BATS
of Seychelles

Toolkit

For Teachers, Students, Environment Clubs, Libraries, Schools, Resource Centres and Environmental Enthusiasts

This toolkit complements the Seychelles Sheath-tailed Bat Treasure Chest which can be borrowed from ICS / WCS

Silhouette Foundation

Welcome to The Amazing World of Bats

Bats are amazing. They comprise one fifth of all mammals on earth, are found in all continents except Antarctica and lead rich and complex lives, Bats should be part of our everyday conversation, as much as the ocean, fish and sunshine. Bats, however, are still largely misunderstood. For hundreds of years and in many places around the world they have been mistrusted, villified and persecuted. Yet they are fascinating creatures similar in many ways to humans. They perform vital ecosystem services that help our planet to stay healthier and all of us to survive. And they are cute (which can also mean ugly but interesting depending on your point of view). They deserve our attention and understanding. They benefit from our love and concern. They need our practical research and ongoing conservation efforts.

We are lucky in Seychelles to have representatives of both kinds of bats - Fruit Bats which eat fruit, nectar and pollen, (Seychelles Flying Fox *Pteropus seychellensis,* Aldabra Flying Fox *Pteropus aldabrensis)* and Microbats which eat insects – Seychelles Sheath-tailed Bat Sousouri Bannann (*Coleura seychellensis*). *[should the 3 other microbats be mentioned here?? If so I will make a fact sheet for each of them)*

Sousouri Bannann is the rarest bat in the world, and it is **only** found in Seychelles. It is up to us as Seychellois to save and protect Sousouri Bannann for the heritage of the whole world.

Silhouette Foundation UNDP Island Conservation Society SGP The GEF Small Grants Programme gef GLOBAL ENVIRONMENT FACILITY INVESTING IN OUR PLANET

Table of Contents

Page….

Glossary

Ecosystem

Ecosystem services

Resilience

Echolocation

Ultrasonic

Sonar

Pesticide

Ecology

Species

Disperse

Brink

Extinct

Extinction

Critically Endangered

IUCN Red List

Dredging

Environmental degradation

Legislation

fragile

Page….

Ecology: study of the relationships between organisms and their environments.
Ecosystem: represents a community of plants, animals and micro-organisms that are linked by energy and nutrient flows and that interact with each other and with the physical environment.

What's included in this Toolkit:

Inside the Resource Guide

- Introduction to Bats
- Bats of Seychelles **(Our Country's Heritage)**
  - Pteropus Family (Sousouri)
    - Seychelles Flying Fox *Pteropus seychellensis*
    - Aldabra Flying Fox *Pteropus aldabrensis*
  - Microchiroptera
    - Seychelles Sheath-tailed Bat (Sousouri Bannann) *Coleura seychellensis*
    - 3 Insectivorous bats from Aldabra??
    - Tadarida pumila (Little Free-tailed Bat)
    - Others…Jeanne Mortimer

- Amazing Bat Facts Sheet
- Activities Worksheets
- Find That Bat sheet

Alongside the Resource Guide

- EDGE poster
- EDGE leaflet

On the Pen Drive (Credit Card)

- EDGE DVD
- SBC Spot DVD
- Silhouette YouTube
- Echolocation Music clip
- Flying Bat folding instructions clip
- Digital version of Activities Workbook

Accompanying the Toolkit to Schools

- Roadshow Running Order
- Sousouri Bannann Banner
- Treasure Chest
  - Puppets
  - Bat Costume / Bat Dress Ups
  - Art and Craft Materials
  - Games Materials and props
  - Stellaluna book
  - Bat Guides

About This Guide

This guide is designed to provide an up to date and ongoing resource for teachers, tour guides, environment leaders and students of the wonderful world of bats, to engage school and community groups and individuals to understand bats in general, and to delve further into the amazing and unique bats of Seychelles.

The guide's particular focus is on raising awareness and understanding of the critically endangered **Seychelles Sheath-tailed Bat.** The national and international importance of Sousouri Bannann is recognised by the Government of Seychelles, UNDP, GEF Small Grants Programme, Island Conservation Society and Silhouette Foundation in funding this resource and supporting research and ongoing conservation efforts for Sousouri Bannann.

How to use this guide

This toolkit contains a range of suggested activities and suggested lesson plans aimed at primary school levels P3 – P6. The activities have been designed in alignment with the Seychelles National Curriculum Teaching and Learning Programme. Activities vary in style and challenge so can be adapted for children (and adults) of other ages.

As teachers, parents and educators, you will be the best judges of how the toolkit can work for you and your students. Please take as much or as little from it as you wish.

Activities relate across the curriculum to enable themes to be revisited and learning to be re-enforced throughout the year within different subjects (language, science, maths, art and craft, history, geography, social studies) and in successive years as students grow and develop. A key is included with each activity to suggest which subjects the activities may fit with.

We hope you will find the guide useful and relevant, and welcome your feedback and suggestions for updates. Additional activities can easily be incorporated and will appear on the website www.islandconservationseychelles.com and on the Sheath-tailed Bat Facebook page.

Silhouette Foundation
UNDP
Island Conservation Society
SGP The GEF Small Grants Programme
gef GLOBAL ENVIRONMENT FACILITY INVESTING IN OUR PLANET

Why Do Bats Matter?

Roles in the Environment

Bats play an important role in keeping our planet healthy, growing forests and managing pests. In providing these vital ecosystem services in many environments around the world, bats should take the limelight as Friends Of The Earth.

Forest Architects

Pollinators

Fruit Bats like the **Seychelles Flying Fox** need lots of energy to sustain flight. Feeding on the sweet nectars of night-flowering plants , flying foxes have to stick their snouts right into the base of the often bell-shaped flowers, becoming doused with pollen along the way. Typically these flowers are pale in colour and give off sweet and enticing scents, making them easier to see and smell – so easier to target at night. The bats eat the sugar rich nectars, which quickly give them the energy to fly – sometimes all night. Moving from plant to plant, the bats brush off pollen that has stuck to their fur and thereby increase pollination chances for their target species, including such important species as *Mangliye fler.*

Reforesters

Fruit bats also love the same fruits and sugary juices we do – mango, banana, carambole, local apple , breadfruit and fig are some of their favourites in Seychelles. We can thank our Sousouri for helping to 'grow' many of our local and commercially important fruits and nuts. The bats grab hold and chew into fruits, then often carry that fruit away to eat. When finished, they drop or excrete the seeds far away from the host plant. As well as starting off with its own ready made fertiliser, a seed that has passed through a bat's digestive system has a much higher chance of germination and strong growth. This encourages new healthy forest development and can be particularly important in areas which have suffered forest clearance or weed invasion, such as is widespread on our populated granitic islands.

Best Pest Management

Insectivorous bats like the **Seychelles Sheath-tailed Bat Sousouri Bannann** are nature's pest controllers, eating mosquitoes, midges, beetles and moths in great numbers. So they help to keep insect populations in balance naturally. Overabundance of insects like beetles can damage food crops. Mosquitoes can harbour diseases dangerous to human health. Midges and the hairy caterpillars of some moths make us itch and can trigger allergic reactions and skin conditions. So bats provide a great service in eating these and other insects and negating the use of pesticides or other control measures.

Help Our Bats

There is so much we still don't know about bats – but we do know we need them! The more we discover and the more connections we understand, the more amazing bats seem – and the better the chance we have of conserving them and our planet – and ourselves. Maybe this guide will inspire you to study bats and contribute to their understanding for the benefit of Seychelles and the world.

Getting Excited!
Bats Encourage us to…

- ***Engage*** with our environment, our heritage and each other
- ***Explore*** our perceptions of bats, their role in ecosystems and their place in our lives
- ***Explain*** species, habitats, ecosystems and their relationship with humans
- ***Elaborate*** these themes in the context of our local environment
- ***Evaluate*** current status quo, conservation issues and challenges and ways we can make a difference
- ***Enact*** our discoveries and contribute to real life conservation action in Seychelles, for the whole world

What Is a Bat?

Dingbat. Image credit kutoka.com

Activity Sheets

Who Am I?

Amazing Bat Facts

Curriculum Links: Science, language, geography

What Is a Bat?

Introduction
What makes a bat a Bat:
Who Am I? Worksheet

Development
Of all the wildlife in Seychelles, the only native mammals are bats – Sousouri and Sousouri Bannann. This is a feature of many geographically isolated islands around the world. Why might this be the case?
What other mammals occur in Seychelles?
How do they differ from bats?
What features of bats make them well adapted to life in Seychelles?

The Seychelles Flying Fox *Pteropus seychellensis* is abundant and the population seems healthy.

The Seychelles Sheath-tailed Bat *Coleura seychellensis* is critically endangered. It is endemic to Seychelles – in fact it is now only found on two islands – Mahe and Silhouette.

Activities
Contrast Bats and Birds, Bats and Insects, Bats and Humans
Amazing Bats Fact Sheet
Bat Powerpoint presentation
Zirondel, Sousouri or Sousouri Bannann?

Summary / Learning Points
Bats are mammals like us, with some pretty amazing added features – they are the superhero versions of ourselves.
Eg Flight, Echolocation, highly developed sense of smell, sight, hearing etc.

Extension Ideas
Read the children's book Stellaluna by Jannell Cannon.
Themes to explore could include:
similarities and differences between species families / learning from and with other species / exploring the environment / growing up/becoming independent / blended families

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

Materials:
Blackboard / Whiteboard
Bat Powerpoint Presentation
Amazing Bat Facts Sheet

Key concepts

Curriculum links
Science, language, geography

Who Am I?

I sleep in the day and fly at night…
though I have no feathers
to aid my flight…

What am I?

Fold the page along the dotted line. Show only the riddle side first

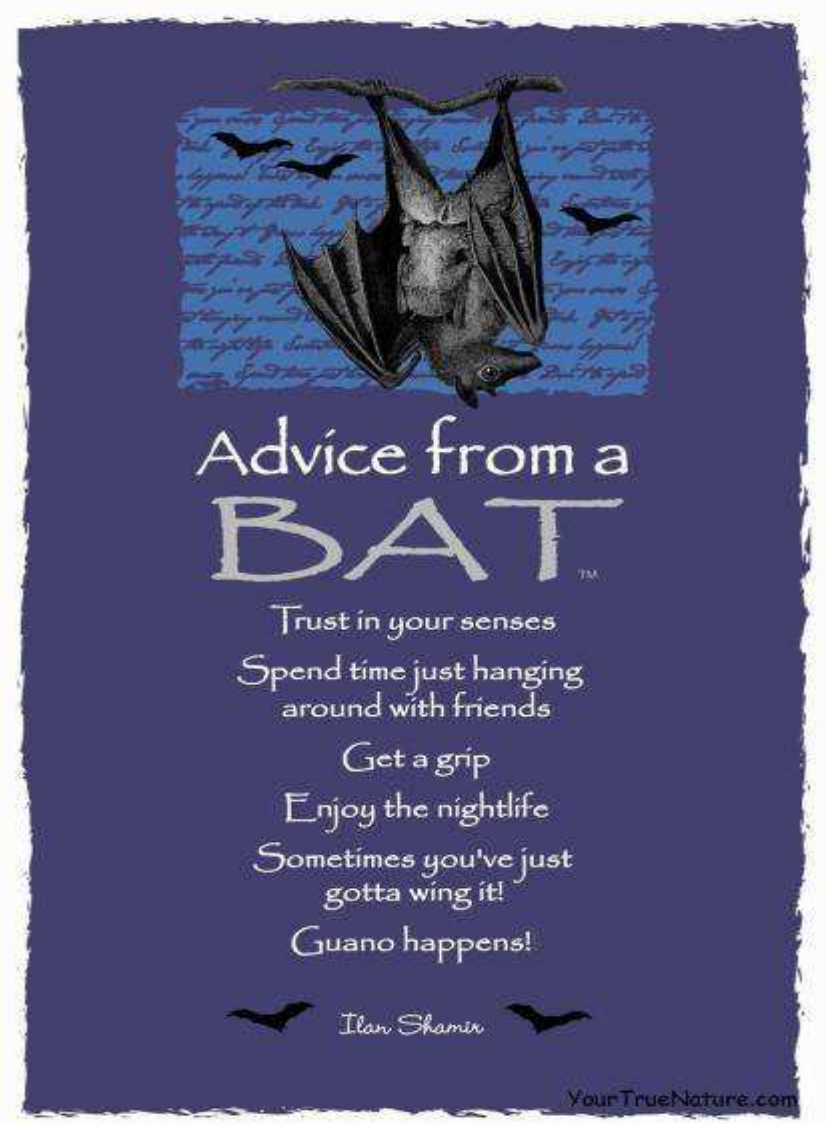
I am a Bat!

A bat is a *mammal*.
Humans are mammals too.
Mammals have five characteristics in common:

- Warm blooded
- Breathe air
- Have hair
- Give birth to live young
- Suckle their young with milk

All Bats have a special extra ability – they can **fly**!
Bats are the only mammals able to fly using their own energy
Imagine if you could fly….

Perception



Activity Sheets

How Do Bats Make you Feel

Myths and Misconceptions
Myths and Misconceptions – the real story
Myths and Misconceptions – more like us

Curriculum Links: Languages

How Bats Are Perceived

Introduction
Bats evoke many and varied reactions. How we feel about bats can influence how they are treated. Exploring feelings, myths and misconceptions can help us to view bats in a different light and lead to better conservation of bats, their habitats and our ecosystems in general.

Development
Misconceptions about bats have led to their being understudied and undervalued, or even persecuted around the world and in Seychelles. Using the "How do Bats Make You Feel" worksheet, explore students' current understanding and perceptions of bats in general, and encourage them to share perceptions in a group.

Activity
Introduce the Myths and Misconceptions sheet 1. Students discuss, then fill in the blank bubbles with their own (or related) current perceptions. Introduce M&M sheets 2 and 3 to reveal bat realities. Discuss why some of these misconceptions exist, and why they might be perpetuated.

Summary / Learning Points
Bats are vital to healthy ecosystems. Changing perceptions and understanding the real deal is beneficial to them and us.

Extension Ideas
Students design a questionnaire and survey a range of participants on their attitudes to bats, then report back to the class. Introduce their new knowledge in an effort to improve public understanding and attitudes.

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

Materials:
•Myths and Misconceptions Sheets
•How Bats Make You Feel Worksheet

Key concepts

Curriculum links
Social studies
Language

How Do Bats Make You Feel?

Write or draw your feelings about bats below. You can do this exercise by yourself, in a small group, or as a whole class. Try doing the exercise at the beginning and again at the end of your bat study.

+	?	-

Myths and Misconceptions

Read the comments about bats and add your own ideas in the blank bubbles

Bats are dirty

All bats carry Ebola virus

Bats get stuck in your hair

Bats are flying mice

Bats suck your blood

All bats have rabies

Bats are blind

Misconceptions…the real story

What we think about bats is sometimes different from how bats really are:

Bats are actually very clean and tidy!! They spend a lot of time preening themselves. Mothers lick their pups to clean them (like cats).

Bats *can* carry diseases, including rabies and Ebola. Most bats are healthy. Less than ½ of 1% of bats carry the rabies virus. As with any wildlife, you should seek treatment immediately if you are bitten or scratched. Observe wildlife respectfully and leave it alone.

There are only 3 species of vampire bats in the world, ranging from Central to South America (Mexico to Brazil). No vampire bats live in Seychelles.

Bats may fly close to people while catching insects, but microbat echolocation is so sophisticated they can fly accurately enough to avoid obstacles as fine as a sewing thread.

All animals and organisms can carry diseases, humans included. All bats are healthy most of the time.

Some bats are born blind and deaf and hairless, but no bats are blind. Microbats use echolocation to "see" in the dark. Pteropus Family bats rely on extremely good eyesight and sense of smell to find food.

Bats are…more like us

Here are some more facts about bats. What would you add?

Bats are social **mammals** – they are more closely related to humans than to rats

Bats are affectionate

Microbats use echolocation to fly fast and acrobatically – they can navigate in small spaces so they never fly into your hair

Bats have fur as humans have hair. They are warm-blooded and breathe air.

Bats are clean and tidy!! They spend a lot of time preening themselves

Bats suckle and care for their young

Bats have the same hand structure as humans – with longer finger bones and more elegant thumbs

Characteristics

Distinguishing Features

Activity Sheets

A Bat Does That? – write a description of Sousouri / Sousouri Bannann

Which Bat Is That? - which features describe Sousouri / Sousouri Bannann

Which Bat Does That? - discuss similarities and differences

Bat Shapes – how to draw a Seychelles Sheath-tailed Bat

Facial Features – Make a mask

A Bat Does That?

Choose a species and complete your Bat Facts with words and pictures

Sousouri

Sousouri Bannann

Bats are

Bats eat

Bats live in

Bats can

Which Bat Is That?

Discuss similarities and differences between the two species in Seychelles. Use the headings to inform your discussion

Sousouri

Appearance (size, wings, tail, eyes, teeth, ears, fur)
Habitat
Colony
Roost
Diet
Vocalisations
Related Species
Distribution
Breeding
Migration
Population Status
Current Understanding
Current Research
Attitudes towards

Sousouri Bannann

Which Bat Does That?

Write underneath the picture the words that belong to:

Sousouri Bannann

Diurnal
Nocturnal
Large (wingspan 1·1m)
Small (wingspan 29cm)
Insectivorous
Frugivorous
Cave roost
Tree roost
Critically Endangered
Least Concern
Have close relatives
Evolutionarily Distinct
Small Eyes
Large Eyes
Small Ears
Large Ears
Have a Tail
Have No Tail
Use Echolocation
Use Sight and Smell
Teeth for holding and squeezing
Teeth for holding and chewing
Make sounds humans can hear
Make ultrasonic sounds
Some people eat them
Protected by law
Easily observed
Difficult to observe

Sousouri

Which Bat Does That?

Answers...

Sousouri

Active Day and Night
Large (wingspan 1·1m)
(weigh 550g)
Large Eyes
Small Ears
No Tail
Use Sight and Smell
Eat Fruit, Nectar and Pollen
Tree roost
IUCN Least Concern
Have close relatives
Teeth for holding and squeezing
Noisy and vocal
Easily observed
Some people eat them

Sousouri Bannann

Strictly nocturnal
Small (wingspan 29cm)
(weigh 11g)
Small Eyes
Large Ears
Have a Tail
Use Echolocation
Eat Insects
Cave roost
IUCN Critically Endangered
Evolutionarily Distinct
Teeth for holding and chewing
Quiet and ultrasonic
Difficult to observe
Protected by law

Is it a Bird? Is it a Plane?

It's Sousouri Bannann!

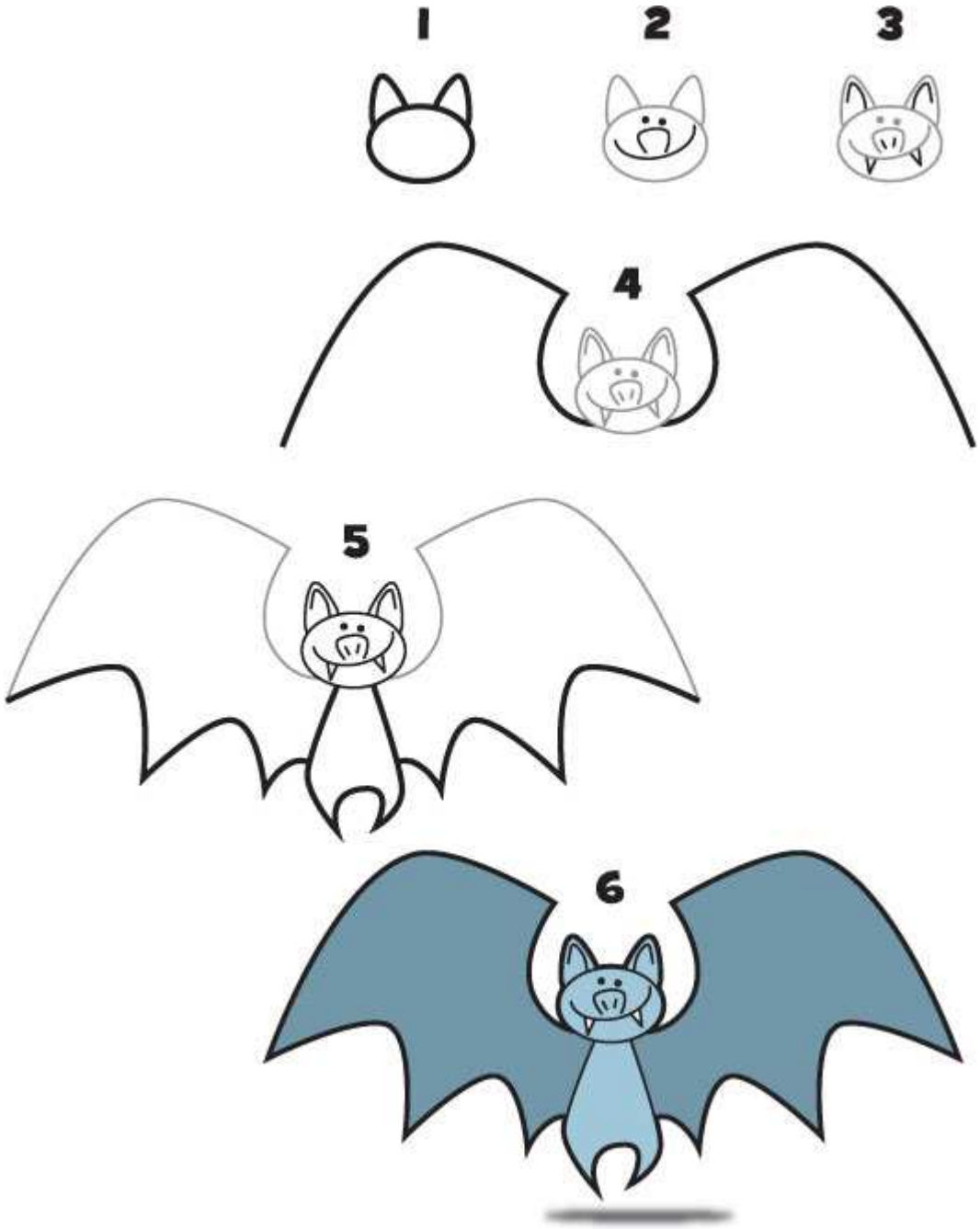
The Seychelles Sheath-tailed Bat and the Seychelles Cave Swiftlet share many characteristics and can be easily confused for one another. Cut out and pile, then sort the characteristics below into their correct species. Have you seen a Zirondel you thought was Sousouri Bannann? Or vice versa?

Sousouri Bannann

Zirondel

Sousouri Bannann (Seychelles sheath-tailed bat)	**Zirondel (Seychelles cave swiftlet)**
I am a mammal	I am a bird
I have fur	I have feathers
I give birth to live young	I lay eggs
I roost in caves	I roost in caves
I echolocate to "see" in the dark	I echolocate to "see" in the dark
I eat flying insects	I eat flying insects
I feed/am active at night	I feed/am active in the daytime
I am listed as Critically Endangered on IUCN red list	I am listed as Vulnerable on the IUCN red list
I feed my young on milk	I feed my young on insects

How to draw Sousouri Bannann



Example only – Russell drawing one for ourselves

Seychelles Sheath-tailed Bat Mask

What Do You Know?

Bats' facial features differ according to their diet and habits. Insect-eating bats like the Seychelles Sheath-tailed Bat aka Sousouri Bannann or *Coleura seychellensis* have a short, squished looking muzzle, sharp teeth and strong jaws for catching and chewing their insect prey. Their large erect ears with a *tragus*, are used to hear the echoes bouncing off their prey. The tragus is an extra spike of cartilage sticking up from the base of each ear, which may help in giving better sound definition. It's a helpful identification tool as different species have differently shaped traguses (and ears and noses). You have a tragus (and an antitragus) too. Can you find it? Do you use it?

Seychelles Sheath-tailed Bats have short snouts and relatively large ears for their body size. Their sharp teeth help them in catching and eating their insect prey. They rely more on echolocation and less on their eyesight, though they are not blind.

Seychelles Fruit Bats *Pteropus seychellensis* or Sousouri have a long snout, teeth to bite through and hold tough fruit skins, and a long tongue for licking nectar and fruit juices. Their large eyes and acute sense of smell help them to find food in the dark of night.

Materials

Heavy card or paper
Colouring pencils, pens and crayons, mixed media (fake fur, vinyl, paints, cotton wool)
Scissors and small holepunch, glue
Hat elastic or iceblock stick

How to:

Copy the mask shape onto some heavy card, then use your imagination to decorate it. Cut around your mask, and cut holes in the mask for your eyes and nose. Make two more small holes to thread the hat elastic on either side of the mask to keep it in place, or glue two iceblock sticks behind the holes. Where will you go to search for your next meal? Or will you head back to the roost for a rest?

Seychelles Sheath-tailed Bat Mask

Flight

Fossil of *Onychonycteris finneyi* discovered in the Green Lake Formation of Wyoming in 2008. It is dated from a deposit area 52.5 million years old and shows a claw on each finger - modern bats have only one thumb claw on the wing.

Image Credit Royal Ontario Museum

Activity Sheets

Activity - Make a Flying Bat
Activity - Make an Origami Bat
Activity – Echolocation Shouts in Teams of 2
Activity – Pulling your tshirt over your knees to simulate sheath tail effect
Activity - Make Bat Wings / Bat Costumes (for Carnival 2016)

The Magic of Flight

Introduction

Bats are mammals - they share important basic characteristics with primates, rodents and cetaceans to name a few. Bats , however, are the only mammals capable of powered flight. You're a mammal too – you even have tiny skin flaps between your fingers. Imagine if you could fly! Apart from the pure joy of flying, why would you take to the air? How would you adapt your body to fly better?

Development

Everything about a bat's body is designed to make flying easier and more efficient:

•Small, light body
•Elongated finger bones
•Waterproof membrane stretching from the body to the fingertips
•Wings criss-crossed with blood vessels help ripped or damaged spots to heal quickly
•Glands that secrete oil, which the bat spreads on its wings to keep them in good condition – just like hand cream!
•Large body-size-to-wingspan ratio
•Strong flight muscles which are powerful enough to account for weight changes due to breeding and feeding (carrying large fruits or eating thousands of insects)
•Heart rate can increase from 300bpm to 1000bpm to power flight
•Ability to fly fast and acrobatically
•Ability to change direction quickly and accurately – much better than birds, which have 'leaky' fixed wings
•Splayed hip joints (rotated through 180 degrees) make the knees point backwards. This helps bats to alight and hang upside down without effort.
•Super flexible wrists that help the wings to fold up like an umbrella. Bats can walk on their wrists.
•Claws that grip and swivel, and hold the bat upside down while sleeping – even hibernating.
•Claws are also used to turn the bat right way up for giving birth, and in some species when peeing or pooing.
•In Sousouri Bannann, a sheath over the tail which acts like a rudder to direct flight
•Echolocation to avoid obstacles and find food on the wing
•Echolocating shouts timed to the wing's downbeat – for energy efficiency
•Muscle which closes off the ear during an echolocation shout to protect the ear
•Can use wings and sheath to catch insects and transfer them to the mouth while flying
•Until recently it was thought that the strange appearance of bats' faces were a hindrance to flight. A new study demonstrates that the shape of the nose, tragus and ears all aid in making flight more efficient, by creating an updraft.

Summary

Bats are perfectly adapted to their environment, and adaptable in ways we are still discovering. But are they resilient? What can we do to help ensure their survival?

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

Materials:
•Flying Bat foldable A4 paper
•Flying bat instructions
•Origami Bat instructions

Key concepts

Curriculum links
Social studies
Language

Flight Anatomy

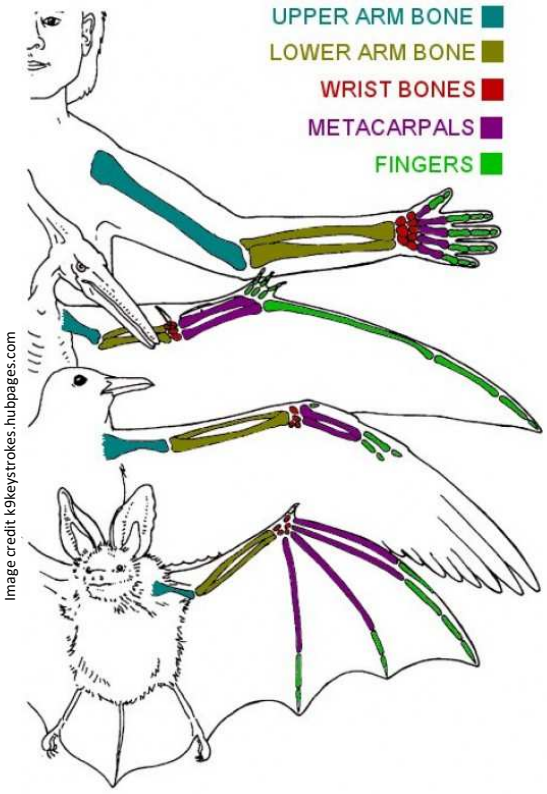
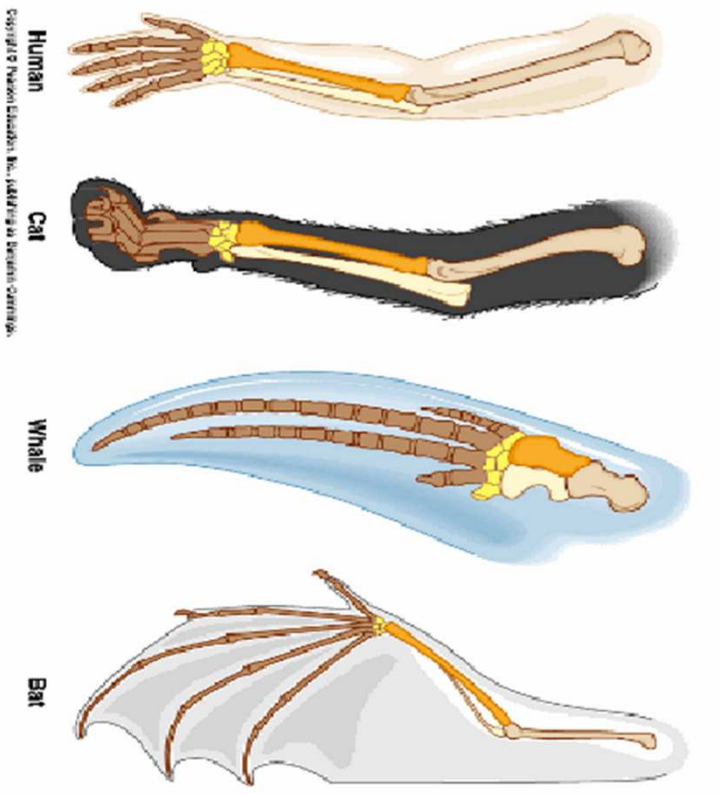


Image credit k9keystrokes.hubpages.com



Bone Structure

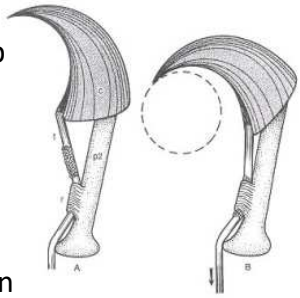
Bats, humans and whales (and for example cats) have the same basic bone structure in the shoulder, arm and hand. The proportions are different and function differently.

Bat wing structure and bird wing structure work very differently to power flight.

Bats are more efficient flyers than birds or insects. This is due to more joints, and more flexible joints in their wing structure, plus a stretchy skin membrane that they can manipulate more finely to adjust to the surrounding conditions (eg wind, weather, prey and predator actions). Fingertip controls allow for extreme agility. Think about your own hands and how many things you can do with them…bats use their hands to fly.

How do bats hang upside down?

Hanging is the most relaxing position for a bat. A strongly attached tendon in a bat's hind foot means that when a bat lands, its own weight auto-locks the claws into position. That's why bats can sleep hanging upside down without falling off their roost. The locking system allows the claws to grip whether the muscles are relaxed or not, so even dead bats remain hanging. Hanging by their feet only means a bat is ready to fall into flight more quickly.



Why bats hang upside down is another question…

Activity: write a paragraph or a poem about Why Bats Hang Upside Down

The Magic of Flight

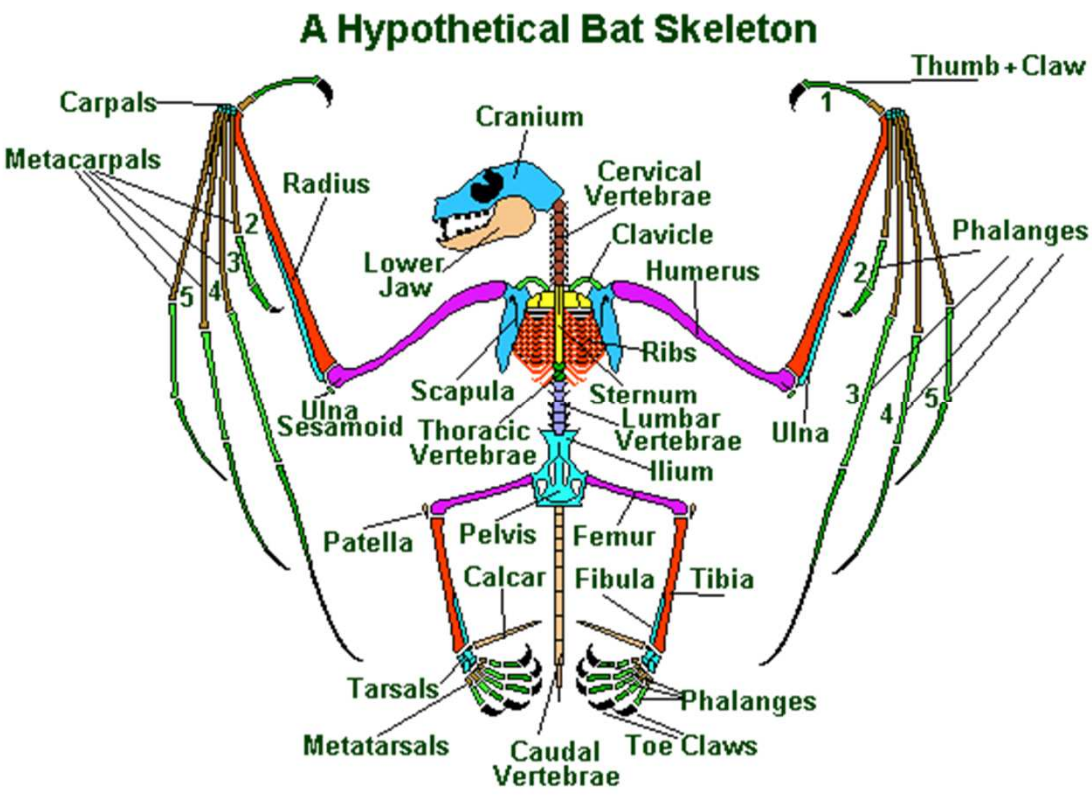


Image credit earthlife.net

Extension Ideas

Bat evolution is not yet fully understood. Scientists disagree about how bats evolved.

Review the suggested readings and discuss the evolution of bats and the theories of “flight-first” v “echolocation-first” v “flight and echolocation together”.

Draw a bat evolution timeline based on what scientists know so far. How long ago did bats evolve? What else was happening on earth during those times? Where are the gaps? Why do you think bats have evolved in these ways?

What are your own views on bat evolution?

Duration:
30 mins

Setting:
Indoors or Outdoors

Suitable for:
P6 +

Materials:
Reading Materials

Topics

Curriculum links
Science
Maths
Language

The Magic of Flight – Make a Flying Bat

Duration:
10 minutes
Setting: Classroom

Suitable for:
Ages 6+

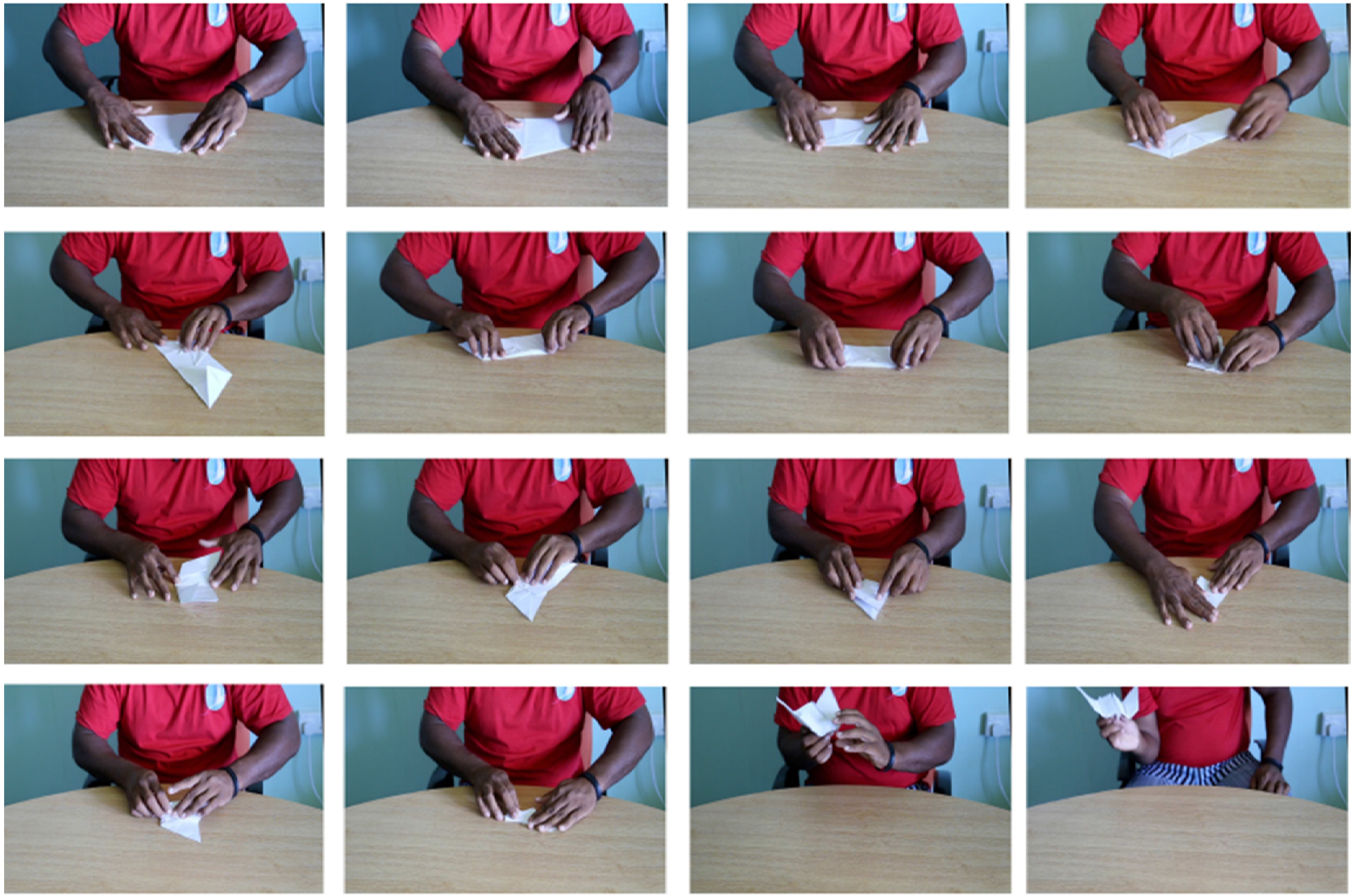
Materials:
•Sheet of A4 paper
•Folding instructions
•Colouring pens

Topics

Curriculum links:
Science
Maths
Also for back page of the newspaper

•See YouTube How To video
•http://paperairplaneshq.com/monsoon.html

The Magic of Flight –
Make a Flying Bat continued



The Magic of Flight –
Make a Flying Bat

INSTRUCTIONS (*Flying tips at the end*)

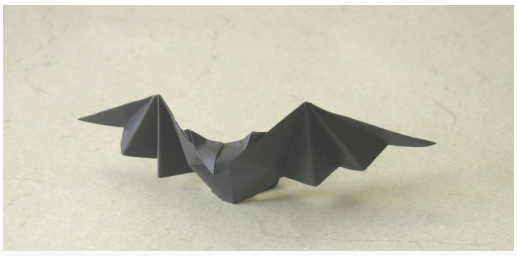
This elegant wing design combines outstanding elements of the flying wing style to produce the best all around craft. Start with a letter size sheet of light to medium weight paper.

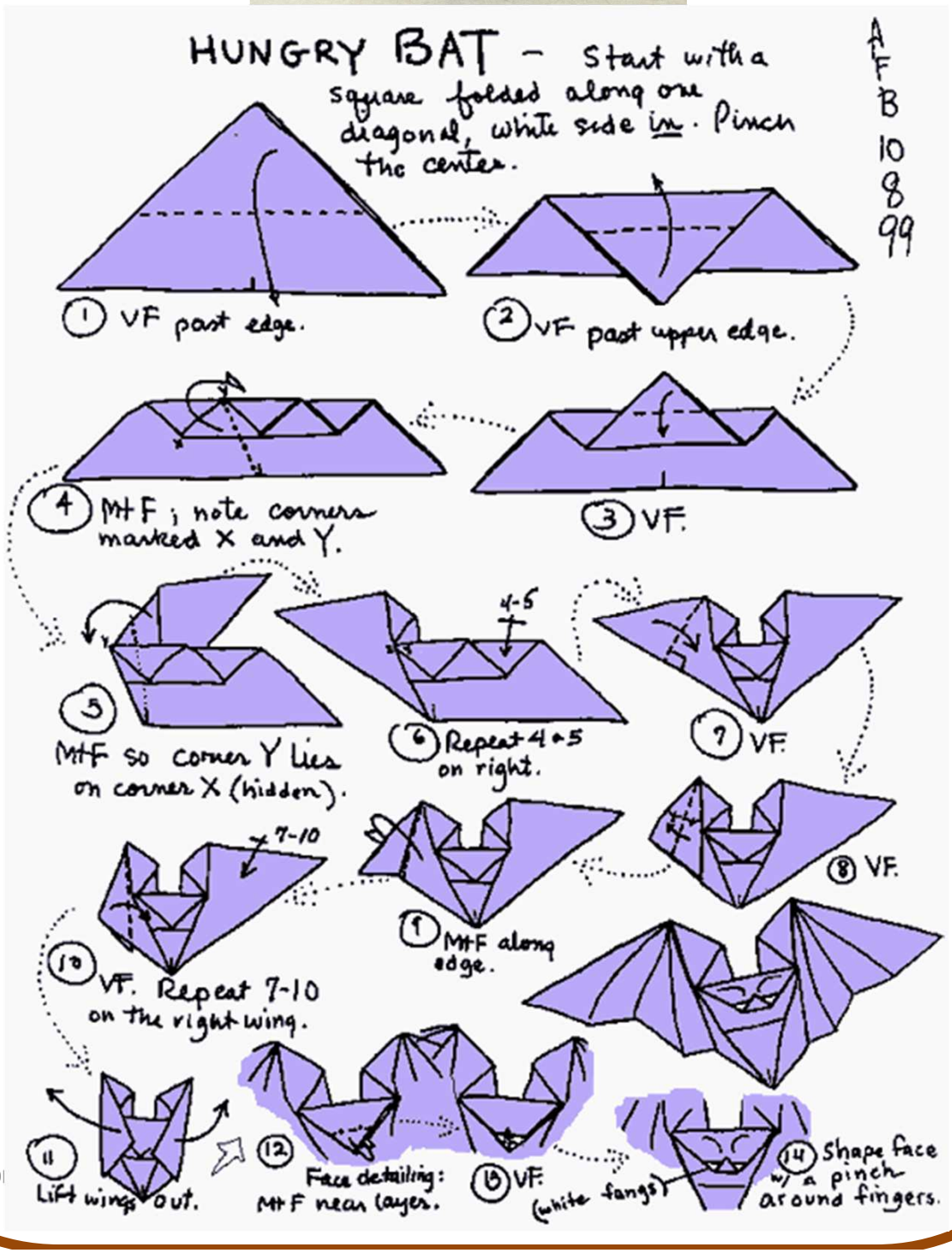
1. Fold the sheet exactly in half by bringing the short edges together. Make the crease and then unfold.
2. Bring the top edge down to the crease just formed to make a new crease parallel to the one just created. Unfold after making the crease.
3. Repeat the process with the bottom edge. Bring it up to the first crease created and make a new crease parallel to the first. Unfold the paper after making the crease. The sheet should now be divided evenly into quarters.
4. Position the sheet so that the creases you have made are vertical.
5. Form a new crease by bringing the upper right hand corner of the sheet down. The left end of this new crease should hit the upper left corner exactly. The upper right corner should lie directly over the right-most vertical crease line.
6. Open the flap just created and make an identical one by bringing down the upper left corner. As before, the right end of the new crease should hit the upper right corner exactly and the upper left corner should lie directly over the left-most vertical crease.
7. Open the flap just created and turn the sheet over from left to right. The diagonal creases just formed should be toward the top.
8. Make a new crease by bringing down the top edge of the paper. This new crease should be parallel to the edge of the paper and go exactly through the meeting point of the two diagonal creases created earlier. Open the flap to expose the new crease.
9. Turn the sheet over from right to left and prepare to reverse fold some of the flaps.
10. Fold down the top flap again but this time bring up the edges of the sheet where the crease meets them. All the creases are in the proper direction so the flaps should come in naturally as shown. Press all creases down flat.
11. Open the flap at the top layer on the left to form a large triangle. Press down to create a new crease in line with the existing crease which created this flap.
12. Do the same thing on the right side. Bring the top layer down by opening the flap. This creates a crease in the layer beneath.
13. Turn the sheet over from left to right. The pointed side should be away from you toward the top.
14. Form a new horizontal crease by bringing the pointed tip down towards you. The new crease should be parallel to the bottom edge of the sheet and the ends should hit th edge exactly where the diagonal folds do. Make the crease as tight as possible through all layers.
15. Bring the upper right corner down to form a new crease. The right end of this new crease should hit the lower right corner exactly. The left end of this crease should hit the vertical guide crease created near the beginning of the folding.
16. Do the same on the left side. Bring the upper left corner down to form a new crease. The left end of this new crease should hit the lower left corner exactly. The right end of this crease should hit the vertical guide crease created near the beginning of the folding.
17. Fold the top edge downward to form a new flap. This flap should just cover the downward pointed flap beneath it. The crease should be parallel to the bottom edge. There are many layers so press hard and make the crease as tight as possible.
18. Turn the plane over and position it so that the side with all the flaps is toward the left.
19. Fold the plane in half along the existig center line crease. Make sure all edges line up.
20. Position the plane so that the center line crease is toward you and the wing tips are pointing away.
21. Bring the top layer down to form the first main wing crease. The right end of this crease should be about one finger width above the center line crease. The left end of this crease should be about two finger widths above it.
22. Fold the wing tip back up along the line of the existing guide crease. There are many layers near the front edge of the wing which do not have this crease. Press all the layers as tight as possible.
23. Turn the plane over from left to right keeping the wing tips pointed away from you.
24. Bring the other wing down to make a crease which matches the one beneath it. Line up all the edges before mashing this crease in place.
25. As before, fold the wing tip back up along the line of the existing quide crease. There are many layers near the front edge which do not have this crease. Press all the layers as tight as possible.
26. Open the plane and adjust all the angles to be the same on both sides. The dihedral should be flat to slightly downward. The wing tips should be set at an up angle. If the angles are set properly, no other trimming should be necessary.

THE THROW – Launch with a moderate to hard throw. This craft flies well in most conditions and can be thrown hard at a high angle for long soaring flights. Increaseing the dihedral downward and the wing flaps upward will make it more stable and fly straighter

The Magic of Flight –

Make an Origami Bat



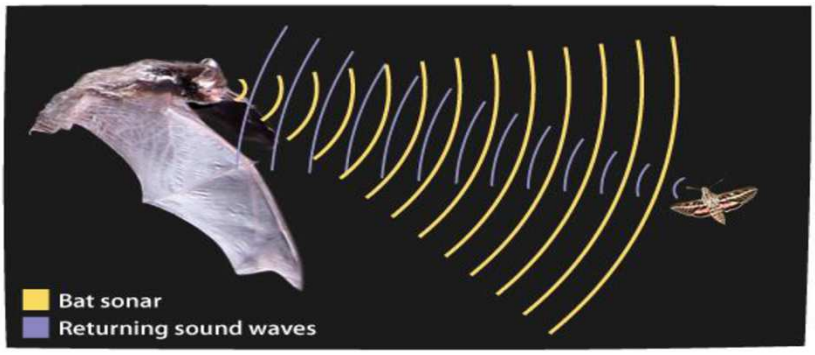


The Magic of Flight –

Make your Bat costume for Carnival 2016

Echolocation
and other Superpowers

Echolocation



Show DVD

Habitat and Home

Activity Sheets

Activity -
Activity -
Activity –
Activity –
Activity -

Habitat

Introduction
Habitat loss and disturbance due to land clearing and invasive vegetation is a major threat to the survival of Sousouri Bannann.

Development
Seychelles Sheath-tailed Bats rely on coastal boulder caves with stable temperatures to roost. Their roosts are usually found very close to the coast and the beach, the same areas humans like to develop for houses, hotels, resorts and restaurants. The Seychelles Sheath-tailed Bat used to be found on Mahe, Praslin, La Digue and Silhouette in large numbers. As human populations and industry have increased, Sousouri Bannann has disappeared from Praslin and La Digue, and is now found in critically small numbers in only a few locations on Mahe and Silhouette.

Sousouri Bannann also need healthy foraging grounds with abundant insects for them to feed on. Freshwater wetlands and marshlands provide good habitat for these insects. Sometimes humans do not recognise the value of these habitats and try to drain or fill them to get rid of the insects and to be able to build on them. As native plants decrease, so do the insects that rely on them. This in turn decreases food sources for the bats. Loss of biodiversity leads to a drop in ecosystem resilience.

There is constant and increasing pressure on bats, roost sites and foraging grounds from human development in the form land clearing, draining and filling, and disturbance for roads, houses and resorts. The bats and their roosts are protected by law from disturbance. However, their foraging grounds are not yet identified or protected, and their survival is still threatened.

Activity
Discuss what makes a great home for a Sheath-tailed Bat
Use the What Is A Cave worksheet to inform your discussion.
Show photos of suitable and unsuitable Sheath-tailed Bat roost sites. What features enhance or detract from this habitat?

Extension
Have you seen any sites like this?
How can we protect and preserve these habitats? How can we increase habitat for Sousouri Bannann that benefits other species as well? Research current protected areas and areas in your vicinity that you think need protection. Develop a plan to help these areas be conserved. This could include zoning ideas, writing to the government, making a leaflet or poster on why these areas are special.

Duration:
30 - 60 mins

Setting: Classroom / Grounds
Indoors / Outdoors

Suitable for:
Ages 8 +

Materials:
•What Is A Cave worksheet
•Photos of suitable and unsuitable bat habitat, insect habitat, wildlife habitat

Topics
interdependence, food webs, environmental threats

Curriculum links
Geography, science, social studies, languages

What is a Cave?

- Brainstorm what makes a cave a cave. What are some uses for a cave? Who uses caves and why?

- **What makes a cave a great place for a microbat to live? Why is it an important habitat? What else uses these caves?**
- Safe shelter
- Stable cool temperature
- Difficult for humans and predators to access
- Network of spaces means many hiding and resting places, various escape routes
- Food source?
- Water source?
- Weatherproof
- High open space allows bat to drop the 2 – 3m required for initiating flight

- **What can threaten a roost?**
- Human disturbance
- eg White nose syndrome from one cave due to one international caving convention is thought to be the cause of decimating north american bat populations
- Noise
- Blasting
- Vibrations
- Changing the vegetation / outlook / surroundings (Bats are creatures of habit and don't cope easily with change)
- Predators (rats, cats, owls)
- Disease
- Other Ideas?

Habitats continued

Activity
Discuss what makes a great foraging ground for a Sheath-tailed Bat. Draw a picture of your ideal habitat, including vegetation, water source, wildlife, food, predators, surrounding habitats and other threats. How can we protect and preserve these habitats? How can we increase habitat for Sousouri Bannann that benefits other species as well?

Activity
Design a 3D model habitat for Seychelles Sheath-tailed Bats. Use Silhouette Island as your reference point. Include roost sites, foraging grounds, flight paths and obstacles.

Activity
The Webbing Game – Ecosystem Interdependence
All players stand in a circle. Each player is given a name/picture card representing an element of the environment. Starting player holds one end of the string and asks "who depends on me?" Those players take hold of the string and ask the question again. String is unfurled to show relationships. Once all players hold the string, discuss why connections are interdependent and often depend on previous and subsequent connections. Then introduce an environmental problem (water pollution, pesticide use, land clearing, invasive species, climate change etc). All players affected by the problem drop the string and sit down. One problem often leads to other problems. Until the web collapses. Emphasise that everything is interdependent and even one break in the chain has far-reaching consequences.
See worksheet for name cards.

Extension Ideas
Roadshow Bring and plant a native garden to encourage nocturnal insects beneficial to plants and bats.
Duration:
2 – 3 hrs
Setting: School Grounds / Botanical Gardens
Suitable for: Ages 9 +
Materials: Native plant seedlings, gloves, sunscreen, hats, water

Field Trip Visit the native plant garden on Silhouette, the Botanical Gardens or the National Biodiversity Centre on Mahe. Do a guided tour with Rangers to understand the connections between species. Invite Pat Matyot and Katy Beaver along to talk. Design your own guided tour for parents and guests to experience the special plants and habitats at your school.

Duration:
60 mins
Setting: Classroom
Suitable for:
Ages 5 +

Materials (2D Habitat) :
•Drawing or poster paper, pens, pencils
•Pictures of native plants and invasive plants
•Pictures of native plant garden on Silhouette

Materials (3D Habitat):
•Felt and material "landscape" pieces of Silhouette Island
•Cards to represent habitat elements as above
•Velcro Bats (or finger puppet bats)

Materials (Webbing Game):
•Ball of String
•Webbing Game worksheet cards

Key concepts
interdependence, food webs, environmental threats

Curriculum links
Science
Geography
Language
Social Studies

What is a Wetland?

Brainstorm what makes a marshland a brilliant freshwater wetland. What are some uses for a wetland? Who uses wetlands and why?

What makes a wetland a great place (for a microbat to forage)? Why is it an important habitat? What else uses these marshes?

- Native plant biodiversity, health and abundance
- Insect abundance and biodiversity
- Open area – uncluttered habitat
- Difficult for humans and predators to access
- Network of spaces means many hiding and resting places, varied foraging opportunities
- Food source
- Water source

What can threaten a wetland?

- Human disturbance
- Pollution, sediment, runoff
- Filling in
- Insecticides, pollutants, extra nutrient loads - that pollute the water and poison the wildlife
- Climate change and extreme weather events
- **Changing the vegetation / outlook / surroundings (Bats are creatures of habit and don't cope easily with change)**
- **Invasive plant species**
- **Disease**
- **Other Ideas?**

A vital Bat Foraging Ground: Marshland at Cap Ternay, Mahe Island Seychelles Image Credit Klaartje Puttemans, claireobscuur.com

Habitats are Hope – Vegetation Regeneration

Use these name / picture cards for the Webbing Game. You can also add your own.

Bat	**Cave**	**Boulder**	**Native Plant**
Invasive Plant	**Mosquito**	**Beetle**	**Moth**
Midge	**Owl**	**Cat**	**Rat**
Water	**Sun**	**River**	**Ocean**
Marsh	**Mangrove**	**Resort**	**Humans**
Scientist	**Developer**	**Tree**	**Earth / Soil**
Conservationist	**Cyclone**	**Tsunami**	**Fire**
Pesticide	**Noise**	**Vibration**	**Smoke**

Habitats

Make a Bat Puppet Colony

Activity
Make a simple bat puppet from a toilet roll.
Fold the top and bottom of the toilet roll to form ears at the top and sheath tail at the bottom. Paint your toilet roll. Cut wings from black craft paper. Add wings, eyes, nose, mouth, teeth and tragus. Add a string to hang bats as a colony in a corner of the classroom. Bats can hang upside down or flying. Bats can also be used as finger puppets.

Activity
Use each child's bat puppet in a simple role play about bats.

Bats are social creatures who like to live in a group called a ***colony***. A baby bat is called a ***pup***. Bats need a safe place to sleep and rest called a ***roost***. Sousouri Bannann roost in cool ***caves*** in boulder fields close to the coast.

When the bats are sleeping and are disturbed, they fly around and squeak. Some bats may huddle together, or try to crawl and hide in smaller, darker ***crevices***. Some bats may fly out and ***abandon*** their roost. It is stressful for the bats to be disturbed. They use up energy they should be saving for important tasks like foraging, breeding and feeding their young and staying healthy and strong. We should leave them alone.

Duration:
30 minutes

Setting: Classroom

Suitable for:
Ages 3+

Materials:
•Empty toilet rolls
•Sheets of black A4 craft paper
•Colouring pens
•Brown paint

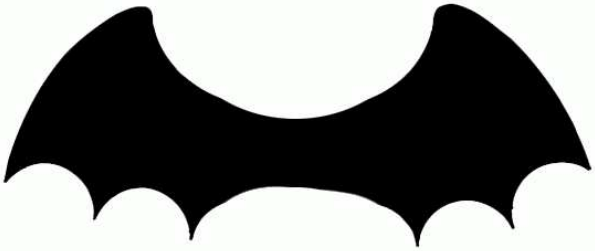
Topics:

Curriculum links:
Languages
Geography
Science
Social Studies

Bat Puppet Colony

Materials
Empty toilet rolls
Bat wings stencil
Heavy card or craft paper - black
Colouring pencils, pens and crayons, black or brown paint, mixed media (fake fur, vinyl, cotton wool, glitter)
Scissors, glue, stapler
Googly eyes / white paper

How to:
Use the bat wings stencil to trace onto card and cut out one per student. Colour the toilet roll black or brown using media. Fold the toilet roll top and bottom as shown to form the bat's ears and tail. Glue the wings to the bat's back and the eyes to the front. Add fine details features as desired.



Roleplay
Students (with their puppets) are a colony of Seychelles Sheath-tailed Bats.
Designate an area of the classroom or playground as the roost, another as the foraging ground.
One teacher (or volunteer student) is a predator such as a Barn Owl or Rat.
One teacher (or volunteer student) is a disturbance such as humans entering the roost, noise and vibrations, dust, smoke or fire.
One teacher (or volunteer student) is an obstacle in the flight path, such as a new building (hotel / resort / light pollution / road / other human structure) or an altered vegetation / foraging landscape (tree falls / cut down, invasive plants grow quickly)
Let the students react instinctively to the intrusions. They will likely respond with "fight or flight". Some will huddle, some will flee alone (rendering them more vulnerable to predation), some may crawl or fly away to hide

Discussion
What effects does this have on their energy, focus, ability to regroup, ability to protect themselves / hide / survive?
What can we do to help our bats be as resilient as possible?
What could we do to help them increase their colony? Increase their population in Seychelles?

Diet and Ecology

Activity Sheets

Activity – Prey Predicaments – Diet?
Activity – Prey Predicaments - Guano
Extension Activity – Malaise Trapping
Extension Activity – Planting a Native Garden
Extension Activity – Field Trip with Worksheets
Activity -

Prey Predicaments - Diet

Introduction
What do Seychelles Sheath-tailed Bats eat and how can we help their foraging?

Development
Sousouri Bannann are one of over 930 worldwide species of *insectivorous* microbats. Their diet includes beetles, moths, mosquitoes and midges. Moths and beetles with their higher fat contents may be preferred during breeding season. Insects are more abundant after rains and during the growing, flowering and fruiting seasons of their food.

Discuss the different types of insect prey available to microbats. Which might be their favourites and why? Do microbats have different food requirements during different seasons or times of the year? Do they change their diet depending on what's available? What happens to wildlife when humans and hotels use pesticide fogging? How would you help Sousouri Bannann find enough food? Find more food? Find healthier food?

Activity
Use the worksheet to discover what is food for the Seychelles Sheath-tailed Bat and what isn't. Discuss how bats are impacted by fogging and landclearing.

Extension Activity – For Roadshow
Pass around resin insects for students to inspect. Discuss which insects might be most appealing to a bat. Why would a bat choose this insect? Would it be available at night? Would the bat find this food close to its roost, or would it have to fly a long way to find food? What effect would this have on the bat's foraging ability and success? Which insects are most beneficial for bats?
How many insects do you think a bat could eat in one flight?
What if the bat was pregnant or nursing?
What effects might this have on agriculture?

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

Materials:
•Prey worksheet
•Insect Outlines
•Glitter
•Confetti
•Glue
•Colouring pens
•Crayons

Key concepts

Curriculum links
Science
Languages

ICS April 2015

Prey Predicaments

Which of these are foods for Sousouri Bannann?
Which are *not* foods for Sousouri Bannann? Why not?
Where would the bats find this food?
How would the bats find this food?
What are the threats to these foods?
What are the threats to the bats eating these foods?
What can you do to enhance and protect their food source?

Prey Predicaments – Guano

Introduction
We can learn a lot about bats by collecting and analysing their scats (poo). Beetles and moths are favourite foods for insectivorous bats. They are caught and eaten whole, but their hard exoskeletons cannot be digested. This means we can look through bat scats to discover what they have been eating and in what abundance. As beetles and moths have shiny and lacy wings and exoskeletons or shells, bats poo out glittery scats. Pretty!

Activity – *Roadshow with Resin Insects*
Activity – *Toolkit with Photos of Insects*
Study the resin insects in the drawstring bag, and the photos of insect prey of Sousouri Bannann.

Discuss what kind of environment supports / shelters / increases these insects? How can we increase this habitat to improve the bats' foraging chances? How could insects avoid Sheath-tailed bats? Or other predators? How can bats outsmart insects?

Then colour and decorate the beetle and moth prey.

Summary / Learning Points
A healthy and diverse insect population is vital for the survival of Seychelles Sheath-tailed Bats. Bats keep insect populations in check and provide a natural pest control service. Destructive environmental practices such as logging and fogging reduce insect abundance and diversity and negatively impact predators. Creating, restoring and managing native habitat is beneficial for ecosystems and vital for the continued survival of Sousouri Bannann.

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

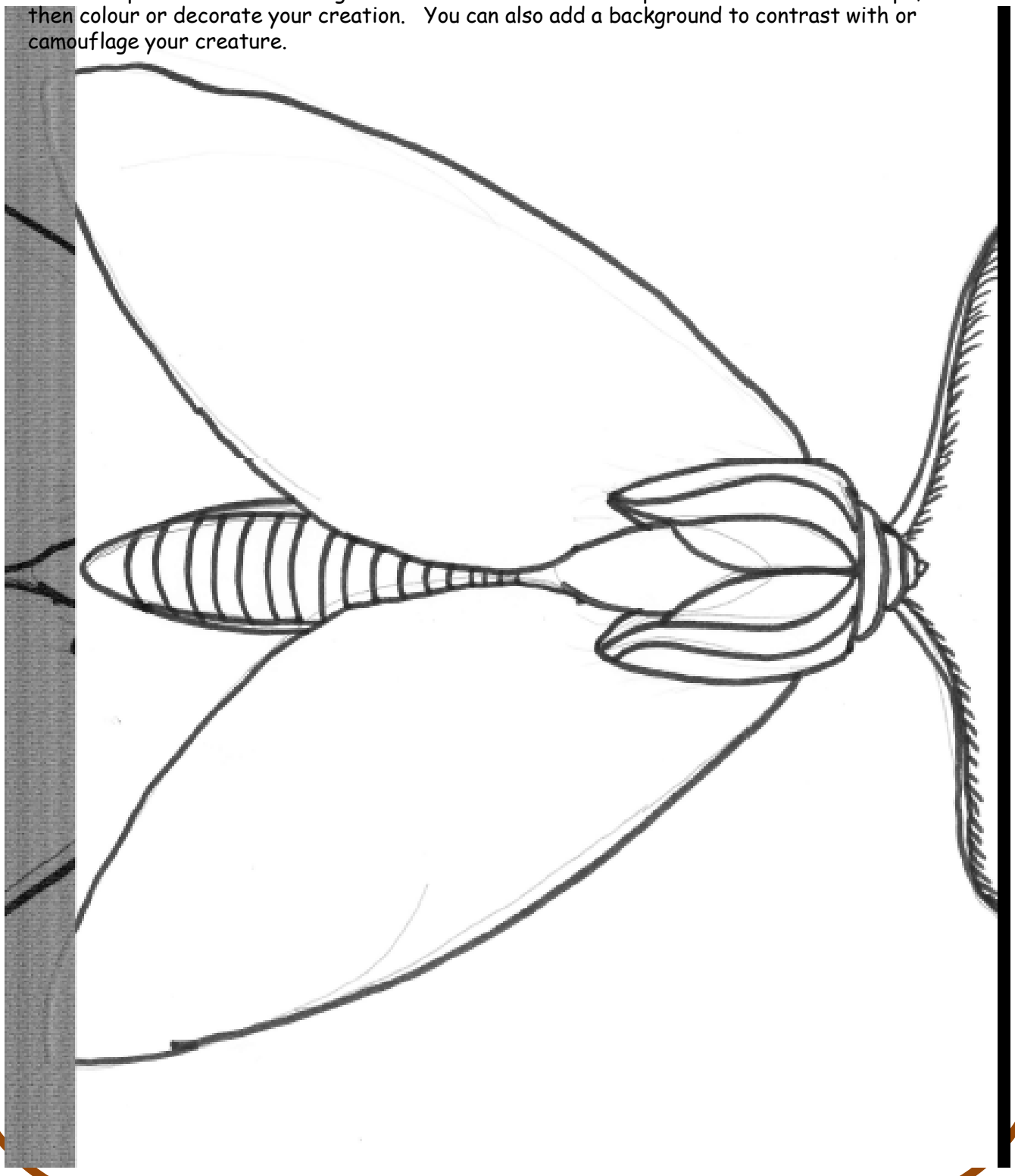
Materials:
•Resin insects
•Photos of insects
•Magnifying Glass / Magnifying Box / Microscope
•Find That Bat Worksheet

Key concepts

Curriculum links
Science, Art, Languages

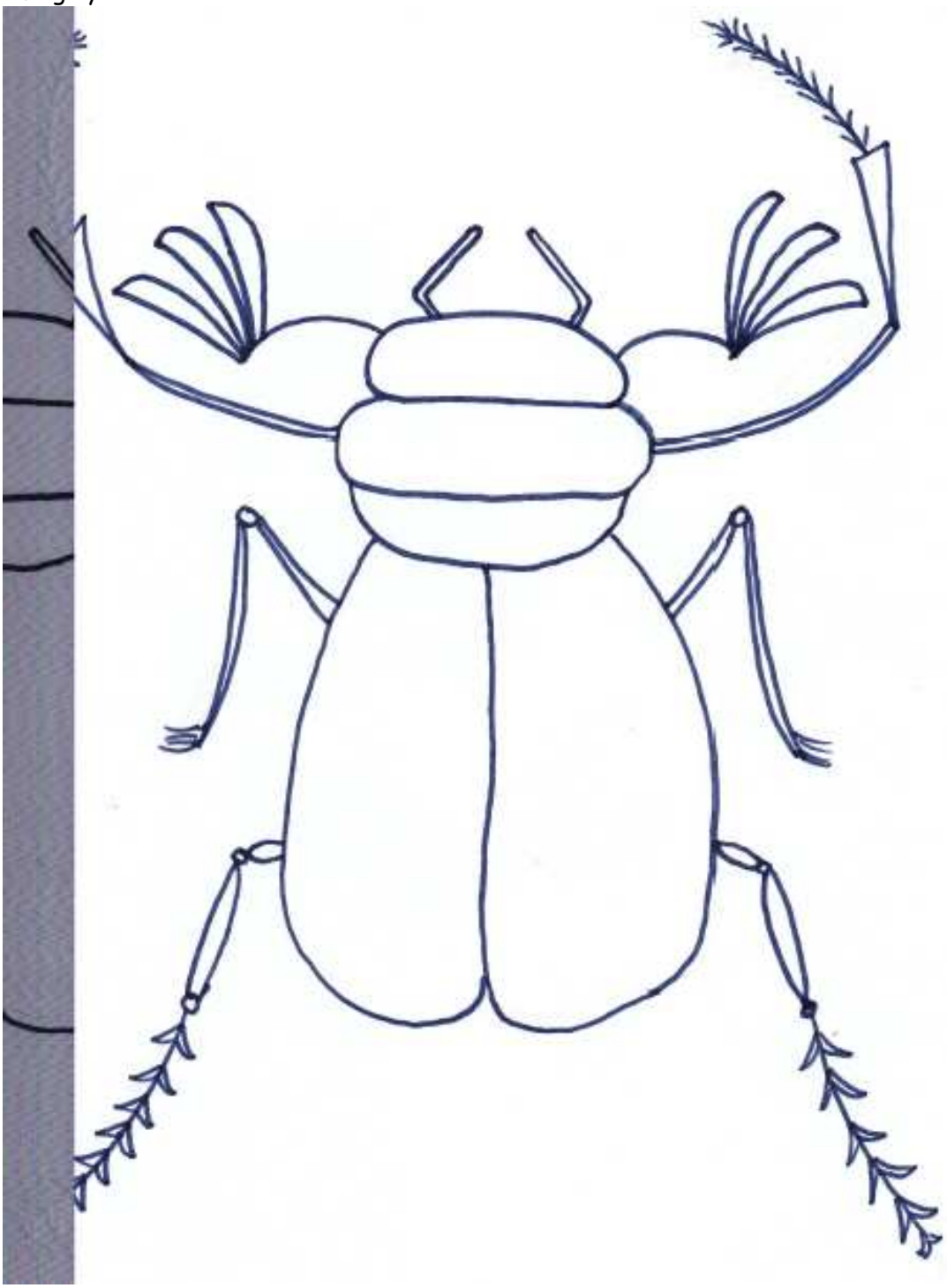
Prey Predicaments

Moths and caterpillars have soft bodies and delicate wings, but hard legs and casings. Some caterpillars and moths have irritating, itchy hairs, or are brightly coloured to deter predators. Some use patterns to camouflage themselves. Add detail and patterns to the moth shape, then colour or decorate your creation. You can also add a background to contrast with or camouflage your creature.



Prey Predicaments

Beetle wings, legs and casing are too tough for bats to digest. However bats must swallow the entire beetle and excrete the indigestible parts. Add detail and patterns to the moth shape, then colour or decorate your creation. You can also add a background to contrast with or camouflage your creature.



Prey Predicaments

Extension Ideas
Set your own malaise trap overnight at school. You can use a white sheet tied up if you don't have a real malaise trap. Collect and study the insects using magnifying boxes. Draw the insects, paying attention to the segmentations.

Create your own resin insects and discuss when and where they would become prey for bats and other nocturnal creatures.

Field Trip
Visit the National Botanical Gardens on Mahe or take a day trip to Silhouette Island to learn more about plant / insect interactions and see native habitats successes.

**** Winners of the Roadshow Quiz at each school will be invited to spend a day with Rangers and WCS and their teacher / leader on Silhouette Island as their prize**

Field Trip Worksheet??

Duration:
Overnight

Setting: Grounds / Outside

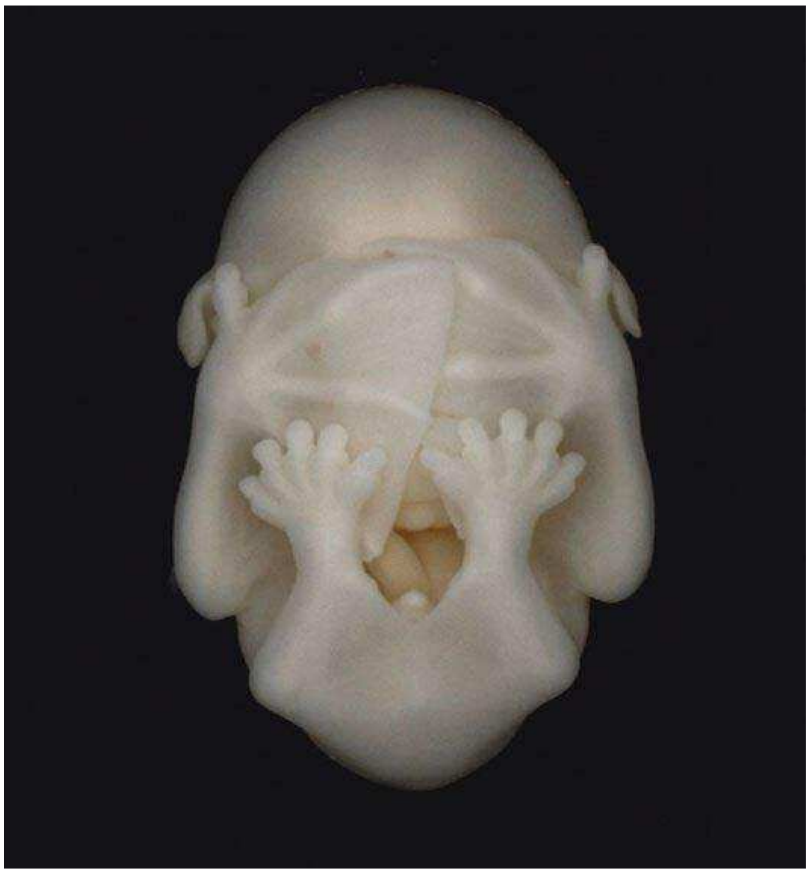
Suitable for:
All ages

Materials:
•Resin insects
•Magnifying Glass / Magnifying Box
•Malaise Trap (homemade from white sheet, pegs, string, light source)

Key concepts

Curriculum links
Science, Languages

Breeding



Baby bats go through an embryonic stage called the Peekaboo Period.

Activity Sheets

Activity -
Activity –

Breeding

Introduction
Some features of bat mating and reproduction are generalised here. Mating, birth and development of the young of the Seychelles Sheath-tailed Bat has so far not been extensively studied.

Development
Seychelles Sheath-tailed Bats belong to the microbat family Emballonuridae, meaning sac-winged bats. The males of this family generally have scent glands on the underside of the elbow. These glands may be used to give off a scent or pheremone to attract females for mating.

In temperate areas of the world, bats mate during autumn or winter. Bats are one of the few mammals that can pause the reproductive cycle – in some species the female carries live sperm in her uterus during cold weather then ovulates in spring and becomes pregnant. Pus can then arrive in spring when the weather is milder and food is more readily available. In Seychelles, bats also mate during the months of the southeast monsoon. Pups are born in November – December. Some young have also been observed in April, possibly indicating a second breeding season.

Females generally give birth to a single young, called a pup. The pups of microbats weigh about ¼ of the mother's weight when it is born – that would be like your mother giving birth to a 13kg baby! Pups of megabats weigh about 12% of their mother's weight. Pups are born furless, with their eyes closed, and cannot fly, so the mother carries her pup around attached to her underside and suckles it with milk from her nipples, which are located under her armpits. As the pup develops and matures, the mother will generally leave it behind in a 'creche' with other pups at the centre of the roost, while she goes out at night to forage and gain enough nutrients to sustain herself and also continue suckling her pup until it is mature. The pup is able to fly by 3 – 4 weeks of age, and is almost full size by this time, yet the mother will continue suckling until the pup is fully developed by 2 months of age, when it is full adult weight and size.

Activity

??

Duration:
30 mins

Setting: Classroom

Suitable for:
All ages

Materials:

Key concepts

Curriculum links
Science
Languages

Activity Suggestion??

Conservation

Predators and Threats

Activity Sheets

Activity -
Activity -
Activity –
Activity –
Activity -

Planning for People and Wildlife

Introduction
As human populations grow and develop, the needs of other species can be neglected or pushed to the background. A healthy ecosystem requires a balance in planning for the needs of all its inhabitants.

Development
Photocopy and study a map of your district and / or surrounds. Identify human structures v natural areas and features. Discuss whether wildlife and environment has been given adequate protection.

Activity
Students work in groups to design their Ideal Community, considering all aspects of the natural and built environments. Use the worksheet list as a guide, and add features as required.

Activity
Students compare the maps of Cap Ternay and Silhouette (La Passe) as a case study, and suggest a future management plan for the Cap Ternay site. Should built environment be included in the plan? To what extent? For what purpose? What are the alternatives?

Summary
Revisit the map of your district / surrounds. In light of the Ideal Community activity, How would you change this? Can you change this? Why would you want to change this?

Extension
Invite an officer from the Ministry of Land Use and Habitat to give a guest presentation to students. Eg how planning decisions are made, what influence can students and the public have on these decisions (if any).

Duration:
30 – 60 mins

Setting: Classroom

Suitable for:
Ages 10+

Materials:
Map of District
Worksheet Guide
Map of Cap Ternay

Key concepts

Curriculum links
Geography
Social Studies
Language

ICS April 2015

Planning for People and Wildlife

Forest	Road	Nature Reserve	Public Beach	Church
River	Carpark	Park	Rock wall	Community Centre
Beach	Busstop	Playground	Harbour	School
Mangrove	Zebra Crossing	Sportsfield	Restaurant	Residential Houses
Marsh	Traffic Signs	Sea Level Rise Set-Aside	Hotel / Resort	Shop
Bridge	Farm			

Planning for People and Wildlife

- Map of Silhouette esp La Passe + Resort

-Map of Cap Ternay / Baie de Ternay

-School District Maps

Threats - Disease

-Discussion of White Nose Syndrome
-Discussion of cumulative effects of pesticides in food chain
-Insects to bats to bat reproduction…case studies of other animals eg Mauritian Kestrels and DDT (and other pesticide sprays…)

Case study – Mauritian Kestrels

Case study – Stahlschmidt and Bruhl 2012 – likely impact on bat reproductive success of bats eating foliage-eating arthropods (common pipistrelles in a sprayed apple orchard)

Extinction Is Forever

Introduction
The Seychelles Sheath-tailed Bat currently numbers less than 100 individuals on only two islands of Seychelles – Mahe and Silhouette – in the whole of the world. Its ongoing survival is critically endangered, and as an endemic species found only in Seychelles, it is the responsibility of Seychellois to save Sousouri Bannann for the planet.

Development
Look at the IUCN Red List of Threatened Species around the world, then focus on the species in Seychelles. Discuss threats to Sousouri Bannann and the impacts of losing a species altogether.

Activity
Design a Poster to tell kids and adults around the world how special Sousouri Bannann are, and what we should do to protect them. Posters can be scanned, enlarged and printed for display at school, in the library, at the NHM, in the newspaper, on the school / education / NGO / social media websites.

Summary
There is much we as students and a community can do to help in conserving our precious National Treasures of Seychelles. Get active!

Extension
•Class discuss and vote for the five top posters. Ideas can be merged to produce a Best Of class poster. For display as above. Class reps can present poster to another class as peer teaching and discussion exercise.
•Ministry of Environment Representative visit to school to view posters and engage in discussion with students on community conservation actions they can be involved with.

Duration:
30 – 60 mins

Setting: Classroom

Suitable for:
Ages 7+

Materials:
•Why Save Sousouri Bannann dot point sheet
•Design A Poster Worksheet

Key concepts

Curriculum links

ICS April 2015

Extinction Is Forever…

Why

Save Sousouri Bannann?

- Endemic
- Edge species
- Rarest bat in the world
- Interdependence
- Ecosystem services
- Ecological responsibility

What

threatens Sousouri Bannann?

- Pollution
- Habitat Loss
- Pesticides
- Loss of Prey
- Invasive predators, invasive plant and animal species
- ???

Extinction Is Forever

Design a Poster in the space below, to tell kids and adults around the world how special Sousouri Bannann are, and what we should do to protect them. Posters can be scanned, enlarged and printed for display at school, in the library, at the NHM, in the newspaper, on the ICS website. The class can also vote for the five top posters and merge their ideas.

Bats in Culture and The Arts

Batty Poetry

Introduction
Bats are triggers. They evoke emotions and provoke reactions. Each of us has a unique perception of bats, a unique perspective. We can share and deepen our understanding through poetry. Poetry is a personal, ancient and enduring form of self expression. Through poetry we can connect with our own voice, our environment, and with each other. We can simply enjoy the creative process. And we can also use poetry to raise awareness about the animals, plants and systems of our world – because every species needs a voice.

Development
Show some images of bats around the world and in Seychelles. Use the Amazing Bat Facts sheets as a reference. Chat through some perceptions of bats. Explore some emotions and reasons for reactions to bats.

Activity
Close your eyes and sit quietly. Breathe deeply. Bring an image of bats to mind – whatever image comes up is great. Keep your eyes closed . What do you feel? Pay attention to the sensations in your body. Are your senses (hear, smell, touch, taste, see, imagine, intuit) awake? Maybe you are focussing on Sousouri Bannann. Or another bat. Or something entirely different. ..

When you are ready, open your eyes and pick up your pen.
Use writing paper or the bat foldable template to write a poem, a rap or a song about bats in general or Sousouri Bannann in particular. Add a sketch, a drawing, a doodle or a pattern if you like.

Collect and display the poetry bats in your classroom or school noticeboard. Choose some of the poems to read at assembly.

Extension Ideas
Choose poetry for display in the school library . Create a Bat Poetry Trail throughout the school and make a Treasure Trail Map to accompany it. Design artwork to accompany the poems. Submit poems to the newspaper or radio for publication. Poetry can be in Creole, English or French.

Duration:
30 mins

Setting:
Classroom/
Indoors /
Outdoors

Suitable for:
All ages

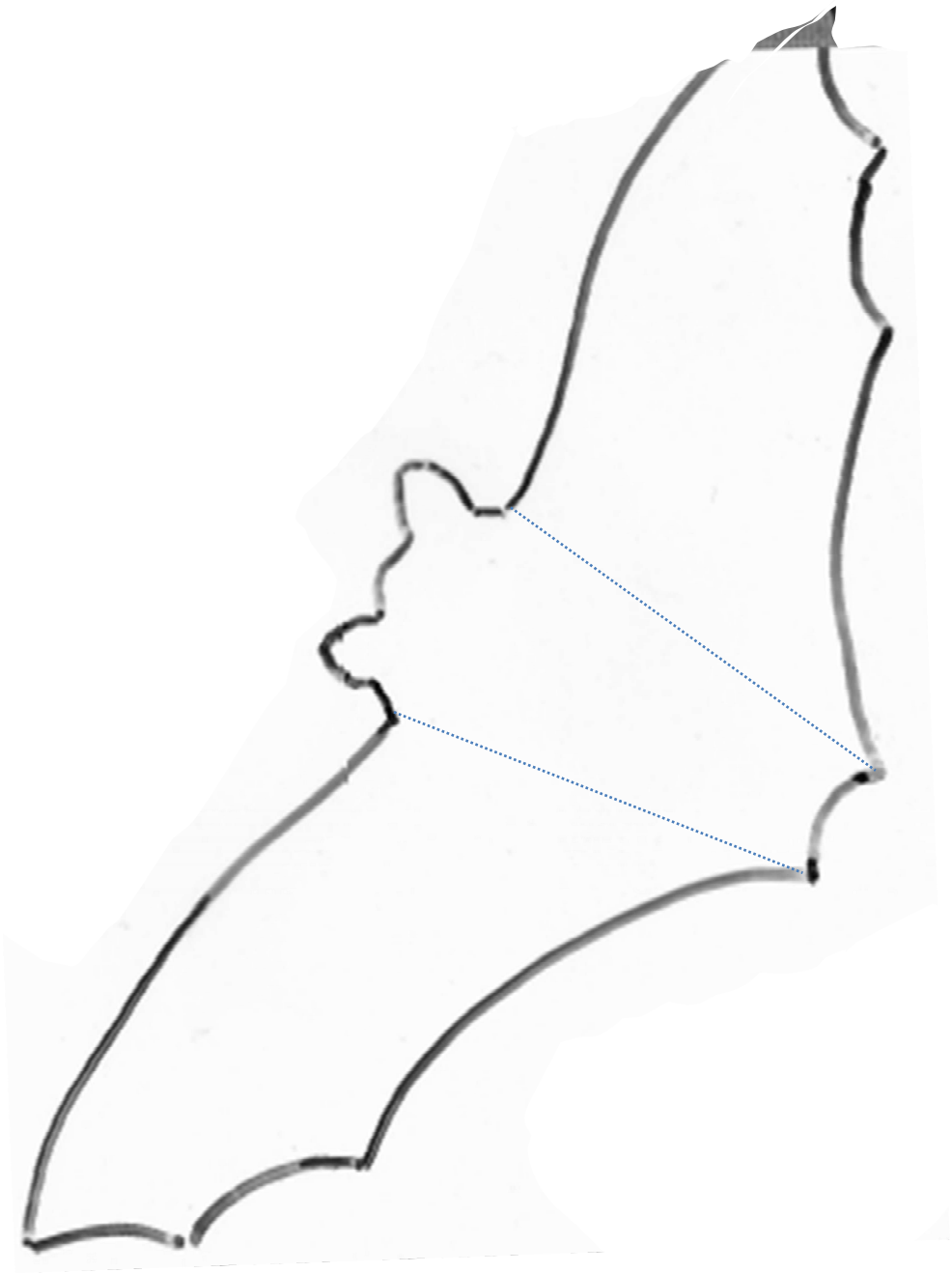
Materials:
•Writing paper
•Pencil or pen
•Bat Foldable for younger children

Topics

Curriculum links
Language
Social Studies
Art and Culture

Bat Foldable

Trace then cut out the bat shape. Fold wings in along crease marks and use for your poetry. Bats can be displayed together in a roost.



Bat Legends

Write a story about bats where they are the heroes rather than the typical scary creatures. Use the wings to help you. Illustrate your story if you wish.

Bat Games

Image Credit Mirage-5x5 deviantart.com

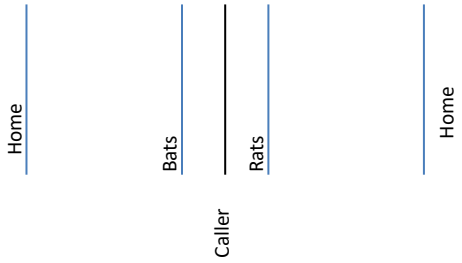
Games

- ## Bat and Moth – an exercise in echolocation

- Students form a circle and a larger circle is drawn in chalk or dirt or sand around them as a boundary. Choose one child as the Bat – they close their eyes or use a blindfold. The other children are Moths who run around the Bat randomly. Each time the Bat calls “Bat”, all the Moths must shout “Moth”. The Bat then reaches to tag a Moth by hearing alone. Once a Moth is caught s/he becomes the next Bat.

- ## Bats and Rats – Test your knowledge

- Draw five parallel lines in the dirt / sand/ chalk. The caller stands on the centre line, perpendicular to the children. Divide children into two teams, Bats and Rats. Each team lines up along one of the middle lines, facing each other. Use the Worksheet of True / False Facts about Bats. If the caller calls a true statement, The Bats turn and run to their home line, chased by the Rats. If the statement is false, the Rats run home, chased by the Bats. Any child caught swaps teams, until all children are in one team.



- ## Webbing Game

(see Habitats Are Hope activities)

- ## Fat Bat Game – probability and statistics

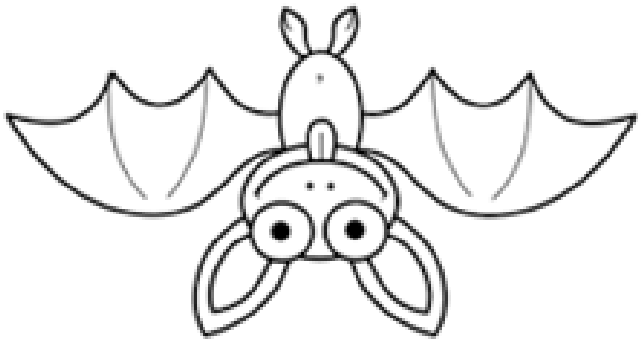
- Students roll a die to see how many insects their bat eats. Students may continue rolling, in this Bat version of Pig, until they elect to stop, or until they roll a 1. But be careful! If your bat is still eating (collecting points) when a one is tossed, you are a **Fat Bat** and lose all of your points for that round.
- This game is designed to provide a fun experience in the experimental probability of a single die toss. However, students get lots of practice adding a string of single digit numbers, as they total up their winning points for each round. A data analysis option is included to formally extend the analysis of the game's probability for older students.

Games

Bats and Rats – Test your knowledge

Bats are Blind	**F**
Rats eat Bats	T
Bats live in caves	T
Bats hibernate	T
There are a lot of bats in the world	T/F
There are enough bats in the world	F
Bats suffer from diseases	T
Bats carry diseases	T
Bats are active during the day	T
Bats have lots of babies at once	F
Baby bats hatch from eggs	F
Bats fly into your hair	F
All bats drink blood	F
Bats are dirty	F
Bats eat frogs	T
Bats are vampires	F
People need bats	T
Bats are used for cricket	Ha Ha
Bat mothers carry their babies while they fly	T
Bats need people	T
Bats are affectionate	T
Bats are intelligent	T
Bats are cold blooded	F

Puzzles



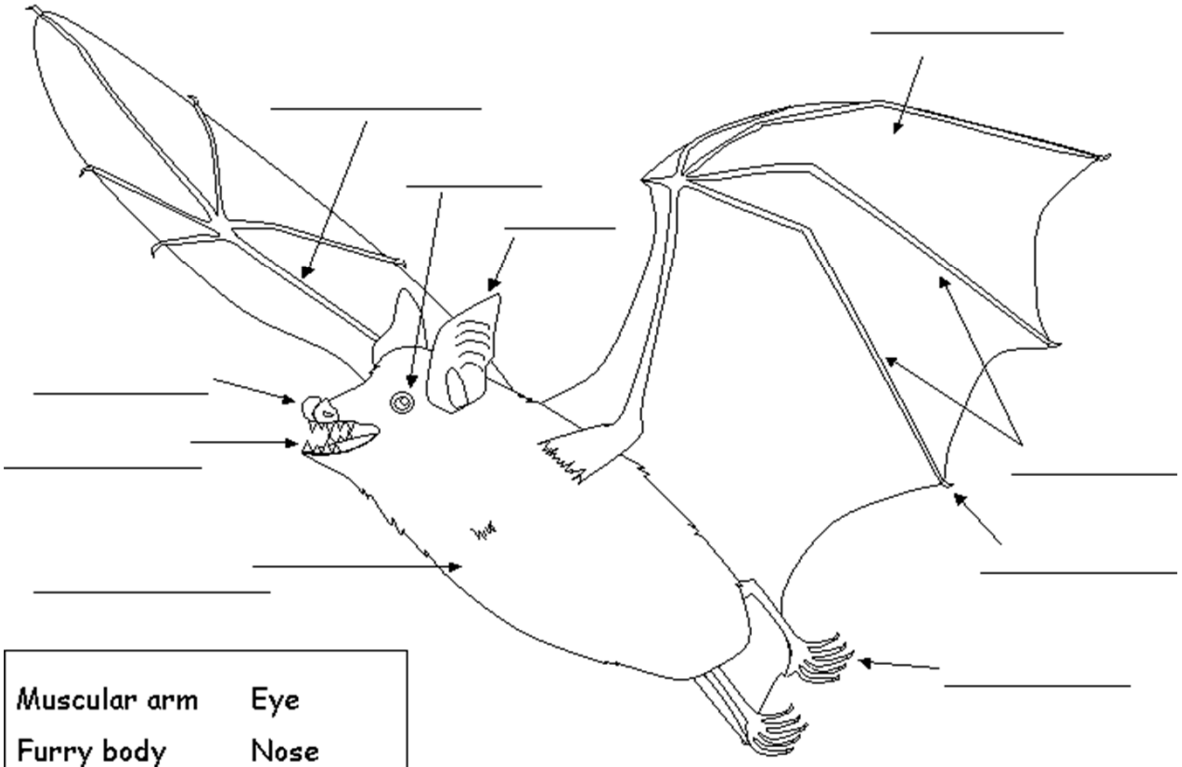
- Bat Findaword Creole
- Bat Findaword English
- Threats to endangered species Findaword English
- Crossword puzzle English
- Dot to dot
- Maze
- Colour the dots picture
- Label the Bat
- Bat Math Quiz
  http://glenwoodcaverns.com/pdfs/Bats_Math_Quiz.pdf

- Other suggestions…

Label The Bat

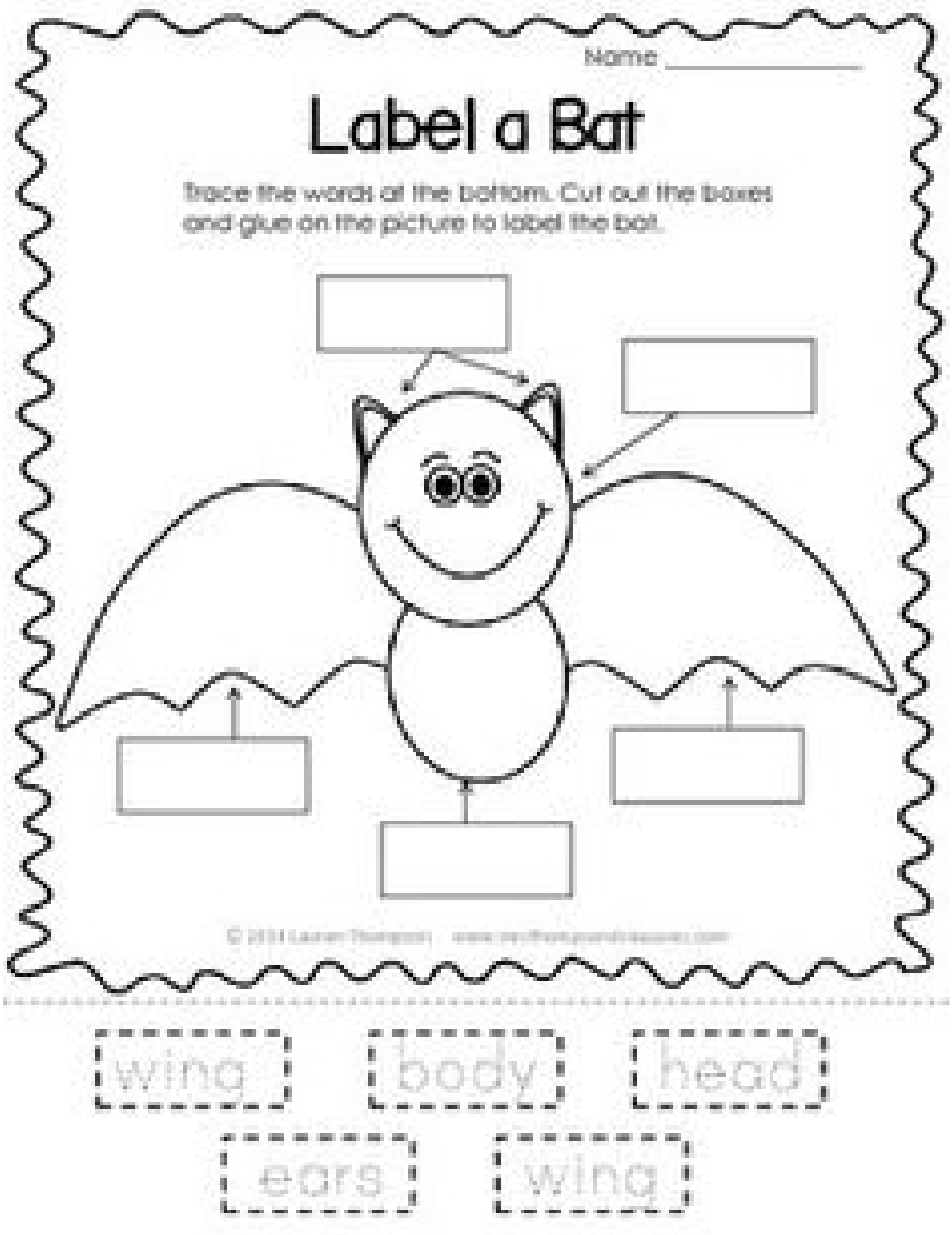
Name: _____

Label the different parts of the bat using the words in the word box.



Muscular arm	Eye
Furry body	Nose
Sharp claws	Fingers
Sharp teeth	Hind feet
Ear	Wing

Label The Bat



Bat Word Search

F S A A P N E S N I V K H F Q

N L T Q W R R O T G H W I U E

E A O C I Z C B B A S R B R V

U M F P E T N Q Z S B P E R A

G M M R U S R E G N I F R Y C

X A B R U A N F L Y O S N M C

V M N C D I V I X L R P A A M

O A W A H O T Z X A W F T C P

L Y R S G N I W E Q U O E U A

B R O W N E A X N J T V L W U

bats
brown
cave
ears
fingers
fly
fruit
furry
hibernate
insects
mammals
nocturnal
radar
vampire
wings

Creole Bat Wordsearch

n	e	n	v	o	l	e	r	r	o	i	o	r	m	p
v	a	k	a	l	e	z	e	l	r	e	b	h	o	l
p	u	d	r	n	n	r	g	u	o	n	i	k	n	a
e	g	t	n	e	i	p	o	n	n	b	o	c	t	n
s	e	c	c	a	f	s	t	q	o	c	s	u	r	t
t	r	e	t	e	u	i	a	u	d	i	o	t	e	n
i	k	a	s	o	v	s	m	t	r	e	n	e	l	a
c	k	a	s	f	t	k	i	a	o	h	a	s	a	t
i	t	e	b	e	b	i	t	p	m	m	r	u	f	i
d	a	s	h	g	r	n	r	o	o	b	s	b	e	f
q	p	u	p	o	o	k	z	v	u	a	u	s	k	t
w	g	o	m	u	n	e	g	n	s	r	a	e	s	i
n	r	p	w	a	l	s	t	a	t	e	e	r	o	e
o	i	a	z	n	l	n	a	z	i	l	e	t	n	e
v	f	i	y	o	r	n	m	a	k	a	b	e	l	a

sousouri (bat)
biosonar (biosonar)
pwal (fur)
lakar (cave)
nik (roost)
lezel (wing)
grif (claw)
pous (thumb)
lezo (bone)
plant natif (native plants)

Pti bebet (insect)
makabe (beetle)
moustik (mosquito)
entelizan (intelligent)
mamifer (mammal)
pestisid (pesticide)
andanze (threatened)
Anvol vit (fast flying)
gouano (guano)
hibou (owl)

lera (rat)
sat (cat)
envole (fly)
montre lafekson (affectionate)

Environment Wordsearch

Identify threats to endangered species in the grid below. The words can be written horizontally, vertically and diagonally.

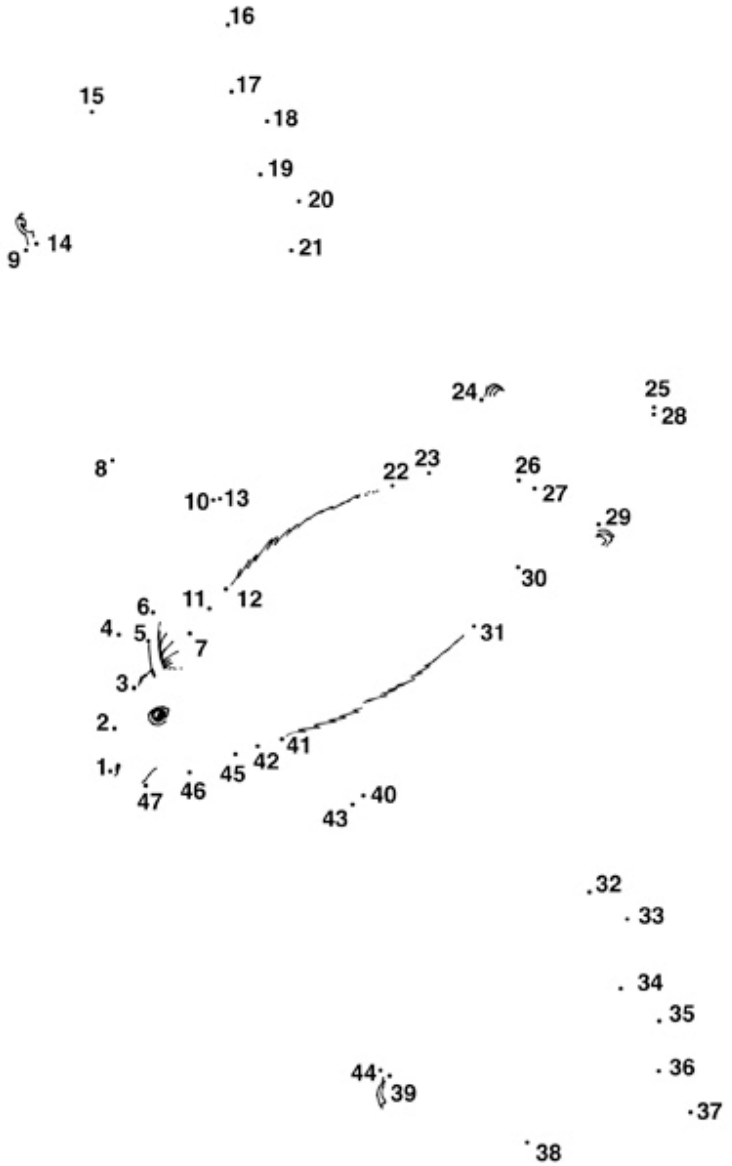
m	x	c	l	o	a	c	b	d	i	s	b	e	i	i	e	f	i
e	p	o	l	l	u	t	i	o	n	e	f	a	a	n	u	d	n
i	u	a	b	i	c	e	c	m	d	a	t	g	n	o	p	i	t
u	z	d	e	a	m	o	n	e	y	f	s	b	d	i	i	s	r
r	m	e	i	z	d	a	q	d	g	d	i	t	u	t	s	i	o
e	d	f	b	s	b	y	t	c	h	i	o	c	s	p	o	n	d
c	m	o	n	e	e	k	d	e	m	e	g	e	e	m	k	t	u
l	i	r	c	m	e	a	f	o	c	r	p	l	c	u	a	e	c
a	t	e	a	z	a	j	s	b	g	h	e	g	h	s	n	r	e
m	u	s	t	a	n	g	b	e	s	s	a	e	a	n	e	e	d
a	w	t	c	p	r	e	d	a	t	i	o	n	n	o	g	s	s
t	e	a	x	a	d	l	l	e	h	a	p	d	g	c	m	t	p
i	z	t	h	s	i	b	b	u	r	z	f	i	e	e	k	v	e
o	l	i	c	k	i	h	z	f	u	g	o	w	x	h	a	w	c
n	a	o	b	i	c	p	o	a	c	h	i	n	g	o	y	x	i
a	z	n	f	o	s	s	i	l	f	u	e	l	u	s	e	y	e
u	y	c	o	m	p	e	t	i	t	i	o	n	f	i	r	e	s

Pollution climate change, deforestation, reclamation, money, disease, predation, fire, poaching, competition, introduced species, land use change, fossil fuel use, consumption, waste, rubbish, neglect, disinterest, disbelief

Dot to Dot

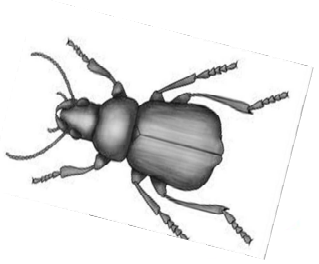
Who Am I? Connect the Dots to Find Out.

I am a mammal but have a skill that no other mammal has. It gets us out at night (nocturnal) where we feed on flying insects. We don't need to see in the dark because we use a special kind of radar called echolocation to make our way through the night. I am a _____.

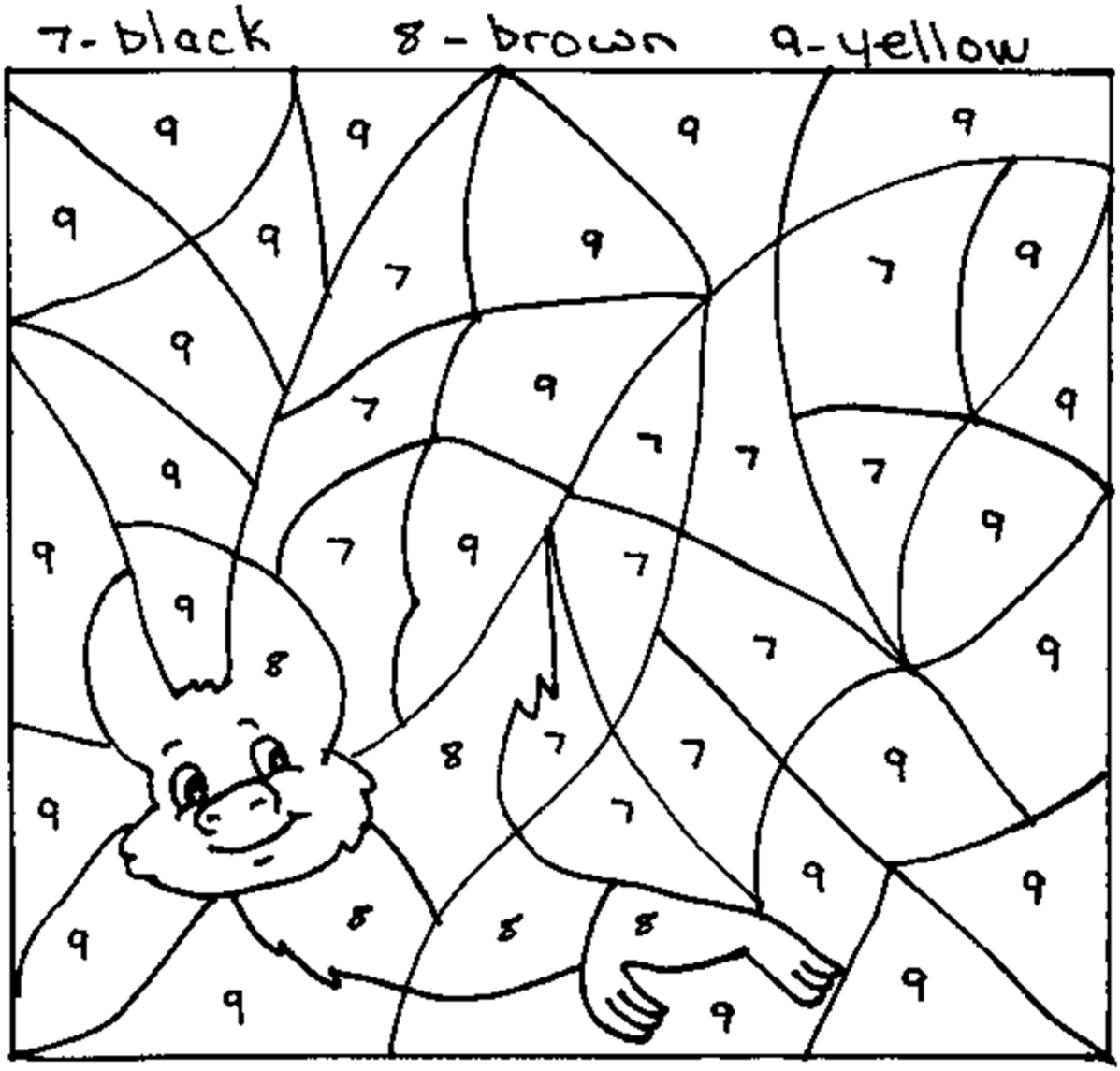


Bat Maze - what does a bat eat?

Help the Sheath-tailed Bat echolocate its way to a tasty beetle meal. How quickly can you hone in on your prey? Look out for the Barn Owl!



Colour by Numbers



Colour The Bat

Use any colours you like – natural camouflage colours or imaginative colours
Then add a background for roosting or foraging habitat

Acknowledgements
References
Further Information

Earthlife.net – bat anatomy
http://arstechnica.com/science/2008/02/13/earliest-bat-fossil-reveals-transition-to-flight/
http://www.livescience.com/1245-bats-efficient-flyers-birds.html
Howstuffworks.com