1100 species of bats in the world and they eat all sorts of different food! About 367 species eat fruit, 11 species are considered carnivorous and more than 722 species eat insects!

Have the class make 3 posters with pictures of each food group (fruits to represent the diet of fruit eating bats, cows, horses and sheep to represent the diet of the carnivorous bats, and mosquitoes and moths to represent the insect eaters). Place students into groups and have them try to find as many bat species as they can that eat each type of food. Since there are so few carnivorous bat species and so many insectivores (insect eaters), organize the groups accordingly.

Students can look online or in books (example: Bats of the World by Gary L. Graham, or Walker's Bats of the World, by Ronald M. Nowak) for pictures of bats that eat the food group they are assigned. Students can draw or print pictures, cut them out and glue them to the poster and identify them by name underneath.

Once all three food group posters have been filled, have students present their poster to the rest of the class and discuss the different diets of bats!



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MORE WAYS TO DISCOVER AND LEARN

GO ON AN ADVENTURE

Extend learning with additional ideas for your classroom.

Organize a bat outing! There are many options available for visiting a bat viewing site. Bat Conservation International publishes a map of bat viewing locations around the world that can be found here: <http://www.batcon.org/index.php/get-involved/visit-a-bat-location/bat-viewing-sites-around-the-world.html>. In addition, your local zoo or university biology department may have information on where to safely view bats locally.



When organizing such an outing it's important to always have an expert guide in attendance who has experience with the location and to follow all safety guidelines as published locally. This is important for both the safety of you and your students, but also for the safety of the bat colony you are viewing.

Have students bring a notebook and pencil to write down observations during the visit. For example, students can record; a) the number of bats, b) if there were multiple species, c) if there were any mothers and pups and, d) if they observed any bats catching and eating insects.



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LITERACY CONNECTION

Have students (alone or in pairs) choose a favorite bat species from the ones discussed in class and create a guide book entry for them including:

1. A picture
2. The common name and scientific name
3. Information about
 - a) range: what part of the world it lives in
 - b) habitat: what habitat it lives in (forest, caves, near water)
 - c) diet: what is the bat species favorite food
 - d) special feature: does the bat have any special features?

Once they have completed their entry, place them in a binder and encourage students to read through the other entries. If the curriculum permits, encourage students to add to the guidebook periodically!



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NEW WORDS

Hibernaculum: A mine or cave where bats who live in colder climates spend the winter hibernating together in large groups.

LOOK IN A BOOK

Use these books to help students learn about little brown bats (one of the most common bats in North America):

Shadows Of Night: The Hidden World of the Little Brown Bat

by Barbara Bash. Gibbs Smith, 2004.

Beatrice La Bat

By Harla H. Robertson. Tate Publishing, 2011.

Boo, the Little Brown Bat

By Paula Pifer. Purpose Life Publishing, 2006.
1996.



OTHER RESOURCES FOR TEACHERS

All about bats: <http://www.batcon.org/index.php/all-about-bats.html>

Little brown bats: http://www.biokids.umich.edu/critters/Myotis_lucifugus/

Amazing bats of Braken Cave:

<http://kids.nationalgeographic.com/kids/stories/animalsnature/bat-cave/>



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