

Teaching About Flying Foxes and Microbats

Human relationships with Flying Foxes & Microbats

Purpose and Structure of this Teaching Resource

Education plays a significant and unique role in constructing public understanding and opinion about Bats, as well as informing policy. Therefore, we developed this teaching resource to support educators who would like to introduce 'Bats' (Flying Foxes and Microbats) to their students while teaching required aspects of the Australian Curriculum. There are three Senior resources that offer teaching suggestions for embedding the teaching and learning about bats throughout the 11 and 12 curricula. These include: Supporting Native Animal Welfare; Flying Fox and Human Relationships; Flying Foxes and Why they are Important. Our goal is to assist you with teaching suggestions: linked to the Australian Curriculum; that provide background scientific information; that offer activity specific teaching resources; and that present a vast array of web-links all relating to the teaching and learning of Bats.



As you will see in our *Notes for Teachers* (below), Flying Foxes are considered by scientists to be a keystone species (one of the most important species in an ecosystem), and yet in Australian culture, Flying Foxes [are misunderstood and vilified](#). Therefore, we developed these educational resources for Year 11 and 12 to promote scientific, as well as Health & Safety knowledge about Bats, and we invite students to challenge erroneous social stereotypes promoted in Australian media and wider society.

This educational resource is structured in the following way:

- An overview of each activity and their links to the Australian Curriculum (our curricular links are not definitive, as you may identify other Content Descriptors these activities are transferable to);
- Scientifically-based background *Notes for Teachers* about Flying Foxes and Microbats;
- A detailed outline of each activity that includes resources and discussion points to guide learning;
- An extensive online resource list; and
- Attachments of the printable resources suggested for the activities.

This teaching resource was developed by Australian teachers, for Australian teachers, and so we *do* understand that it can be difficult introducing controversial concepts into classrooms. We celebrate your commitment to ecological sustainability, and we stand beside you in your decision to advocate and education for change, not only for these important and wonderful mammals, but for wider Australian Ecosystem. Even though these teaching suggestions present factual information, we believe it is essential for students to emotionally connect with bats in order for them to be open to learning and making a difference. The following videos illustrate how cute and wonderful Flying Foxes and Microbats are! We hope you enjoy this resource.



<https://www.youtube.com/watch?v=T84jdO8YrYA>
<https://www.youtube.com/watch?v=Uuvaos1WHTk>
<https://www.youtube.com/watch?v=T84jdO8YrYA>
<https://www.youtube.com/watch?v=aMuWgN2DVD4>
<https://www.youtube.com/watch?v=Io3yl0OhTSY>
<https://www.youtube.com/watch?v=2GncgfPNNms>

This teaching resource was written by Dr. Ali Sammel (a.sammel@griffith.edu.au) and Tara Hart.

Please reference Dr Alison Sammel when using this material.

Activity Summary

This concept-based teaching suggestion looks at the keystone species of Flying Foxes and is designed to enhance students' understanding of these protected native mammals.

These concept-based teaching suggestions are designed to help students learn about the role of the Flying Fox in our ecosystem through scientific, legal and statistical viewpoints. It provides the opportunity to deconstruct the concept of the Flying Fox as a 'socially or legally constructed' ecological risk.



Flying Foxes have coevolved with the Australian landscape for over 40 million years, which means have they developed important relationships with our native trees (which only release their flowers' pollen at night, specifically for the Flying Foxes to pick up), and with the humans who have lived on this magnificent land. The activities in this document highlight historical and contemporary relationships bats have with humans living in Australia.

Activity 1 (suggested for Modern History, English, and English as an Additional Language or Dialect)

Through research and role plays, students immerse themselves in their community to explore various relationships with Flying Foxes. Initially, students will be asked to investigate local Aboriginal or Torres Strait Islander understandings about Flying Foxes. Students will then be asked to reflect on their own relationships with Flying Foxes, and then that of the wider community. Students will synthesis the findings of their research and present them through their character in the class role play activities.

Activity 2 (suggested for Modern History, English, English as an Additional Language or Dialect, Essential English, and Literature)

Maralinga in South Australia was the home to top secret, nuclear weapons testing in 1956-1963. In this activity students are invited to engage in higher order thinking to evaluate historical information. Students are asked to investigate the historical events at Maralinga and explore the consequences on Aboriginal residents of the area; the native flora and fauna; or the ecosystem's food web. Students are asked to develop their own 400-600-word (3-4 minute) news review script to communicate their findings (noting the emphasis they deem most important). The script can be written, spoken, multimodal, and in print or digital/online.

Activity 3 (suggested for English, English as an Additional Language or Dialect, Essential English, Literature and Earth & Environmental Sciences)

The numerous heat waves in recent years have had catastrophic effects on Flying Fox populations, with many dying from these extreme weather events. Students asked to first investigate scientific facts about heat stress in Flying Foxes and create their own multimedia information report. Once this is completed, students engage in a class in response to questions they have posed to them regarding language use and manipulation, as well as any newly acquired knowledge or perceptions about bats.

Activity 4 (suggested for English, Geography, and Philosophy and Reasoning)

Students undertaking deductive and inductive arguments about human and climate change factors that are leading to mass Flying Fox deaths in Australia. This activity will explore a case study that occurred in Cairns, Qld. In groups, students are asked to formulate topic questions and then research and respond to these questions as they relate to an ABC newspaper report. Students will be asked to focus on understanding and developing direct (deductive) and indirect (inductive) arguments.

Australian Curriculum Senior Secondary Curriculum

These learning activities can be linked into the following subjects and units:

English

- Unit 1 - Explore how meaning is communicated through the relationships between language, text, purpose and audience.
- Unit 2 - impact of language and structural choices on shaping own and others perspectives.
- Unit 3 - Analyse and evaluate how the conventions of texts influence responses including how responses to texts may change over time and in different cultural texts.

English as an Additional Language or Dialect

- Unit 1 - Investigate how language and culture are interrelated and expressed in a range of contexts.
- Unit 2 - Analyse how point of view shapes audience response.
- Unit 3 - Comprehension skills and strategies including framing research questions to direct inquiry and synthesising information from multiple sources, including literary and non- literary texts.

Essential English

- Unit 1 - Comprehend and respond to the ideas and information presented in texts drawn from a range of contexts.
- Unit 2 - Consider the ways in which main ideas, values and supporting details are represented in social, community and workplace texts.
- Unit 3 - Consider how different perspectives and values are presented in texts including the relationships between context, purpose, and audience, and the impact on meaning in social, community and workplace texts.

Literature

- Unit 1 - Develop knowledge and understanding of different ways of reading and creating literary texts drawn from a widening range of contexts. Analyse the relationships between language, text, contexts, individual points of view and response.
- Unit 2 - the ways in which text structures, language features and stylistic choices provide a framework for audiences' expectations, responses and interpretations.
- Unit 3 - Evaluate and reflect on how representations of culture and identity vary in different texts.
- Unit 4 - Critically evaluate own and others' justifications, evidence and points of view.

Earth & Environmental Sciences

- Unit 4 - The changing Earth - the cause and impact of Earth hazards and whether human activity is attributable to climatic conditions.

Modern History

- Unit 4 - The modern world since 1945 with particular reference to foreign policy and nuclear testing at Maralinga.

Geography

- Unit 2 - The process of urbanisation and its implication for human wellbeing and urban and rural places
- Unit 3 - Land cover transformations. The differences in the process of land cover change between countries due to factors such as government policy, institutional arrangements, land ownership, type of economy, ideology and culture, in addition to the range of physical factors.

Queensland QCAA Senior Secondary Curriculum

Philosophy & Reasoning

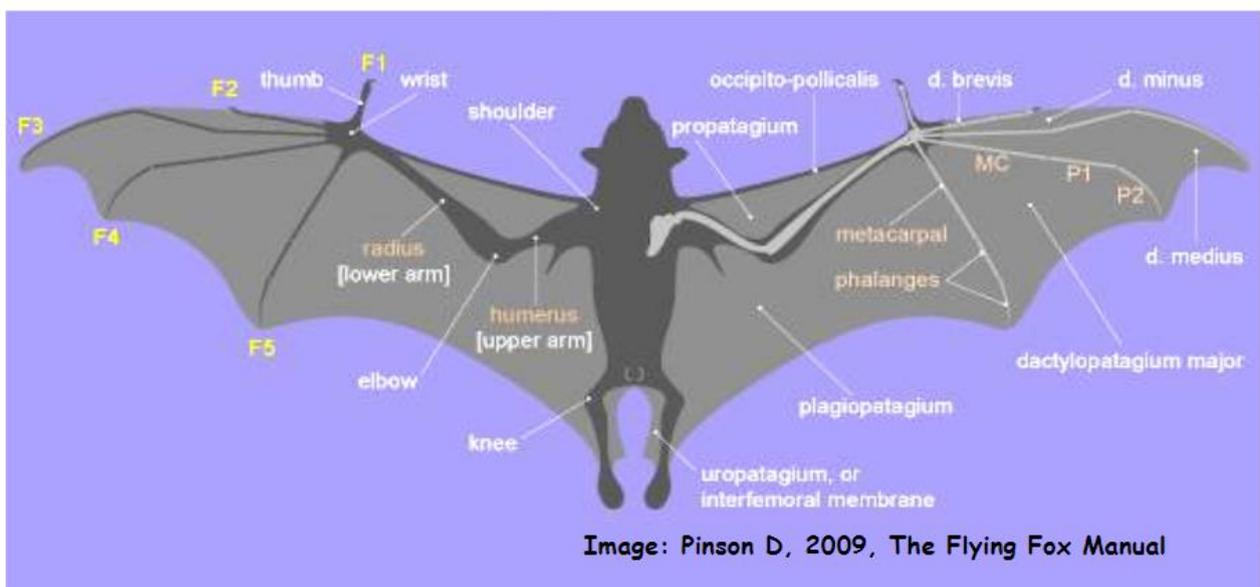
- Topic 1 - Fundamentals of philosophy and reasoning. An argument, in philosophical terms, is an intellectual process whereby a connected series of statements are intended to establish a proposition. To assess an argument is to assess a truth claim and is therefore foundational to both the process of critical inquiry and our knowledge about the world.

Background notes for Teachers about Flying Foxes and Microbats

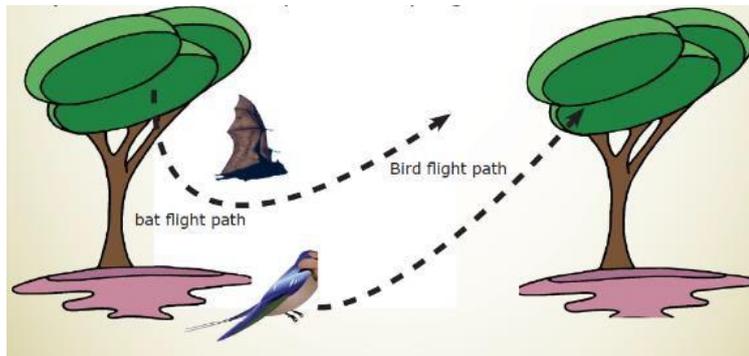
For far too long, bats have instilled fear and inspired bad omens in many cultures around the world. Vilified in the media, these deeply misunderstood and misrepresented creatures are incredibly unique animals that play a vital role in Australia's ecosystem. In a world where attitudes towards sustainability are continuously changing and evolving, it is vital that students of today move away from misinformed historical stereotypes in order to develop a strong understanding and appreciation for this amazing creature, the only mammal capable of sustained flight.



There are over 1000 different species of bats worldwide. Bats are classified into two major groups: Flying Foxes and Microbats. Both share many similarities with humans: they have a similar skeletal structure (they have elongated fingers, not wings that they fly with), are warm-blooded, give birth and suckle their young, are devoted and caring mothers and even leave their children (called pups) at 'childcare' as they go in search of food! Most species can only give birth



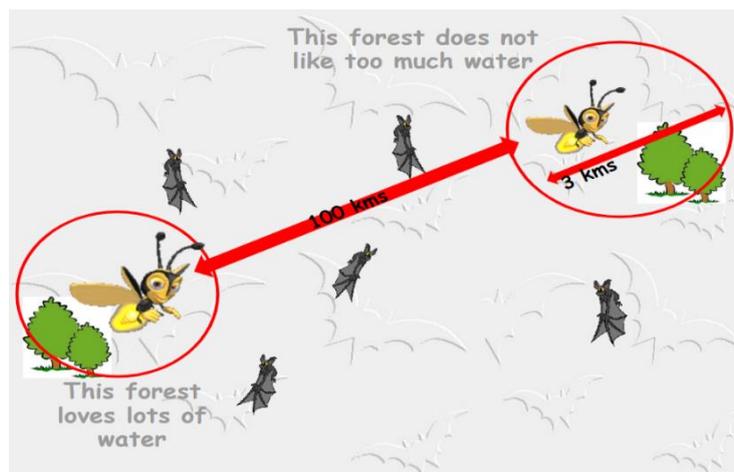
to one pup per year. Infants are carried everywhere by their mothers and suckled for up to five months. Bats are not aggressive animals. Bats do not 'swoop' or 'attack'. If spooked, a bat will fly away but because they have hands and fingers rather than wings, they must drop or fall in order to catch the wind that will provide them with the lift necessary to sustain their flight.

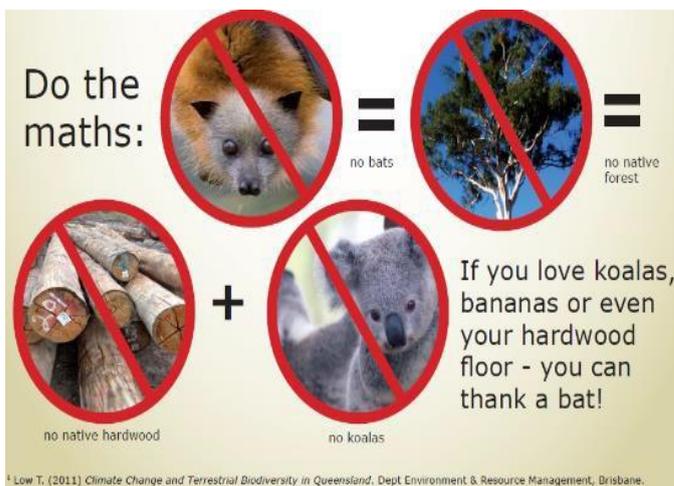


Flying Foxes or Megabats, are the largest sized bats (they also used to be known as Fruit Bats, but Flying Fox is the term that is used today). A Flying Fox has extremely good eyesight (the same as ours during the day and 25% better at night) and hearing and use these, and their strong sense of smell, to navigate the world. They are not blind and do not use echolocation. Flying Foxes are a keystone species in Australia meaning they are one of the most vital animals in our ecosystem. Flying Foxes play a key role in ensuring we have healthy coastal forests. Australian native trees reproduce by releasing and accepting pollen for fertilisation. After a flower on a tree is fertilised via pollination, the new genetic materials combine to produce seeds that then need to be distributed to other locations, away from the parent trees. Flying Foxes play an essential role in these processes. The study of science reveals that Flying Foxes and our native forests work together in an amazing and unique way that enhances the process of forest reproduction. Our native trees only release their flowers' pollen at night, specifically for the Flying Foxes to pick up. Flying Foxes have the exact soft belly fur needed to collect and carry as much pollen as possible while they fly from flower to flower. As the Flying Foxes move from flower to flower, drinking nectar, they pass along the pollen they collect on their bellies. This process fertilises the plant's flowers. Bees also do this role: however, as pollination occurs at night, Flying Foxes are more effective.



Furthermore, bees can only travel up to three kilometres and so cannot introduce new genetic material from other forest locations. The Flying Fox can travel over 100 kilometres per night and can fly from one forest to another, introducing new genetic material that will strengthen the resilience of the new generation of forests. Indeed, it is predicted that Australia's forests will only survive climate change due to Flying Foxes introducing new genetic material to the next generation of trees. For example, one forest might not like much water, and a bee will keep that gene pool the same, but a Flying Fox might fly from a forest that likes lots of water, 100 kilometres away, and introduce this new gene to the area. In doing so, the new generation of trees in that forest will be resilient to both drought or flood conditions.





Not only do Flying Foxes pollinate our native forests, they also eat the seeds from the fruit and disperse them to new areas so that the young trees can grow. Other animals do this, but a Flying Fox can digest the seed in a way that does not harm the seed, and when it is excreted, it can grow into a new plant. The process of chewing and digestion in other animals can ruin the seed, making it unviable for growth. A Flying Fox can distribute up to 3000 seeds in a single night! Their role as a keystone species means that Australian tree species, all Australian mammals such as koalas who seek shelter and food in these trees, Australian fruit trees and the Australian hardwood industry are all reliant upon the existence of the Flying Fox. In this way, humans are also dependent on Flying Foxes via the forests they sustain, as the forests supply us with oxygen, food and resources.

The second category of bat in Australia is the Microbat. This small bat plays an equally important role in the Australian ecosystem. Unlike the Flying Fox, the Microbat has extremely bad eyesight and relies on echolocation for travel and food. Microbats are insectivorous and can catch up to 500 insects per hour. The Microbats' incredible ability to consume large numbers of insects such as mosquitos and fruit flies means that life would be far less tolerable for both humans and plant species without them. It is interesting to know that Microbat boxes are being installed by universities, schools, farmers and the general public to reduce the use of pesticides within the environment and eradicate mosquito related diseases such as ross-river fever.



Considering the key role both Flying Foxes and Microbats play in Australia's ecosystem, it is unfortunate that the biggest threats to the species are habitat loss and ignorance and misinformation leading to poor human perception. People usually hold the misconception that bats carry lots of diseases. This is untrue. Science shows that there is only ONE disease that a human can catch from a bat: the Australian Bat Lyssavirus (ABLV). It is a form of rabies, but it is really, really rare. There have only been three reported cases in Australia. ABLV is very rare in the bat community, and most bats that contract this disease leave the colony and die within a few days. A person would have to be bitten by a bat within a small window of time (within those few days) to become infected. Therefore, the World Health Organisation considers it one of the rarest diseases on the planet! Contact with bat excrement, bat-eaten fruit, or having a bat fly above you will NOT transmit this disease. However, if bitten or scratched by ANY bat, all Australian government departments and bat groups strongly recommend people go to the hospital where they will receive a series of three post-bite injections (free of charge) that will ensure they do not get ABLV. There is no reason why any person should contract or die of ABLV as injections are available in Australia to stop this disease. If you do catch ABLV and do not receive the injections, you WILL die. It is important that students learn that if bitten or scratched by ANY animal, they must tell an adult, and if it is a bat, they should get the injections from the hospital.

It would be interesting to look at the Australian Bureau of Statistics to see the statistics associated with animal related deaths. This investigation would highlight that horses, cows, dogs and cats are dramatically more likely to cause human deaths than bats are. However, the most important message that students need to learn is: never touch a sick or injured bat, tell an adult if you get bitten or scratched by a bat and if you find a bat, it is best to notify your local bat (or animal) rescue and conservation organisation

The most important message that students need to learn is: never touch a sick or injured bat, tell an adult if you get bitten or scratched by a bat. If you find a bat, notify your local bat (or animal) rescue organisation.



Activity 1 (suggested for Modern History, English, and English as an Additional Language or Dialect)

This learning suggestion can be modified to fit within the learning requirements of the specific unit you are presently working on:

Geography

Unit 3 - Land cover transformations. The differences in the process of land cover change between countries due to factors such as government policy, institutional arrangements, land ownership, type of economy, ideology and culture, in addition to the range of physical factors.

English

Unit 1- Explore how meaning is communicated through the relationships between language, text, purpose and audience.

Unit 2- The impact of language and structural choices on shaping own and others perspectives

English as an Additional Language or Dialect

Unit 1- Investigate how language and culture are interrelated and expressed in a range of contexts.

Unit 2 - Analyse how point of view shapes audience response.

Essential English

Unit 1- Comprehend and respond to the ideas and information presented in texts drawn from a range of contexts.

Unit 2 - Consider the ways in which main ideas, values and supporting details are represented in social, community and workplace texts.

Literature

Unit 1 - Develop knowledge and understanding of different ways of reading and creating literary texts drawn from a widening range of contexts. Analyse the relationships between language, text, contexts, individual points of view and response.

Unit 2 - the ways in which text structures, language features and stylistic choices provide a framework for audiences' expectations, responses and interpretations.

Through research and role plays, students immerse themselves in a community discussion about a proposed development that will result in the destruction of a local forest that is home to a Flying Fox colony.

Students will explore the perspectives of various local citizen groups including connecting with the local Indigenous community to understand relationships humans have with Flying Foxes. Students will engage in their own research and this may include the attached Dreaming story. Students will present the findings of their research through their character in the class [role play activity](#).



This activity may form part of the informal assessment requirements of the unit through the class discussion at the end of the activity, where students reflect on their learning and the significance to society on the changing face of their local ecosystem.

1. To understand the historical relationship Flying Foxes have had with humans, it is important for students to research local Aboriginal or Torres Strait Islander knowledge about Flying Foxes. This knowledge, if it is able to be shared, may be passed down through [dreamtime stories](#). These stories can be told, sung or communicated through various forms of art. Students are encouraged to connect with their local Aboriginal or Torres Strait Islander community and find out about any stories that can be shared about Flying Foxes or Microbats. If this is not possible, please use the story below.

Show students the the painting 'Kalben and Walkan - Aw' and have them form small group reading circles to share the dreaming story (attached reference 1) <http://gallery.aboriginalartdirectory.com/aboriginal-art/arthur-koekka-pambegan-jnr/kalben-bone-fish-story-place-and-walkan-aw-sacred.php>

2. Invite in someone from the local Aboriginal or Torres Strait Islander community to talk with the students about the historical and contemporary relationship they have with the local native flora and fauna. Ask students to write a written reflection on their relationship with these same species, with particular focus on Flying Foxes. If students do chose to contact their local Aboriginal Elders, invite them to read 'Respect for Elders and Culture' to help them better understand how to respect cultural engagement and processes: <https://www.creativespirits.info/aboriginalculture/people/respect-for-elders-and-culture>
3. Once students have generated an understanding of how they relate to Flying Foxes and the natural environment around them, the students are asked to research why scientists and Governments believe Flying Foxes are important to Australian ecosystems. For more information please see:
 - <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/importance.html>
 - <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-law>
 - http://www.nwc.org.au/wp-content/uploads/2016/12/Flying_Fox_Article_June2010.pdf
 - <http://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/native-animal-facts/flying-foxes>
4. Once they have this scientific understanding of Flying Foxes, students are asked to think about how their wider local community views Flying Foxes. This concept will be investigated through a role play. To understand these varying community perspectives, students will participate in a [role play activity](#) where they take on community characters to learn varying perspectives within the community.
5. Allocate role play characters, to enable students to tailor their research to their character. You may wish to allocate this research as homework and to continue this learning process the following week.

Students will use geographical and inquiry skills to investigate these circumstances; judge the reliability and usefulness of sources and the value of different kinds of evidence; explore different interpretations and representations; and use a range of evidence to support and communicate an argument as it pertains to the values and beliefs of their character.

A list of reliable primary and secondary sources is attached below. This list is not exhaustive, and some characters may need to investigate news articles and other sources to allow them to better understand their character, and their point of view. Certain resources will better suit particular characters within the role play. Through this activity, students will have the opportunity to discuss their points of view with their peers and

they will need to critically evaluate the information they gain, as it pertains to their character.

** If you wish to take this activity further, you may choose to invite members of the community into your role play, to play themselves, to generate a more authentic learning experience. Some community members you may wish to consider could include Aboriginal Elders, elected representatives and animal welfare representatives.

5. Students prepare a [Character Analysis](#) which is to include a bibliography and acknowledgement of whether sources are primary or secondary, and should address the following considerations:
 - What does the character see the problem to be? (e.g. government or community opinion about Flying Foxes and the land cover)
 - How does the character think and feel about the problem?
 - What is the character's likely reaction to the problem?
 - How will the character feel about the outcome of the problem?
6. Once character analyses are complete, have students undertake the role play activity where they respond to what the Uber driver heard.
Students walk around the space and 'chat' about the topic with one person and then move to another person and start another conversation.



Begin with a teacher in Hot Seat scenario (you may like to wear a hat or scarf - something to indicate when you are 'in character').

In character, introduce yourself to students as a local,

Uber driver who is sharing some information he

overheard when driving a new to town passenger around yesterday. Tell students you

overheard this person talking on their phone about how that scrappy old bushland on the side of town would be a great development plot, if he could get his hands on it. Talk about the Flying Fox colony that live out there and how you understand that to some people, Flying Foxes are considered a pest, but that others believe Flying Foxes to be really important to the survival of native forests throughout Australia.

In the role play activity the students are invited to ask questions to clarify what the Uber driver may have heard and to share their opinions (in character).

7. While 'in character' ask the students to watch a (14 minute) video explaining the importance of Flying Foxes to the Australian ecosystem, and after the video, ask the student to respond 'in-character'.



<http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>

8. Once the activity finishes, deconstruct both role plays with the students. Questions may include:
 - a. did the opinions of the characters change, what were the key understandings both before and after watching the video, 'No Tree, No Me'?
 - b. what information in the video specifically generated this change?
 - c. did this information alter the underlying motivations of individuals?
 - d. what might be the short- and long-term consequences of this change within the community.
9. Students create a written reflection about the affect language and underlying belief systems had on shaping their character's opinions and those of others. In this text, students are to consider their own use of text structures, language features and stylistic choices to respond to their experiences in this learning sequence.

Suggested Resources

- In Defence of the Flying Fox <http://www.abc.net.au/catalyst/stories/3000668.htm> (10.13)
- Pearson, T., 2013. TEDx Talk 'No Tree No Me' <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>
- 'Respect for Elders and Culture': <https://www.creativespirits.info/aboriginalculture/people/respect-for-elders-and-culture>

Activity 2 (suggested for Modern History, English, English as an Additional Language or Dialect)

Essential English, and Literature)

This learning suggestion can be modified to fit within the learning requirements of the specific unit you are presently working on:

Modern History

Unit 4 The modern world since 1945. Two Historical Knowledge topics relevant to these teaching concepts include:

*The evolving nature and character of the Cold War in Europe and the Asia-Pacific from 1948 through to détente, including the arms race and threat of nuclear war, and the new Cold War of the 1980s

*The involvement of Australia in the Cold War, with particular reference to foreign policy, nuclear testing at Maralinga, and the war in Vietnam

English

Unit 1 Explore how meaning is communicated through the relationships between language, text, purpose and audience.

Unit 2 The ways ideas, attitudes and voices are represented, for example, how events are reported differently in the media

Unit 3 Analyse and evaluate how the conventions of texts influence responses including how responses to texts may change over time and in different cultural texts.

English as an Additional Language or Dialect

Unit 1 Investigate how language and culture are interrelated and expressed in a range of contexts. *Unit 3*

Comprehension skills and strategies including framing research questions to direct inquiry and synthesising information from multiple sources, including literary and non-literary texts.

Essential English

Unit 1 Comprehend and respond to the ideas and information presented in texts drawn from a range of contexts.

Unit 3 Consider how different perspectives and values are presented in texts including the relationships between context, purpose, and audience, and the impact on meaning in social, community and workplace texts.

Literature

Unit 1 Develop knowledge and understanding of different ways of reading and creating literary texts drawn from a widening range of contexts. Analyse the relationships between language, text, contexts, individual points of view and response.

Unit 3 Evaluate and reflect on how representations of culture and identity vary in different texts and forms of text.

Introduce the lesson to students with the following statement: *Why did Australia consent to Britain testing their atomic weapons on Australian soil and what effect did this testing have to the local Indigenous residents and the native flora and fauna?*

Students will use historical skills to investigate these events; judge the reliability and usefulness of sources and the value of different kinds of

Aboriginal man's story of Maralinga nuclear bomb survival told with virtual reality

7:30 | By Alex Mann
Updated 7 Oct 2016, 11:49pm



VIDEO: The art 3D film technology is bringing an Aboriginal man's unique tale of nuclear bomb survival to audiences (7:30)

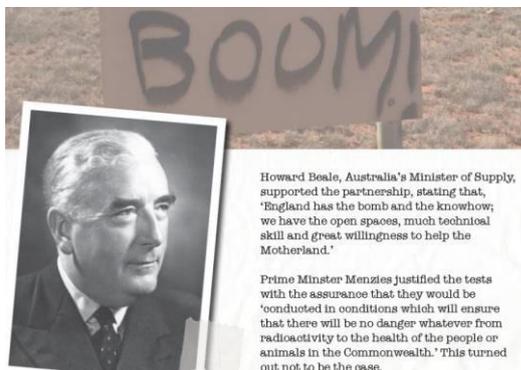
evidence; explore different interpretations and representations; and use a range of evidence to support and communicate an historical argument.

1. Show students this site video of an Elder from the deserts surrounding the Maralinga atomic bomb test: <http://www.abc.net.au/news/2016-10-07/aboriginal-mans-story-of-nuclear-bomb-survival-told-in-vr/7913874>

2. This second video is a recount from two Maralinga atomic bomb test survivors talking about their experiences - an Aboriginal man and a serviceman : www.CreativeSpirits.info, Aboriginal culture - History - Maralinga: How British nuclear tests changed history forever: <https://www.creativespirits.info/aboriginalculture/history/maralinga-how-british-nuclear-tests-changed-history-forever#ixzz4noKlvtor>



3. Students individually formulate a question to guide an inquiry to investigate historical events



and their consequences on Indigenous residents of the area or the native flora and fauna. Show students the following quotes from Australia's then Minister of Supply, Howard Beale, and Prime Minister, Robert Menzies and have them evaluate how language has been used or manipulated to communicate a specified viewpoint and potentially serve an agenda.

Beale: *"England has the bomb and the knowhow; we have the open spaces, much technical skill and great willingness to help the Motherland"*

Menzies: justified the tests with the assurance that they would be *"conducted in conditions that will ensure that there will be no danger whatever from radioactivity to the health of the people or animals in the Commonwealth"*.

4. There are currently seven species of insectivorous Microbats identified on Maralinga-Tjuratja lands.

Mollossidae	# <i>Mormopterus</i> species 3 "little penis" (Inland Freetail-bat)
	# <i>Tadarida australis</i> (White-striped Freetail-bat)
Vespertilionidae	<i>Chalinolobus gouldii</i> (Gould's Wattled Bat)
	<i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)
	<i>Nyctophilus</i> sp.
	<i>Nyctophilus timoriensis</i> (Greater Long-eared Bat)
	<i>Scotorepens balstoni</i> (Inland Broad-nosed Bat)
	<i>Vespadelus baverstocki</i> (Inland Forest Bat)



For more information about [Microbat populations on the Maralinga-Tjuratja lands](https://data.environment.sa.gov.au/Content/Publications/Maralinga-Tjuratja_BioSurvey.pdf) please see: https://data.environment.sa.gov.au/Content/Publications/Maralinga-Tjuratja_BioSurvey.pdf (Specifically, pages 15, 27-28, 90, 94, 96, 98-100, 103-104 - attached as Resource 5).

For more information about Microbats please see:

- <http://education.abc.net.au/home#!/media/29916/scientists-study-suburban-microbats>
- <https://www.ehp.qld.gov.au/wildlife/animals-az/micro-bats/>
- <http://www.allaboutbats.org.au/micro-bats/>
- <http://bats.org.au/about-bats/microbats.php>
- <http://wildcare.org.au/species-information/bats/>

5. Based on the above information, use [reliable online sources](#) to undertake an investigation of the following suggested research topics:

- Habitat loss / land rights (people and animals)
- Loss or poisoning of food web - negative impacts on people, fauna (e.g. **insectivorous microbats**) and flora.
- Investigate Microbats and use this information to speculate what influence nuclear testing might have had to the Microbat populations living on the Maralinga-Tjuratja lands.
- Explore the assumption of anthropocentrism:
 - It is not only humans who have been affected - what rights have been awarded to the plants/non-animals?
 - Compare [legal policies that apply to Maralinga](#) to the recent court decisions in [New Zealand and India to give legal personhood to three river catchment areas](#).
 - [Maralinga and the natural environment](#): who speaks for the environment?
- Why was priority given to the government's foreign (British) relationships over their relationship with Indigenous Australians and concern for the wellbeing of the South Australian environment?

6. Students develop their own 400-600-word (3-4 minute) news review script to communicate the findings reporting this story noting the emphasis they deem most important. The script can be written, spoken, multimodal, and in print or digital/online.

- Students should evaluate the ways in which texts have represented different perspectives of culture and identity from all parties involved.

Suggested Resources

- Black Mist Burnt Country. Testing the Bomb: Maralinga and Australian Art_ http://blackmistburntcountry.com.au/wp-content/uploads/2017/09/BMBC_Edu-Resource-web.pdf
- Mann, A, 7 Oct 2016 Aboriginal man's story of Maralinga nuclear bomb survival told with virtual reality_ <http://www.abc.net.au/news/2016-10-07/aboriginal-mans-story-of-nuclear-bomb-survival-told-in-vr/7913874>
- Gorman, A, 8 Nov 2017, From the Nullabor to the nuclear age: what fossils reveal about south Australia's past, The Guardian <https://www.theguardian.com/science/2017/nov/08/from-the-nullabor-to-the-nuclear-age-what-fossils-reveal-about-south-australias-past>
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- Stokes, B Nuclear Australia <https://nuclearnewsaustralia.wordpress.com/>
- Maralinga's radioactive fallout still blowing in the wind <https://nuclearnewsaustralia.wordpress.com/2009/10/02/maralingas-radioactive-fallout-still-blowing-in-the-wind/>
- Maralinga radioactive dust - then and now <https://nuclearnewsaustralia.wordpress.com/2009/10/06/571/>
- Aboriginal History Inc, Vol 23 1999 <http://press-files.anu.edu.au/downloads/press/p72831/pdf/book.pdf?referer=1065>

- Teacher Resource - Maralinga: The Anangu Story, by the Oak Valley and Yalata communities, with Christobel Mattingley
http://lib.oup.com.au/secondary/english/Oxford_English/1/01_MPS_EL1_Maralinga.pdf

Activity 3 (suggested for English, English as an Additional Language or Dialect, Essential English, Literature and Earth & Environmental Sciences)

This learning suggestion can be modified to fit within the learning requirements of the specific unit you are presently working on:

English

Unit 1 Explore how meaning is communicated through the relationships between language, text, purpose and audience.

Unit 2 The ways ideas, attitudes and voices are represented, for example, how events are reported differently in the media

English as an Additional Language or Dialect

Unit 1 Investigate how language and culture are interrelated and expressed in a range of contexts.

Essential English

Unit 1 Comprehend and respond to the ideas and information presented in texts drawn from a range of contexts.

Unit 4 Evaluating the evidence upon which different views are based and how texts use language to appeal to the beliefs, attitudes and values of an audience.

Literature

Unit 1 Develop knowledge and understanding of different ways of reading and creating literary texts drawn from a widening range of contexts. Analyse the relationships between language, text, contexts, individual points of view and response.

Unit 4 Critically evaluate own and others' justifications, evidence and points of view.

Earth & Environmental Sciences

Unit 4 The changing Earth - the cause and impact of Earth hazards and whether human activity is attributable to climatic conditions.

In this lesson students will create an information report for the media about Flying Foxes and heat stress events. Once they have completed their own article, students will then be asked to present their findings and compare and contrast their story with mainstream media reports. Student will be asked to reflect and analyse the way attitudes and events can be reported differently through the media.

1. Ask students to research why Scientists and Governments believe Flying Foxes are important to Australian ecosystems. For more information please see:

- <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/importance.html>
- <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-law>
- http://www.nwc.org.au/wp-content/uploads/2016/12/Flying_Fox_Article_June2010.pdf
- <http://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/native-animal-facts/flying-foxes>

2. Watch the TED Talk video <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/> to help students understand the role of Flying Foxes in our environment.
3. Ask students to explore the plight of Flying Foxes in extremely hot weather and what causes a heat stress event.



For more information please see:

- <https://www.eianz.org/document/item/4123>
- <http://www.environment.nsw.gov.au/animals/flying-fox-heat.htm>
- <https://www.animalecologylab.org/ff-heat-stress-forecaster.html>
- <https://www.lfwseq.org.au/deadly-recipe-flying-foxes-extreme-heat-climate-change/>
- <https://theconversation.com/killer-climate-tens-of-thousands-of-flying-foxes-dead-in-a-day-23227>

Some may think: “why should we care if flying-foxes are dying – there are too many of them anyway – I see them all the time where I live”. Well, these animals are important long-distance pollinators and seed dispersers of our already fragmented native vegetation, and they have been listed as vulnerable due to population declines. And, yes, it is true that you may be seeing thousands of bats in your area (at least in some months of the year), but this is because bats are forced to move into urban environments as humans reduce and modify their natural habitat, limiting their roosting sites and food resources.

<https://australianmuseum.net.au/blogpost/science/too-hot-for-flying-foxes>

4. Provide students with [Managing Heat Stress in Flying Fox Colonies](#) (by Sonya Stanvic, Viki McDonald and Linda Collins) as it provides a comprehensive guide to all aspects of heat stress events as they pertain to Flying Foxes. <https://www.fourthcrossingwildlife.com/HeatStress- StanvicMcDonaldCollins.pdf>
5. Invite students to investigate whether human activities such as land-clearing have influenced the occurrence of heat stress events (use the above websites for information).
6. Students are to create a multimedia information report (e.g. YouTube video) about heat stress events and Flying Foxes. Some topics they may wish to address could include:
 - a. Impacts of heat stress events on the location of Flying Fox colonies
 - b. Caring for Flying Foxes during heat stress events including the organisation of volunteer support activities
 - c. Creation and project management of co-ordinated heat stress event action plans
7. Students can use the websites listed in point 2, or be encouraged to find their own (however, for this activity encourage students to avoid media reports, so they will not be influenced by other media reports when writing their own report).
8. Have students present their written media reports (presentation style around the room) and encourage students to walk around and read the other reports. Other classes, teachers or the external community could be invited into this presentation. The reports could be pre-judged by the students and the best report could be presented to the external audience.

9. Have students investigate how the mainstream media portrays heat stress events and Flying Foxes. An overarching critique could then be made about the media reports by looking at:
 - a *How does the media's application of language impact our society's perceptions of reality, and decision making?*
 - b *How can we use language manipulation to our benefit? How can it help in our day to day lives?*
 - c *Did you learn anything new about bats, or have you found that your viewpoints you walked in with have altered? If so, please share.*

Activity 4 (suggested for English, Geography, and Philosophy and Reasoning)

This learning suggestion can be modified to fit within the learning requirements of the specific unit you are presently working on:

English

Unit 2 The ways ideas, attitudes and voices are represented, for example, how events are reported differently in the media.

Geography

Unit 2 The process of urbanisation and its implication for human wellbeing and urban and rural places

Philosophy & Reasoning (QCAA)

Topic 1 Fundamentals of philosophy and reasoning: An argument, in philosophical terms, is an intellectual process whereby a connected series of statements are intended to establish a proposition. To assess an argument is to assess a truth claim and is therefore foundational to both the process of critical inquiry and our knowledge about the world.

A large number of Flying Fox deaths in Cairns were the result of numerous factors. In groups, students are asked to research and respond to the below assigned topic questions as they relate to [a specific ABC report](#). Students are asked to focus on developing direct (deductive) and indirect (inductive) arguments (see attached resource 5).

1. Ask students to share what they know or think they know about these argument types.
 - a. Provide printed versions of the syllabus document (attached resource 4) and have them complete the reading which summarises the argument types.
 - b. Have students pair up and summarise the reading with the first student explaining direct (deductive) and the second student explaining indirect (inductive) arguments.
 - c. Regroup as a class and brainstorm the argument structures based on the paired discussions. Have students record their contributions on sticky notes and attach to the white board under the headings 'Direct (Deductive)' and 'Indirect (Inductive)'.
2. Advise the class they will be learning to develop and execute an argument based on these two argument types, with the topic being the attached ABC newspaper report, "Wildlife emergency declared as baby bats left by stressed mothers as Cairns booms" [<http://www.abc.net.au/news/2017-12-03/baby-bats-abandoned-by-stressed-out-mothers-cairns/9149702>] (attached resource 3).

A suggested topic question is: *Should Cairns City Council be made to change their urban planning approval process to better accommodate local wildlife?*

Wildlife emergency declared as baby bats left by stressed mothers as Cairns booms

ABC Far North. By Brendan Mourier, Fiona Sewell and Adam Stephen
Updated Sun at 6:38am



PHOTO: A far north Queensland ecologist believes bat deaths and construction are connected. (Supplied: Rebecca Koller)

3. Ask students to research why Scientists and Governments believe Flying Foxes are important to Australian ecosystems. For more information please see:

- <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/importance.html>
- <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-law>
- http://www.nwc.org.au/wp-content/uploads/2016/12/Flying_Fox_Article_June2010.pdf
- <http://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/native-animal-facts/flying-foxes>

4. Ask students to investigate what Scientists and Wildlife carers know about mother-baby relationships in Flying Foxes and their behavioural traits. For more information please see:

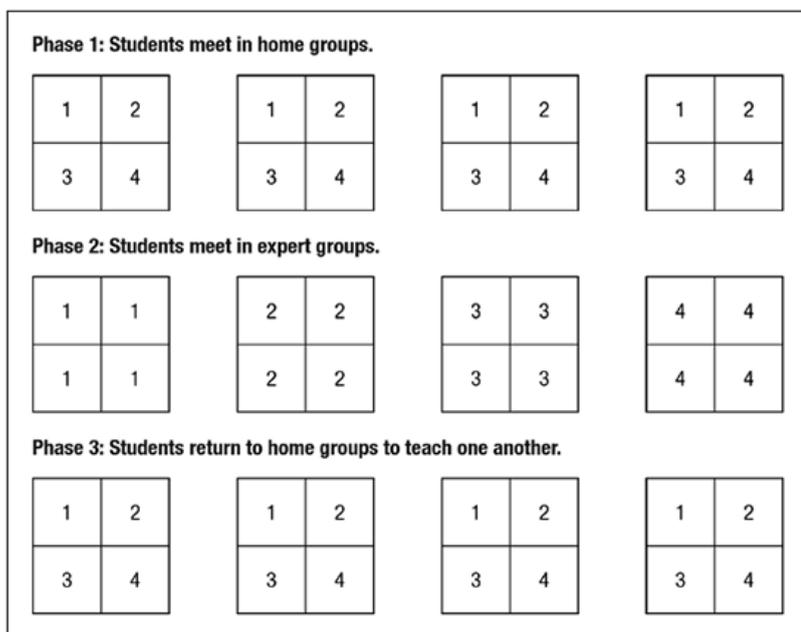
- <http://bats.org.au/about-bats/flying-foxes.php>
- <http://sydneybats.org.au/flying-foxes/gray-headed-flying-fox/grey-headed-flying-fox-reproduction/>
- http://www.allaboutbats.org.au/wp-content/uploads/2017/08/AAB_Year8.pdf
- <https://www.environment.gov.au/system/files/pages/a117ced5-9a94-4586-afdb-1f333618e1e3/files/37-ind.pdf>

From this investigation students will find out that ‘mothers abandoning their babies’ is not the norm for Flying Foxes and demonstrates a deconstruction of facts by the media.

5. Break students into groups to research and respond to assigned topic questions as they relate to the specific ABC report. Suggested questions include:

- Why are Flying Foxes important to native forests?
- Do you believe Cairns is worthy of urban planning awards, given what is happening to the Flying Foxes?
- What do you think will be the fate of the rainforests around Cairns if Flying Foxes continue to die and their population decreases? How might this affect tourism?
- How can the Flying Foxes be saved from this plight?

6. Providing paper for note taking and using a jigsaw activity, break students into home groups to briefly discuss their argument topic and be assigned an expert group to move to.



http://www.ascd.org/ASCD/images/publications/books/frey2009_fig2.1.gif

7. In the expert groups, have each group research a different key component:
 - The importance of Flying Foxes on the ecosystem
 - Urban development in Cairns
 - Tourism, Flying Foxes & Cairns, including ecotourism
 - The relationships between local residents and Flying Foxes
8. When students return to their home group, they can break down the argument using the guiding questions from the attached QCAA Philosophy & Reasoning syllabus and share group responses to determine the class reaction to the arguments presented in the specific ABC media article.
9. After all groups have presented their arguments have a class discussion about:
 - Which argument types they considered more effective, and why?
 - What they have learned about Flying Foxes?
 - Have their perceptions of Flying Foxes changed and how?
 - With this knowledge, what could they do to protect Flying Foxes in their community?



<https://www.batsqld.org.au/>

Resources



- Images of a vaccinated carer at the Kukundi Bat Shelter at Lane Cove National Park, NSW_ <http://www.whitewolfpack.com/2016/11/dedication-and-nice-warm-blanket.html>
- Arthur Kooekka Pambegan Jnr.- Kalben (Bone Fish Story Place) and Walkan - Aw (Sacred Site of the Flying Fox Story Place) <http://gallery.aboriginalartdirectory.com/aboriginal-art/arthur-kooekka-pambegan-jnr/kalben-bone-fish-story-place-and-walkan-aw-sacred.php>
- Working with Indigenous Australians_ http://www.workingwithindigenoustralian.info/content/Resources_1_FAQ.html
- The Wabanaki Traditional Cultural Lifeways Exposure Scenario (<https://www.epa.gov/sites/production/files/2015-08/documents/ditca.pdf>)
- www.CreativeSpirits.info, Aboriginal culture - History - Maralinga: How British nuclear tests changed history forever, retrieved 25 July 2017 Source: <https://www.creativespirits.info/aboriginalculture/history/maralinga-how-british-nuclear-tests- changed-history-forever#ixzz4noKlvtor>
- Maralinga: The shame of Australian nuclear testing <https://woollydays.wordpress.com/2015/08/22/maralinga-the-shame-of-australian-nuclear- testing-part-1/>

- Federal Budget 2017: Aboriginal People Exposed To British Nuclear Testing To Receive Improved Health Care <http://www.abc.net.au/news/story-streams/federal-budget-2017/2017-05-09/federal-budget-2017-nuclear-test-affected-get-health-care-boost/8509134>
- Hawke Government Schemed To Stymie Maralinga Nuclear Test Compensation, Cabinet Documents Reveal. <http://www.adelaidenow.com.au/news/south-australia/hawke-government-schemed-to-stymie-maralinga-nuclear-test-compensation-cabinet-documents-reveal/news-story/303477ea79ba502fd4b558e11f8d1ed6>
- Mann, A, 7 Oct 2016 Aboriginal man's story of Maralinga nuclear bomb survival told with virtual reality <http://www.abc.net.au/news/2016-10-07/aboriginal-mans-story-of-nuclear-bomb-survival-told-in-vr/7913874>
- Gorman, A, 8 Nov 2017, From the Nullarbor to the nuclear age: what fossils reveal about south Australia's past, The Guardian <https://www.theguardian.com/science/2017/nov/08/from-the-nullarbor-to-the-nuclear-age-what-fossils-reveal-about-south-australias-past>
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- Palin, M, 10 Mar, 2016, New generations of Australian families suffering deformities and early deaths because of 'genetic transfer', News.com.au <http://www.news.com.au/lifestyle/health/health-problems/new-generations-of-australian-families-suffering-deformities-and-early-deaths-because-of-genetic-transfer/news-story/5a74b7eab2f433402aa00bc2fcbcbca4>
- Stokes, B. Nuclear Australia <https://nuclearnewsaustralia.wordpress.com/>
- Maralinga's radioactive fallout still blowing in the wind_ <https://nuclearnewsaustralia.wordpress.com/2009/10/02/maralingas-radioactive-fallout-still-blowing-in-the-wind/>
- Maralinga radioactive dust - then and now_ <https://nuclearnewsaustralia.wordpress.com/2009/10/06/571/>
- Aboriginal History Inc, Vol 23 1999 <http://press-files.anu.edu.au/downloads/press/p72831/pdf/book.pdf?referer=1065>
- Teacher Resource - Maralinga: The Anangu Story, by the Oak Valley and Yalata communities, with Christobel Mattingley http://lib.oup.com.au/secondary/english/Oxford_English/1/01_MPS_EL1_Maralinga.pdf
- ABC Newspaper Report, "Wildlife Emergency Declared As Baby Bats Left By Stressed Mothers As Cairns Booms" [[Http://Www.Abc.Net.Au/News/2017-12-03/Baby-Bats-Abandoned-By-Stressed-Out-Mothers-Cairns/9149702](http://Www.Abc.Net.Au/News/2017-12-03/Baby-Bats-Abandoned-By-Stressed-Out-Mothers-Cairns/9149702)]
- Managing Heat Stress in Flying Fox Colonies <https://www.fourthcrossingwildlife.com/HeatStress-StanvicMcDonaldCollins.pdf>



- In Defence of the Flying Fox <http://www.abc.net.au/catalyst/stories/3000668.htm> (10.13)
- Black Mist Burnt Country. Testing the Bomb: Maralinga and Australian Art_ http://blackmistburntcountry.com.au/wp-content/uploads/2017/09/BMBC_Edu-Resource-web.pdf
- Pearson, T., 2013. No Tree No Me. TEDx Canberra <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>
- Bats Qld would like to acknowledge the following image sources:<http://www.thinkoholic.com/2006/04/02/photo-gallery-more-microbats-s338-en/>

Attachments

LESSON	RESOURCE	DETAILS
1	1	Kalben and Walkan - Aw Painting & Dreaming Story
3 & 4	2	ABC News Report about Cairns bat deaths
4	3	QCAA Philosophy & Reason Senior Syllabus
4	4	Direct Approach Vs Indirect Approach

Resource 1

Kalben (Bone Fish Story Place) and Walkan - Aw (Sacred Site of the Flying Fox St **Arthur Kooekka Pambegan Jnr.**

Medium: Acrylic & natural
ochres on milkwood

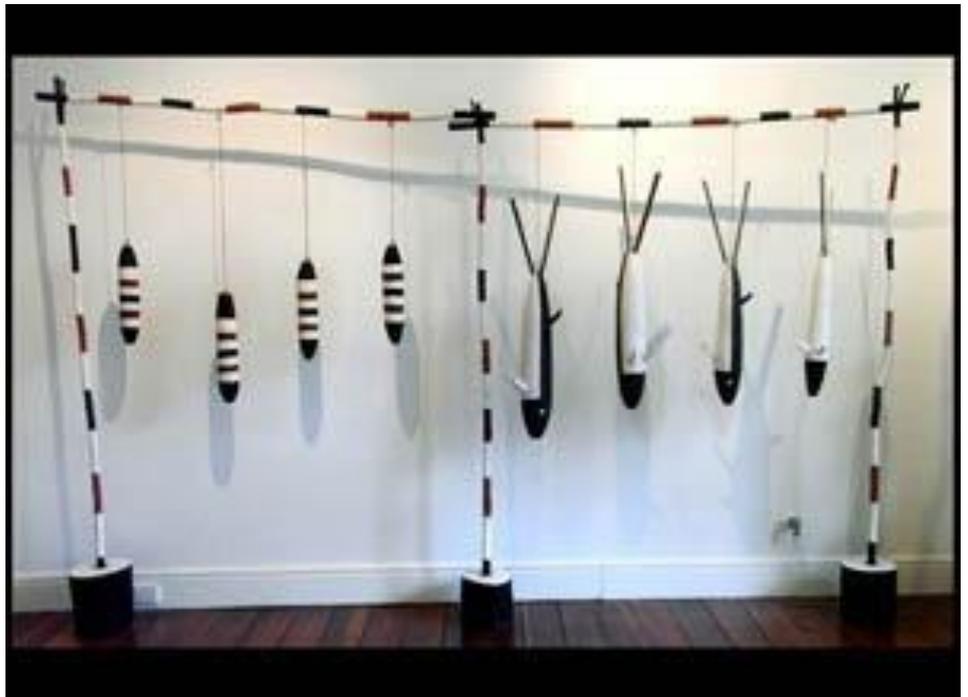
Size: Varies

Year: 2009

Arthur Pambegan's work *Flying Fox Story Place* represents a significant ancestral story for the Winchanam ceremonial group. It refers to a sacred totemic site, Kalben (Flying Fox Story Place) and conveys customary laws and beliefs related to the first stage of the Winchanam initiation ritual. The sculpture represents the 'minh mal' (black Flying Fox) and the 'minh wuk' (small red Flying Fox) hanging upside down from their tree

perches. Flying Foxes may be

abundant in the Cape, nesting in the myriad of mangrove tributaries found along the coastline and are a traditional food source. In *Flying Fox Story Place* 2002-03, they are painted in Winchanam ceremonial white-banded body paint. The long, broad, rust-coloured stripes represent the chests of the flying fox.



This story reveals an inherent respect for people and the land and concerns a taboo that was broken by two young brothers, who sneaked out one morning during their initiation period and speared many Flying Foxes while they were returning to their daytime nesting place among the mangrove trees. After cooking the Flying Foxes in a 'kap-mar' (ground oven covered with sand) the younger brother tried to encourage the other to return for more. One of the 'kek pith' (bamboo spears) went high up into the air and landed in the Watson River, near the Small Archer River. As the boys tried to swim across and retrieve it, a large rock suddenly began to appear from beneath the water.

Meanwhile, the older men back at the camp removed the sand and bark from the ground oven. They found the Flying Foxes alive, which then began to fly all around the boys. When the older men realised the two brothers were missing, they went to the Small Archer River and saw the Flying Foxes pick the two brothers up. The brothers cried out for their parents, admitting that they had done wrong and accepting their punishment. The Flying Foxes then took them up into the sky to the Milky Way, where two black dots now exist as a reminder to Wik people that the traditional law had been disobeyed. When people of the Small Archer and Watson River areas die, their spirits return to the stone at this site.

Based on the essay by Trish Johnson Project Officer, Indigenous Australian Art February 2004

<https://gallery.aboriginalartdirectory.com/aboriginal-art/arthur-kooekka-pambegan-jnr/kalben-bone-fish-story-place-and-walkan-aw-sacred.php>

Wildlife emergency declared as baby bats left by stressed mothers as Cairns booms

ABC Far North | By [Brendan Mounter](#), [Fiona Sewell](#) and [Adam Stephen](#)

Updated Sun at 8:39am



PHOTO: A far north Queensland ecologist believes bat deaths and construction are connected. (Supplied: Rebecca Koller)

The crane index can be a measure of a city on the move, but far north Queensland ecologists believe the developing skyline of Cairns has devastated the city's most valuable natural asset — its wildlife.

Hundreds of baby bats are dying or being abandoned as cranes work on high-rise developments in the centre of Cairns.

Ecologist Martin Cohen believes the development and deaths are connected.

"It's not unusual to get orphaned bats around this camp, however this year we're getting extraordinary numbers," he said.

[RELATED STORY: Dozens of bats found slaughtered in 'horrific' Sunshine Coast scene](#)

[RELATED STORY: Watch out for bats infected with rabies-like virus, NSW Health warns](#)

[RELATED STORY: Buffer zones to protect homes from bats](#)

[MAP: Cairns 4870](#)



"It's a perfect storm for this camp. There's just too much going on around it, which stresses the animal so much that they give birth too young or they abandon their young."

Six cranes have been erected this year to work on several new projects, including a \$370 million multi-tower high-rise development.



PHOTO: Baby flying foxes are being abandoned by their stressed-out mothers in a colony next to major construction in the Cairns CBD. (Supplied: Rebecca Koller)

That work site is about 50 metres from a long-established flying fox colony in the city centre.

Mr Cohen believed the construction was having a detrimental impact on the breeding season, which began in October.

The ecologist said almost 50 per cent of the estimated 1,300 newborn bats were dying or coming into care.

"That's way too high. We should be getting half that, so something's going on this year," he said.

"This is a threatened species. Fifty per cent of their population has decreased since 2004 and they're declining at about 8 or 9 per cent each year."

<http://www.abc.net.au/news/2017-12-03/construction-threat-flying-fox-colony/9175644>

Is price of development too high?

Dr Cohen did not believe the developers were in breach of environmental guidelines.

But he questioned the scale and speed of development in the Cairns CBD and said the city needed to better plan around its wildlife.

"In my opinion it's a bit of overkill [in terms of] the extent of the development, considering there's a nationally significant and threatened flying fox camp over the road," he said.

"People come here to see the natural world and our wildlife, and at the moment it's death by a thousand cuts ... we're turning the Cairns CBD into a concrete jungle."



PHOTO: Wildlife carers are finding flying fox foetuses on the ground in Cairns regularly. (Supplied: Rebecca Koller)

The council argues the development strikes a balance between progress and wildlife protection.

City wins awards for urban planning

A Cairns Regional Council spokesperson said all new developments were required to comply with the principles of tropical urbanism, which included an emphasis on maintaining or creating tropical-style vegetation corridors.

The city has won national urban planning awards for its tropical urbanism concept, while Cairns has also been recognised as having one of the highest rates of tree canopy cover in Australia.

Prime Group, which is building the project, also disputed the development was impacting the colony, and said it was working closely with the council, the Department of Environment Heritage and Protection, and its own ecologists.

In a statement, the company said:

R2G Environmental Consultants have been commissioned by Prime Constructions to monitor spectacled flying foxes (SFF) at the Cairns CBD roost during construction to fulfil the conditions of the State and Commonwealth approvals for the project.

The objective of monitoring activities is to identify significant events that result in disturbance of the SFF at the adjacent roost that may impact the health of the colony.

R2G undertake weekly counts of SFF. To date disturbances, identified as greater than 30 per cent, have not occurred.

A spokesperson for Department of Environment, Heritage and Protection confirmed it had found no causal link.

Resource 3

Topic 1: Fundamentals of argument

Description	
<p>An <i>argument</i>, in philosophical terms, is an intellectual process whereby a connected series of statements are intended to establish a proposition. To assess an argument is to assess a truth claim and is therefore foundational to both the process of critical inquiry and our knowledge about the world.</p>	
Guiding questions	Required content
What are the elements of arguments?	<ul style="list-style-type: none"> • propositions • premises • conclusions • assumptions and tacit premises
How can arguments be structured?	<ul style="list-style-type: none"> • deductive and inductive arguments • generalisations and analogies • necessary and sufficient conditions
How can arguments be evaluated?	<ul style="list-style-type: none"> • validity • soundness • strength
What are fallacies of reasoning?	<ul style="list-style-type: none"> • illicit appeal • assumption • scope • ambiguity • cognitive bias
What are the elements of argument construction and execution?	<ul style="list-style-type: none"> • standard argument technique • direct and indirect arguments • onus of proof • principle of charity • fallibilism
What are the tools of formal logic and how can these inform critical reasoning?	<ul style="list-style-type: none"> • standard form, including syllogisms • propositional operators • translating to and from symbolic logic • deductive proof methods, including Venn diagrams and truth tables • counter examples

https://www.qcaa.qld.edu.au/downloads/senior/snr_philosophy_14_syll.pdf

Resource 4

Direct Approach vs. Indirect Approach

Direct Approach

When you use the direct approach, the main idea (such as a recommendation, conclusion, or request) comes in the "top" of the document, followed by the evidence. This is a *deductive* argument. This approach is used when your audience will be neutral or positive about your message. In the formal report, the direct approach usually mandates that you lead off with a summary of your key findings, conclusions, and recommendations. This "up-front" arrangement is by far the most popular and convenient for business reports. It saves time and makes the rest of the report easier to follow. For those who have questions or want more information, later parts of the report provide complete findings and supporting details. The direct approach also produces a more forceful report. You sound sure of yourself when you state your conclusions confidently at the outset.

Indirect Approach

In the indirect approach, the evidence is presented first, leading *therefore* to the main idea. This is an *inductive* argument. This approach is best if your audience may be displeased about or may resist what you have to say.

At times, especially if you are a junior member of an organization or if you are an outsider, writing with an extremely confident stance may be regarded as arrogant. In such cases, or if your audience will be sceptical or hostile, you may want to use the indirect approach: Introduce your complete findings and discuss all supporting details before presenting your conclusions and recommendations. The indirect approach gives you a chance to prove your points and gradually overcome your audience's reservations. By deferring the conclusions and recommendations, you imply that you've weighed the evidence objectively without prejudging the facts. You also imply that you're subordinating your judgment to the audience, whose members are capable of drawing their own conclusions when they have access to all the facts.

Although the indirect approach has its advantages, some readers will always be in a hurry to get to "the answer" and will flip to the recommendations immediately, thus defeating your purpose. Therefore, consider length before choosing the direct or indirect approach. In general, the longer the message, the less effective an indirect approach is likely to be. Furthermore, an indirect argument is harder to follow than a direct one.

Because both direct and indirect approaches have merit, business people often combine them. They reveal their conclusions and recommendations as they go along, rather than putting them first or last. As a result, the approach strategy of business reports can sometimes be hard to classify.

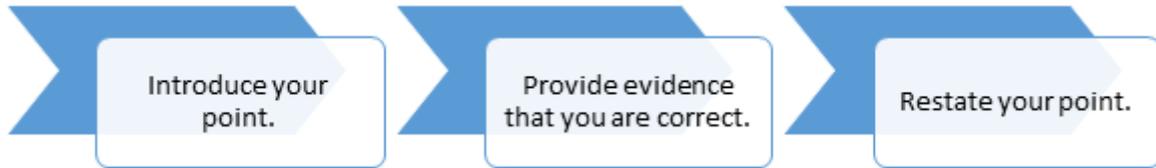
Source: Bové, Thill, and Schatzman, *Business Communication Today* 7th ed., pp. 115-16 and 408-09.

<http://faculty.winthrop.edu/kosterj/writ465/management/directapproach.htm>

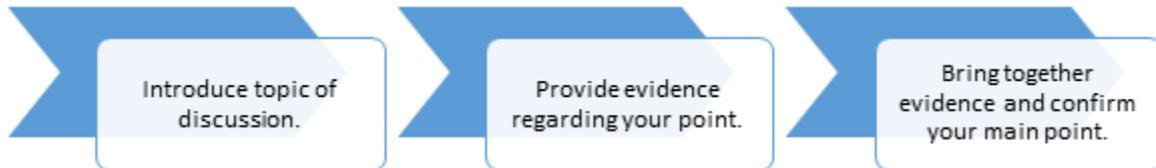
Further examples can be seen at: <http://www2.ivcc.edu/eng1205/Handouts/DirectIndirect.htm>

General Structures

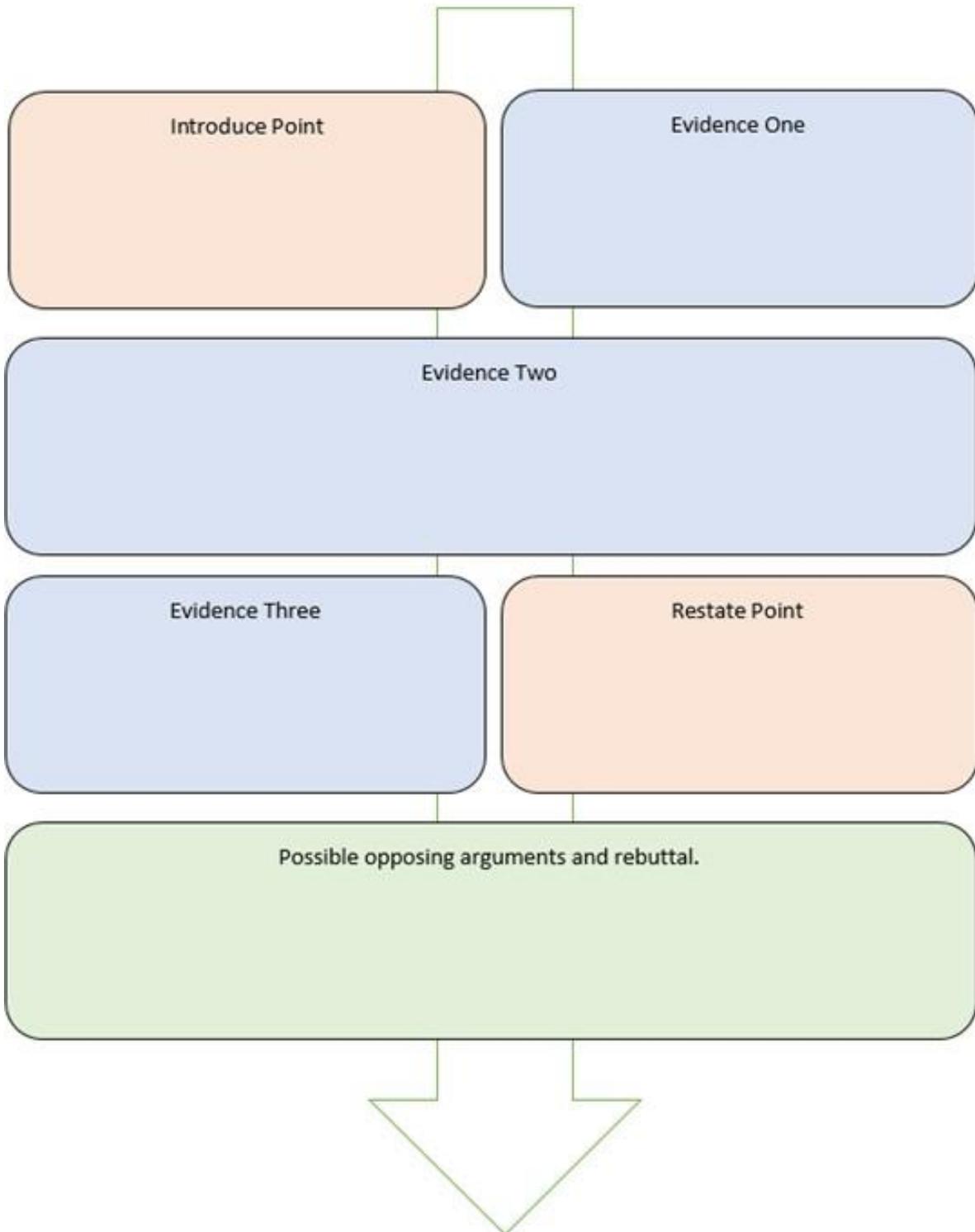
Direct Argument Structure



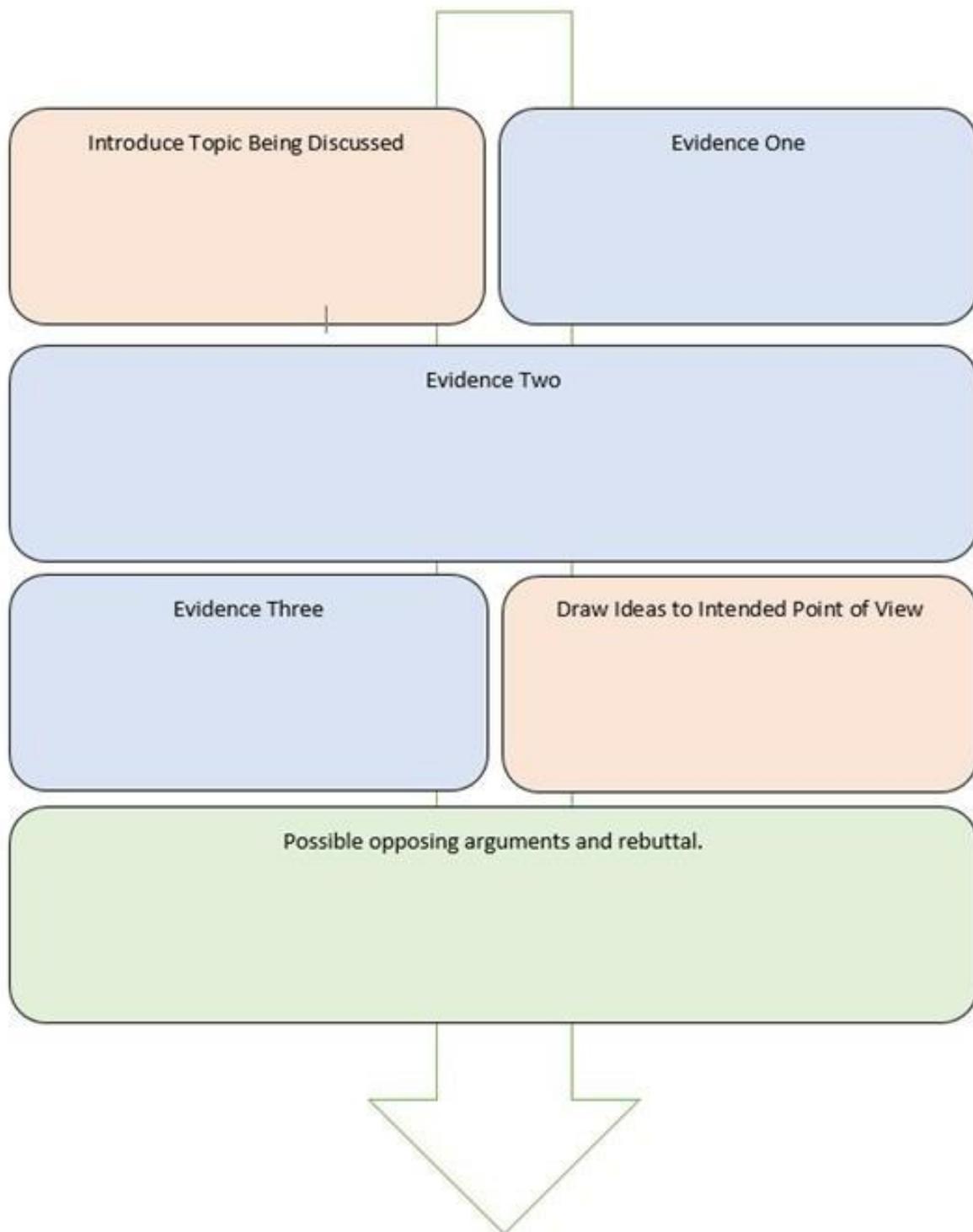
Indirect Argument Structure



Direct Argument Approach



Indirect Argument Approach



Resource 5

Taken from:

Foulkes J. N. & Thompson D. S. 2008. A BIOLOGICAL SURVEY OF THE MARALINGA TJURATJA LANDS, SOUTH AUSTRALIA 2001 - 2007. Science Resource Centre Information, Science and Technology Directorate Department for Environment and Heritage, South Australia.

https://data.environment.sa.gov.au/Content/Publications/Maralinga-Tjuratja_BioSurvey.pdf

Pinytjantjara (microbat species)

Bats were attempted to be surveyed systematically during most field trips. Most of the survey effort was in the form of *Anabat* recordings and from captures of bats in mist-nets and harp-traps.

Prior to this survey, five species of bats were known from the MT Lands, comprised of twenty-nine records. This survey added a further two species and a total of 2,624 records across the MT Lands. All species of micro-chiropteran bat appear to be secure in the MT Lands. All seven species of microbat were recorded in mapping group GVD_6 (Black Oak) and six species in GVD_9, which is an indication of the availability of roosting hollows. No bat records were obtained from five vegetation communities (GAW_6, GAW_11, GVD_12, GVD_19 and GVD_20) (Table 18)

***Mormopterus* species 3 'little penis' (Inland Free-tail Bat) (Figure 60)**

The first records of this species for the MT lands were made on this survey. It is common in the more arid parts of Australia. It was recorded in 9 of 24 vegetation mapping groups with GVD_6 (Black Oak) and GVD_15 (*Acacia* shrubland) communities where most observations were made, and all of the other MT species were. They roost in trees and forage in open unobstructed areas (Churchill 1998). It was recorded at 11.8% of quadrats, however it was the only species not recorded at opportunistic sites (Table 16).



Figure 60: *Mormopterus* species 3 'little penis' was recorded for the first time in the Maralinga Tjarutja Lands during this survey. (Photo: A.

***Tadarida australis* (White-striped Free-tail Bat)**

Surprisingly, this species had not been recorded in the MT Lands prior to this survey, as it is a large distinctive species which is distributed across all of southern Australia (Churchill 1998). It was recorded in 13 of 24 mapping groups (Table 18), with GVD_1 and GVD_3 (mulga dominated communities) where between 20 and 33% of records were made. It was recorded from 22 quadrats (22%) and was the third most commonly recorded bat species (436 records) (Table 16).

***Nyctophilus geoffroyi* (Lesser Long-eared Bat)**

The Lesser Long-eared Bat was the most widely distributed bat species during the survey. It was recorded in 18 of 24 mapping groups (Table 18), with GVD_9 being the community where between 20 and

104

33% of records were made and from 36.6% of quadrats. It was the second most commonly recorded mammal species during the survey. It is widely distributed throughout most of Australia in a wide range of habitats (Churchill 1998).

***Nyctophilus timoriensis* (Greater Long-eared Bat)**

This species is distributed across southern mainland Australia in semi-arid habitats (Churchill 1998). On this survey it was recorded in 3 of 24 mapping groups (Table 18), with GVD_5 and GVD_6 (Black Oak dominated communities) where greater than 33% of records were made. The survey extended the range of this species extensively. This species is rarely caught and poorly known (Churchill 1998) and it was the least recorded bat species on this survey (39 records, 8 quadrats). Additionally, its calls are very difficult to distinguish from those of *N. geoffroyi*, and until further reference calls are collected the distribution and abundance of this species will remain uncertain.

***Chalinolobus gouldii* (Gould's Wattled Bat)**

Gould's Wattled Bat was the most commonly recorded species during the survey, with almost 1400 records from 55 quadrats (36%) and multiple opportune locations. Recorded in 17 of 24 mapping groups (Table 17, 18), with GVD_7 (Marble Gum communities) appearing to be a strongly preferred habitat. This species is found throughout Australia in a wide range of habitats.

***Scotorepens balstoni* (Inland Broad-nosed Bat)**

Prior to the survey it was known from a single record in the MT Lands, however on the survey 130 observations were made from 6 quadrats (4%) and a single opportune location. It was recorded in 3 of 24 mapping groups (Table 17, 18), with GVD_6 (Black Oak) being the community where between 20 and 33% of records were made.

***Vespadelus baverstocki* (Inland Forest Bat)**

This very small bat is widely distributed in arid and semi-arid Australia (Churchill 1998), however, prior to the survey it was known from three records from the MT Lands collected during the Yellabinna Survey in 1987 (Copley & Kemper 1992). Seventy three records were obtained from 12 quadrats (7.8%) and six opportune records (Table 16). It was recorded in 6 of 24 mapping groups (Table 18), with GVD_1 and GVD_2 (mulga dominated communities) appearing to be the most preferred habitats.