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Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (2024). However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the relevant authorities.

Preface

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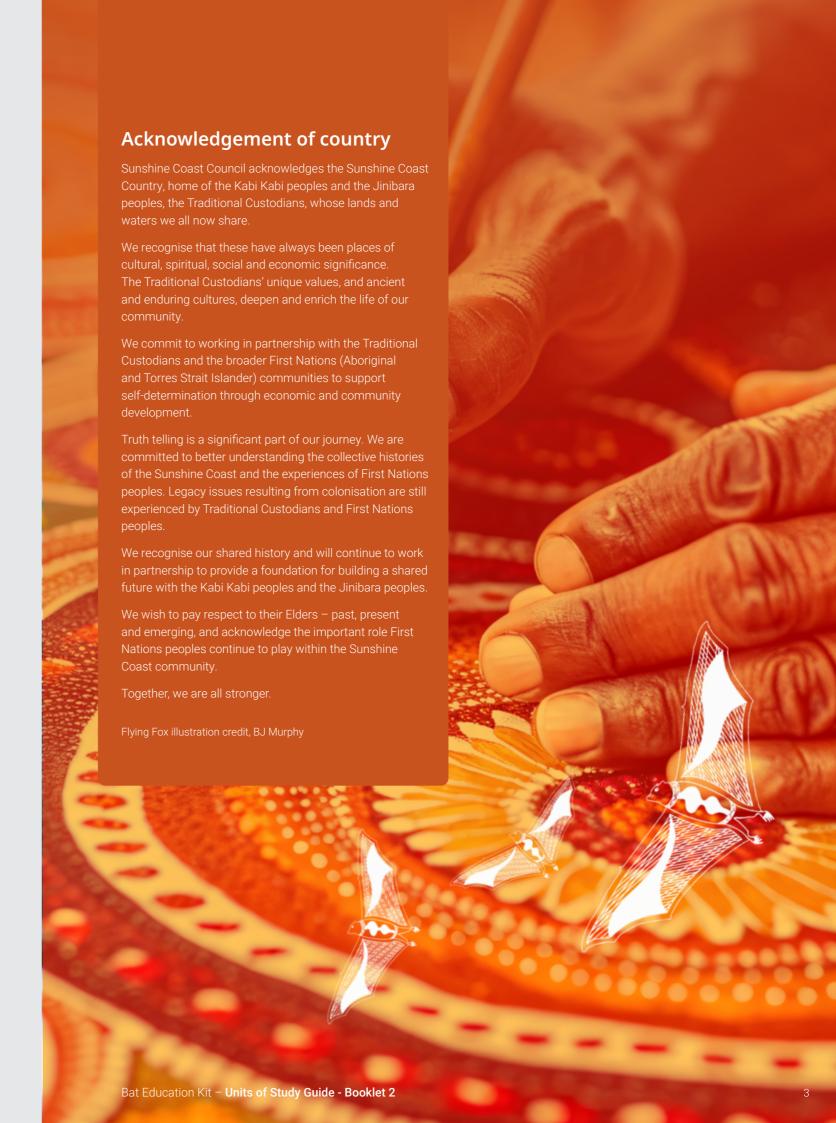








Flying-foxes and micro-bats may carry bacteria and viruses which can be harmful to humans. People who are not trained and vaccinated should not handle bats. If you find an injured micro-bat or flying-fox, do not attempt to help the animal yourself or touch it in any way. Contact the RSPCA hotline (1300 264 625) for assistance.



Units of Study Guide Booklet 2

Sunshine Coast Council

Those Magnificent Flying Mammals!

Bat Education Kit

Explore the captivating world of flying-foxes with our comprehensive 'Those Magnificent Flying Mammals' education materials, consisting of three essential documents: a Teacher's Guide, engaging Units of Study, and invaluable Flying-fox Roost Field Trip information.



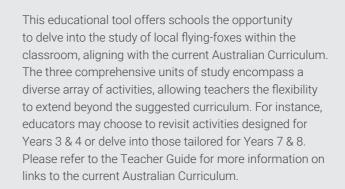
Contents Preface 2 Acknowledgment......3 Introduction 6 What's covered in study unit...... 8 Year 3 & 4......10 Year 5 & 614 Year 7 & 818 Sunshine Coast flying-fox roost sites..... 24 Bat Education Kit - Units of Study Guide - Booklet 2

Introduction

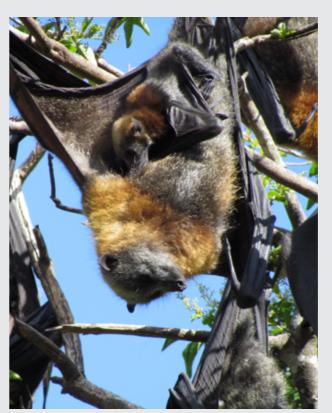
Flying-foxes are the largest flying mammals in Australia, playing a crucial role as keystone pollinator species. Their significance extends to ensuring the survival of our forests and maintaining the overall health of our local ecosystems. While their presence in urban areas can be a source of contention, with some community members recognising their value and offering support, many others highlight negative impacts stemming from their roosting and foraging behaviours.

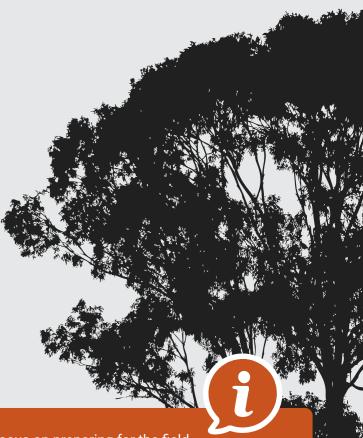


Follow me as I fly through the forest and learn about how important Flying-Foxes are to our whole ecosystem. I'll be your guide through this information kit.



A primary emphasis of these resources is to orchestrate a class excursion to a local flying-fox roost, facilitating firsthand observations in their natural habitat and the collection of relevant data. To ensure a dynamic learning experience, the resource incorporates or recommends a variety of learning media, ranging from podcasts, printed materials, and PowerPoint presentations to factsheets, YouTube videos and books.





Learning activity materials and resources will focus on preparing for the field trip (pre-visit activities), being in the field (field activities), and consolidating learnings after the field trip (post-visit activities). This follows a K-W-L strategy approach, where K focuses on what students know about the topic, W supports students in determining what they want to or need to learn, and the knowledge and experiences they gain from the field work, and L consolidates their learning through K and W expanding into critical thinking and learning opportunities and active custodianship/citizenship experiences.



strategy approach, where K focuses on what students

know about the topic, W supports students in determining

what they want to or need to learn, and the knowledge and experiences they gain from the field work, and L consolidates their learning through K and W expanding into critical thinking and learning opportunities and active custodianship/citizenship experiences.

K-W-L Chart Topic: What I Know: What I Want to Know: What I have Learned:

What's covered in study unit

YEAR level	Overview of Concepts Covered
Yrs 3 & 4	 Characteristics of living and non-living things Life cycles of plants and animals - in particular flying-fox and associated plant species Roles and interactions in food chains Collection of data to develop scientific explanations Record observations and represent these to share with others
Yrs 5 & 6	 Structural features and behaviours of living things enable survival in specific habitats Explore physical conditions of habitats Use of scientific knowledge to make decisions Use equipment to measure and record data
Yrs 7 & 8	 Role of classification Functions of cells as basic units of living things Structure and function of cells for species survival Use of food webs to explore flow of matter and energy in ecosystems Scientific knowledge has an impact on society through ethical, environmental, social and economic considerations Construction of evidence-based arguments to support conclusions
Across all Units of Study	 First Nations peoples have a deep connection to land, waters, skies and community Flying-fox are vital for forest pollination and play an important role in local ecosystems We can all be active stewards for the environment and the plants, animals & fungi that live within it Flying-fox roost sites are important to species survival Due to the decreasing availability of natural habitat as a result of urbanisation and destruction of historic habitat, flying-fox are coming into increasing contact with humans. Flying-fox have unique physical features and behaviours We live in a biosphere



(K)

Years 3 & 4

Year 3 & 4

threats.

Pre-visit (K)

Flying-fox – what do we already know?

Flying-fox

Habitat -

where do we

see them?

Read "Farmers of the Bush" and discuss understanding of flying-fox as a group of animals. Profile a species of flying-fox – what are the different local species? - provide students with a set of questions that they use to research and collect as much information as they can on flying-fox regarding features, needs, lifecycle, habitat needs,

Students present this information to the class in a KWL group discussion on findings – What do we know? What's interesting? What do we want to know more about?

Learn about the important role flying-fox plays in pollinating plants. Find some of flying-fox's preferred flowers and observe pollen under a magnifying glass. Students create a life/food web diagram for a flying-fox showing interactions. Compare life cycles of flying-fox and one of the associated plant species - such as paperbarks or eucalyptus.

- Local area study characteristics and features of the school environment and what's just outside the fence in the local area. Look at plants, soil types, waterways, animals, climate, rainfall, etc. Introduce

 Local
- Can the school environment support a flying-fox living there? Why or why not? What plants and animals are supported? Students create a report profiling the school environment and discussing

why it does or does not support flying-fox.

the concept of Bioregions.

Create a map of the local area highlighting where there is habitat supporting where flying-fox could be found based on ecosystem health. Discuss features of these environments. Discuss features necessary for flying-fox habitat.

Listen to BatPod - an interactive podcast for kids in a "choose-your-own-adventure" format about visiting a roost. Make decisions as a group as you listen.

- Resources
- "Farmers of the Bush" - book & learning materials
- Flying-fox fact sheets for three local flying-fox species

- List of flying-fox significant plant species
- Local mapping
- SCC BatPod podcast

Years 3 & 4

Year 3 & 4



First Nations perspective

Invite a Traditional Custodian of the local Language Nation / Country where your school is located to visit the school and chat with the students. Ask them about the significance of the flying-fox and the local ecosystems, how we can learn from Country and be better custodians of Country through our attitudes and behaviours.

Look for bat related Aboriginal and Torres Strait stories in your library.

stories • First Nations

First Nations bat

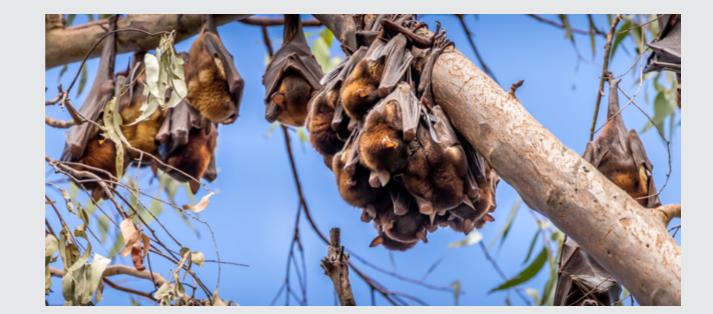
First Nations contacts list

Resources

Threats to flying-fox

Flying-fox are a threatened and endangered species – how did this important forest pollinator end up in this position? Students investigate how the local area / region has changed over time and how those changes have impacted on the flying-fox and its habitat. Discuss the threats that exist to flying-fox. Hold a yarning circle discussion around a series of focus questions for students to answer that explore their views and opinions on the threats to flying-fox and how they would feel if it were to become extinct. What would a flying-fox have to say?

- Historical mapping of local area
- Threats to flyingfox fact sheet
- Yarning circle notes



Years 3 & 4

Year 3 & 4

Resources

Year 3 & 4 Resources

Year 3 & 4			Resources
Field trip (W)	Significant trees for flying-fox	Play the flying-fox Predator Prey game. Discuss the role of flying-fox in moving seeds and pollen around the ecosystem. What species are flying-fox food trees - make a list. Where are they? Students research these trees and gather as much information as they can. Walk the school grounds to see if they are in the school grounds or the local area or in students' backyards. Create a flying-fox herbarium resource. Students find out what they can about their local nature reserve and discuss as a group.	 List of flying-fox significant plant species Plant ID books such as "Mangroves to Mountains", "Noosa's Native Plants" etc School Herbarium instructions Predator Prey Game instructions
	What do we need to find out about?	Check in with students – what do we know, what don't we know, what are we interested in learning more about regarding flying-fox and their habitats. Students prepare inquiry questions for the field trip.	KWL poster
	Visit roost site	Explore the Sunshine Coast Council's BatMap website to locate flying-fox roosts in your local area. Where is the closest flying-fox roost to your school? What are the features of the roost that you can observe from this map? Organise an excursion to visit the roost. Conduct guided field activities in the roost site location – surveys, observations, evidence, measurements, and assessments. Consider nature-journaling.	 Map of local roost Flying-fox Roost Monitoring Form Teacher excursion pack SCC BatMap website Roost Field Guide
	Data collection	Interpret and reflect on data collected – What did we discover? What other inquiry has been sparked? Tabulate and graph findings and interpret – draw conclusions from data.	Flying-fox Roost Monitoring Form

Post-visit (L)	Biodiversity within school grounds	Conduct some of the guided field activities in the school grounds – discuss differences between the roost site and the school grounds – What's the same? What's missing? Create an action plan for the school to improve its habitat integrity and biodiversity.	School map and local area map
	Forage distances	Play the Shrinking Habitat Game – explore flying-fox forage distances, nectar/pollen trees, space requirements, daily activity, seasonal activity, etc. Examine Google Maps for your local area and engage in an activity to determine the distances flying-foxes may travel for foraging from a known roost site. Identify the natural areas within your vicinity that are sufficiently large to sustain flying-fox populations. How do we protect them? Read "Life Upside Down" and explore the suggestions in "How you can help" section. Invite a local Council officer, Ranger or Wildlife Carer into the classroom to discuss local laws and actions to protect flying-fox.	 Shrinking Habitat Game instructions "Life Upside Down" - book
	Habitat Heroes	Habitat Heroes – profile important roles that individuals play in the protection and preservation of flying-fox and healthy ecosystems. Interview them and create films, articles, podcasts, etc. Become a Habitat Hero and create a digital conservation guide for your school community outlining actions to support the health of flying-fox and their habitats.	Habitat Heroes contacts list/ suggestions
	Get your message into the community	As you delve into the study and observation of flying-foxes, have you noticed a shift in your awareness of their role in the ecosystem? Consider pledging your stewardship by making a "Promise to Frankie." Explore creative avenues to inspire others and encourage a positive change in their perspectives towards flying-foxes.	• Promise to Frankie

Years 3 & 4

Years 5 & 6

Year 5 & 6 Resources

Pre-visit (K)	Flying-fox – what do we already know?	Explore the three local species of flying-fox – provide students with a set of questions that they use to research and collect as much information as they can on flying-fox regarding features, needs, lifecycle, habitat needs, threats. Read "Life Upside Down". What are the structural features and adaptations that help them to survive in the environment? Students present this information to the class in a group discussion on findings – What do we know? What's interesting? What do we want to know more about? Explore the wings of bats and the efficiency of flight. How do they compare to other animals that fly? Provide small groups with materials such as newspaper and masking tape to design a set of flying-fox wings to be modelled by one of the group.	 KWL Poster Flying-fox fact sheets for three local flying-fox species "Life Upside Down" book
	Flying-fox Habitat – where do we see them?	Design a map of the local area pinpointing habitats conducive to supporting flying-fox populations, taking into account the overall health of the ecosystem. Discuss features of these environments. Discuss features necessary for flying-fox habitat.	Local mapping



Years 5 & 6

Year 5 & 6 Resources

Pre-visit (K)	First Nations perspective	Invite a Traditional Custodian of the local Language Nation / Country where your school is located to visit the school and chat with the students. Ask them about the significance of the flying-fox and the local ecosystems, how we can learn from Country and be better custodians of Country through our attitudes and behaviours.	First Nations bat storiesFirst Nations contacts list
	Threats to flying-fox	Flying-fox are a threatened and endangered species – how did this important forest pollinator end up in this position? Identify the threats to flying-fox in your area. What are the general community's feelings towards flying-fox. Explore local media for information about high-conflict sites and what measures the Council has taken to keep residents happy.	



Years 5 & 6

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conclusions from data. Students create a report profiling the roost site and discussing why it does

support flying-fox.

Year 5 & 6			Resources
Post- visit (L)	Biodiversity within school grounds	Conduct some of the guided field activities in the school grounds – discuss differences between the nature reserve and the school grounds – What's the same? What's missing? Create an action plan for the school to improve its habitat integrity and biodiversity. Identify a special place or area of significance for flying-fox and undertake custodial responsibilities to look after that site. What needs to be done? Who needs to be involved? Make plans for action.	School map and local area map
	Forage distances	Play the Pollination Game – explore flying-fox forage distances, nectar/pollen trees, space requirements, daily activity, seasonal activity, etc. Consider the threats to flying-fox whilst they fulfill this important ecosystem role. Examine Google Maps for your local area and engage in an activity to determine the distances flying-foxes may travel for foraging from a known roost site. Identify the natural areas within your vicinity that are sufficiently large to sustain flying-fox populations. How do we protect them? Invite a local Council officer, Ranger or Wildlife Carer into the classroom to discuss local laws and actions to protect flying-fox.	Pollination Game instructions
	Habitat Heroes	Habitat Heroes – profile important roles that individuals play in the protection and preservation of flying-fox and healthy ecosystems. Interview them and create films, articles, podcasts, etc. Become a Habitat Hero and create a digital conservation guide for your school community outlining actions to support the health of flying-fox and their habitats.	Habitat Heroes contacts list/ suggestions
	Get your message into the community	Plan and implement a community education program – deliver presentations at school, speak to the local radio, write an article for the local newspaper, create social media posts, develop a podcast, make a movie, etc. Conduct or participate in a tree planting exercise.	

Years 7 & 8

Year 7 & 8 Resources

Pr	e-visit
1	
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Flying-fox
- what do
we already
know?

Explore the classification of flying-fox - what are their scientific names? How are they different from microbats?

Explore reproduction and digestion as specialised aspects of flying-fox.

How could the reproductive cycles and pup survival of flying-fox be affected by climate change?

Discuss the digestive processes of flying-fox as a key to survival. Compare with other nectar, flower and fruit eaters of the forest.

Flying-fox Habitat – where do we see them? Considering the requirements of flying-fox species, make a list of habitat features. Using online aerial mapping, explore areas of the Sunshine Coast that have these features. Are there areas in your school yard or surrounding areas that have - water sources, food trees etc. Look on SCC BatMap website to find flying-fox roosts close to you. Can you identify potential conflicts between these flying-fox roost sites and human activities such as agriculture and urban development? Research and discuss the impact of habitat clearing on flying-fox groups.

Play the "Shrinking Habitat" game and discuss impacts of urban development. What other local fauna and flora species will be impacted by habitat destruction through urban development?

It is widely understood that flying-fox are under threat from a number of issues. What are the impacts of flying-fox roosts being close to residential areas? Is it possible to find solutions to flying-fox and human coexistence using science and technology? Land managers use a range of dispersal and roost management strategies. What are the ethical considerations regarding dispersal methods? What is the role of government in management of community concern, conservation of threatened species and habitat values?

Bat factsheets

SCC BatMap

· Shrinking Habitat

website

game

Year 7 & 8

Years 7 & 8



First Nations perspective

Invite a Traditional Custodian of the local Language Nation / Country where your school is located to visit the school and chat with the students. Ask them about the significance of the flying-fox and the local ecosystems, how we can learn from Country and be better custodians of Country through our attitudes and behaviours.

Resources

- First Nations bat stories
- First Nations contacts list



Years 7 & 8

Year 7 & 8			Resources
Field trip	Significant trees for flying-fox	Embark on an exploration to discover the plant species that flying-foxes require. Create a list of local species and identify those that exist in your school grounds. Explore food webs and understand how these plants play a crucial role in the flow of energy and matter in our ecosystem. Are there spaces in your school that you could conduct a tree plant - to create a habitat for wildlife, and a hub for biodiversity and sustainability?	Flying-fox plant list
	What do we need to find out about?	Check in with students – what do we know, what don't we know, what are we interested in learning more about regarding flying-fox and their habitats. Students prepare inquiry questions for the field trip.	KWL poster
	Visit roost site	Navigate the Sunshine Coast Council's BatMap website to pinpoint flying-fox roosts in your vicinity. Observe changes in flying-fox numbers over time and contemplate the factors influencing these fluctuations. Select a roost site for an on-site visit and initiate a flying-fox count. Develop a map showcasing the roost, your school, and extensive forested areas, investigating the distance flying-foxes cover to reach the forest from the roost site. Organise an excursion to explore the roost, conducting guided field activities within the roost site, encompassing surveys, observations, evidence gathering, measurements, and assessments.	 Map of local roost Roost field guide SCC BatMap website
	Data collection	Explore methods used by scientists to study flying- fox. Develop a selection of hands-on activities you can do at your roost field trip - such as field observations, nature journaling, data collection and analysis. Highlight the role citizen-scientists can play. Discuss the role of research in understanding flying- fox behaviour and ecology.	 iNaturalist maps Bats in Backyards Scientific observations ideas factsheet

Year 7 & 8		Resources	
Post- visit (L)	Biodiversity within school grounds	After looking at the flora/plant species at the flying-fox roost site, can you identify similar species in your school grounds? Do you have extensive gardens? Are they mostly native or exotic? Conduct field observations and collect data on the types of birds, lizards, insects and mammals you see in your school ground. Consider making these observations at different times of the day. Can you build a school data base that others can add to over time so that you can track the increasing biodiversity in your local area. What additional actions can you take to improve or increase the biodiversity within the school grounds?	Flora and fauna identification books, apps and websites
	Living in harmony	As a group, decide on who the stakeholders are when considering living in harmony with flying-fox and humans. For example: flying-fox, flowering gums, residents, scientists, farmers, koala etc. Conduct a yarning circle where everyone's voice is heard and role-play each of these characters and explore what would happen if flying-fox were not in the ecosystem? How can we find solutions together to live in harmony?	Yarning circle instructions
	Get your message into the community	Devise and execute a community education initiative, involving activities such as delivering presentations at your school, engaging with the local radio, crafting articles for the community newspaper, creating informative social media posts, developing podcasts, or even producing a short film. Additionally, consider organising or participating in a tree planting exercise to contribute actively to habitat restoration efforts.	



Roost visits

Embarking on a school excursion to observe a flying-fox roost site offers students a unique and immersive learning experience. Witnessing these fascinating creatures in their natural habitat fosters a deeper understanding of biodiversity, ecosystems, and the crucial role flying-foxes play in maintaining ecological balance. The firsthand observations enhance scientific skills and spark curiosity about the interconnectedness of nature. Moreover, the excursion encourages environmental stewardship, as students gain insights into conservation challenges and solutions. This memorable journey not only aligns with the curriculum but also instils a sense of responsibility and appreciation for the environment in each participant.

During the roost visit, students will actively engage in a variety of hands-on activities designed to deepen their understanding of flying-foxes and their habitats. These on-site experiences aim to foster direct connections with nature, promote scientific observation skills, and instill a sense of responsibility towards wildlife conservation. Through these activities, students will have the opportunity to explore the rich biodiversity of the roost site, enhance their ecological awareness, and develop a profound appreciation for the vital role flying-foxes play in sustaining our local ecosystems.

Sunshine Coast flying-fox roost sites

Here are four roost sites on the Sunshine Coast suitable for school visits:

- Andrea Ahern Bushland Park
 Teranna St, Battery Hill.
 Grey-headed Flying Fox (GHFF), Black Flying Fox (BFF).
 Maternity site.
- Emerald Woods Environmental Area
 Goonawarra Drive, Mooloolaba.
 Little Red Flying Fox (LRFF), Grey-headed Flying Fox (GHFF), Black Flying Fox (BFF).
- Kuluin Neighbourhood Park
 Tallow Wood Dr, Kuluin
 Grey-headed Flying Fox (GHFF), Black Flying Fox (BFF).
- Tesch Park
 Coral St, Maleny
 Grey-headed Flying Fox (GHFF), Black Flying Fox (BFF).
 Nationally significant maternity site.

For more detailed information about the individual sites, including safety and planning, please refer to the Field Trip Guide (booklet 3).





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