Making a difference...together

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Ha-bat-itat School Program

Grade: Grade 2-3

Subject: Life Science
Animals in the Environment

Skills: analysis
description
discussion
exploration
observation
synthesis

Duration: 1.5 hours

Setting: forest

Keywords: chiroptera
echolocation
hibernaculum
hibernation
insectivore
maternity colony
nocturnal
roost
torpor
wildlife tree

Aims

This program is designed to:

- Foster an appreciation of bats and the many adaptations they use to survive.
- Dispel myths and fears about bats.
- Foster an appreciation of the importance of the environment in which bats live and the conditions that they need to survive.

Learning Outcomes

The child will be able to...

- Relate the structure and behaviour of local bat species to their survival in local environments (e.g. sonar/echolocation, flight, torpor, hibernation, and camouflage).
- Compare and contrast the skeletal systems of humans and bats.
- Find and identify suitable bat habitat in a coastal forest.
- Discuss how changes in an organism's habitat can affect the survival of the individual organism and the entire species.

BATS
(Background Information for Teachers)

Myths and Fears
Second only to whales and dolphins, bats are the most asked-about animals at the Royal British Columbia Museum. Indeed, they have fascinated and terrified people for centuries. In China they are believed to bring good luck, however in western culture they are connected to myths about vampires and entanglement in human hair. Though vampire bats are real (there are three species), they do not live in Canada and prefer cattle blood to human blood. Also, do not fear bats becoming tangled in your hair. Their senses are so finely tuned, a U.S. research facility recorded a bat escaping through a moving laboratory ventilation fan - unscathed! Accordingly, bats are similarly adept at avoiding human hair. Bats are not blind. Our coastal bats can see quite well, though they rely on echolocation for flight navigation.

Rabies
It is true that bats can carry rabies; however, scientists estimate that the virus is found in only 0.5% of the bat population. Because it is best to be cautious around any wild animal, especially those that can carry rabies, children and adults should *never* touch a bat, living or dead. In fact, scientists who study bats have rabies vaccinations so they will be able to handle the animals if necessary.

Only dead bats can be tested for rabies and the only way to tell if a human has contacted rabies is to test the bat they came in contact with. The rabies virus can be contracted by touching a bat because bats groom themselves using their mouths, the way other animals do, and saliva can transfer the virus.

If a sick or dead bat is discovered, stay away from the animal and contact the nearest SPCA as soon as possible.

Adaptations
Adaptations are the special structures and behaviours a species has or uses to survive. Bats are fun to learn about because they have so many bizarre adaptations (bizarre to us!). For one, they are the only flying mammal. If you look closely at their wing structure, you can see bats don't fly with their arms the way birds do; they fly with their hands and their great, long fingers. Because bats hunt for insects at night (i.e. they are nocturnal - another adaptation) they have developed an acute sensory system called echolocation or sonar (the same behaviour some species of whales and dolphins display).

Echolocation involves emitting high-pitched sounds that echo back to the animal's ears when the sound strikes an object. From this information the animal can then decipher where the object or prey is and determine exactly how large it is.

Habitat (food, water, shelter and space)
All of Canada's bat species are insectivorous. They live on a diet of insects. Close inspection of a bat's mouth reveals many sharp teeth, excellent for crushing insect exoskeletons. Our bats are tiny; most are about the size of a fist when their wings are drawn in. This is in contrast to the large fruit eating bats found in more tropical zones.

Roosts are places where bats find safety from predators and shelter from weather conditions. Some examples of roosting sites are: spaces under bark, leaves, caves, rock crevices, animal burrows, abandoned mines, building roofs and balconies and **wildlife trees**. A wildlife tree is any standing dead or living tree that provides habitat for wildlife.

There are four general types of roosting sites. Site types are categorized according to when they are used by bats; there are day roosts, night roosts, maternity colonies and hibernation sites. Day and night roosts are used by bats in the summer when they are not in hibernation. Day roosts are safe places to sleep away the day in preparation for a busy night of feeding. Night roosts are safe places to recuperate between energetic flights looking for insect meals. **Maternity colonies** provide safe shelter for hundreds of mothers and their offspring. When young are present, males roost elsewhere. **Hibernacula**, or winter hibernation sites, are for inactive bats during the winter and provide safe shelter from late summer to early spring for an entire bat colony. Most

species migrate to warmer areas or specialized hibernaculum sites such as caves before beginning hibernation. During hibernation they exist on fat reserves. It is never a good idea to wake up a sleeping or hibernating animal as this may lead to its death as these valuable reserves are used up too quickly and no insects are present in the winter to replenish the reserves.

Conservation
Bat numbers are intimately connected with the availability of suitable habitat. Parks provide a much needed source of bat habitat in a time of increased urbanization. Older growth forests are essential to the continued survival of bat species within BC. Bat boxes are a relatively cheap and easy method for homes and schools to provide suitable roosting sites for some local bats when natural habitats are lost.

The 16 species of BC bats:

Found on Vancouver Island
Big Brown Bat (*Eptesicus fuscus*)
Yuma Myotis (*Myotis yumanensis*)
Little Brown Myotis (*Myotis lucifugus*)
Silver-haired Bat (*Lasionycteris noctivagans*)
Long-legged Myotis (*Myotis volans*)
California Myotis (*Myotis californicus*)
Western Long-eared Myotis (*Myotis evotis*)
Keen's Long-eared Myotis (*Myotis Keenii*)
Hoary Bat (*Lasiurus cinereus*)
Townsend's Big-eared Bat (*Plecotus townsendii*)

Not found on Vancouver Island
Spotted Bat (*Euderma maculatum*)
Western Small-footed Myotis (*Myotis Ciliolabrum*)
Fringed Myotis (*Myotis thysanodes*)
Pallid Bat (*Antrozous pallidus*)
Western Red Bat (*Lasiurus blossevilli*)
Northern Long-eared Myotis (*Myotis septentrionalis*)

The two most common species of bats in CRD Parks are the Yuma Myotis and the Big Brown Bat. Because bats are nocturnal creatures, it is unlikely your class will see any during the field study. The program instead focuses on exploring adaptations of bats in a coastal bat habitat.

KEY WORD DEFINITIONS

chiroptera: - mammalian order of bats. Latin for "hand wing."

echolocation*: - an orientation system based on generating sounds and listening to their returning echoes to locate obstacles and prey.

hibernaculum*: - a site where hibernation occurs.

hibernation*: - a state of long term inactivity characterized by a reduction in body temperature and metabolic rate.

insectivore: - insect-eating animal.

maternity colony: - an aggregation of females and their young.

nocturnal: - activity during the night.

roost: - a daytime retreat or night-time resting place.

torpor: - a short term state of inactivity achieved by lowering the body temperature and reducing the metabolic rate in order to conserve energy.

wildlife tree: - any standing dead or living tree with special characteristics that provides habitat for wildlife.

(* from RBCM handbook, **Bats of BC**, by David W. Nagorsen and R. Mark Brigham)

SUGGESTED PRE-TRIP ACTIVITIES

- Read Silverwing, Sunwing, or Firewing by Kenneth Oppel. The author researched bats before he wrote these fictional books, so many of the bat behaviours in the books are based on fact. Discuss as a class which parts of the books you think are made up and which are not.

- As a class, create a "Bat Beliefs" list of things that you have heard or read about bats. Bring any questions your list generates to the park and see if you can discover the answers during your field study.

- Visit Bat Conservation International: www.batcon.org/. This website has a wealth of student and teacher information. There are also videos, slideshows, books and other teaching materials about bats you can order.

FOLLOW-UP ACTIVITIES

- Revisit your class "Bat Beliefs" list and discuss what was true and what was false.

- Now that you've been on your bat field study, as a class compare Silverwing, Sunwing or Firewing to the CRD bat program. Have your opinions changed about how much the author relied on scientific research and how much he fictionalized?

- Create a mural for your classroom of an ideal habitat for coastal bats.

- Write a short story about a real animal, based on your own library research. Read it to the class and see if they can guess what you made up and what you based on science.

- Have students write a story about a bat that lives in Francis/King Regional Park.

- For younger students, read Stellaluna and afterwards discuss the differences between BC's insectivorous bats and tropical fruit bats like Stellaluna.

- Look for suitable bat habitat in and around your school yard, or at home.

- Follow the Bat Conservation International bat box directions. Build a bat box for your school or with your family at home.

- Borrow a bat specimen from the Royal British Columbia Museum

- Invite a bat expert to visit your class. The Ministry of Environment can provide a list of bat experts in your area.

TEACHER REFERENCES

Nagorsen, David W. & R. Mark Brigham. Bats of British Columbia. University of Toronto Press, 1993.

Fenton, M. B. Just Bats. University of Toronto Press, 1983.

Royal British Columbia Museum: http://rbcm1.rbcm.gov.bc.ca/ Phone 387-3701

Canada's Schoolnet: http://www.schoolnet.ca/home

Bat Conservation International: www.batcon.org/

STUDENT REFERENCES

Oppel, Kenneth. Silverwing.

Oppel, Kenneth. Sunwing.

Oppel, Kenneth. Firewing.

Wildlife Branch Information Brochure. **Bats in British Columbia**. BC Ministry of Environment, 1994.