

Teaching About Flying Foxes and Microbats

Supporting Native Animal Welfare

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

In 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 for students to support their local wildlife communities.

The activities in this document ask students to:

- deconstruct language, imagery and purpose associated with bat focused websites
- engage mathematical processes of shape, measurement and consumer arithmetic to provide costings for maintenance works at a wildlife sanctuary
- conduct a short survey to identify what people in their local community know about the local wildlife care groups
- create informed opinions and be able to communicate this opinion in written and verbal form
- undertake a micro business activity to raise funds for a bat care group of their choice



These images are of a vaccinated carer at the Kukundi Bat Shelter at Lane Cove National Park, NSW. See (<http://www.whitewolfpack.com/2016/11/dedication-and-nice-warm-blanket.html>)

For more information, please see

- <http://conditions.health.qld.gov.au/HealthCondition/condition/14/33/14/Bats-human-health>.
- <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/>
- <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-law>
- <http://www.health.nsw.gov.au/environment/factsheets/Pages/flyingfoxes-questions.aspx>

Activity 1 (suggested for English)

Through exploration, analysis and examination of the text within the Bat focused websites, students identify the intended audience giving consideration to language, text and purpose. Applying this knowledge, students document their findings whilst identifying suggestions to enhance the website's ability to target their audience.

Activity 2 (Essential Mathematics and General Mathematics)

Like many native animal hospitals and care facilities, Currumbin Wildlife Hospital relies on donations and volunteers to reduce overhead expenses and afford to keep operating. As well as the general ongoing costs of running the organisation, occasionally high cost capital improvements and maintenance projects need special funding allocations. This activity sees students engage mathematical processes of shape, measurement and consumer arithmetic to provide costings for maintenance works at the sanctuary.

Activity 3 (General Mathematics and Media Arts in Practice)

Students are to conduct a short survey to identify what people in their local community know about the local wildlife care groups. The students are asked to analyse this data and design a way to communicate information about these groups, or their findings, to their local community.

Activity 4 (English, English as an Additional Language or Dialect, Essential English, & Literature) Student will investigate the Health and Safety aspects associated with Australian Bat Lyssavirus (ABLV) and bats. They will then critique online texts and documents to explore the representation of ABLV, specifically in relation to Flying foxes. Students are then asked to create informed opinions and be able to communicate this opinion in written and verbal form.

Activity 5 (General Mathematics and Business Studies)

Students are asked to investigate ways they can generate funds for a bat care group. They then undertake a micro business activity to raise funds for a bat care group of their choice.

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.

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.

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.

Maths

- Unit 1 - Solve problems relating to solving problems relating to calculations, applications of measurement, the use of formulas to find an unknown quantity and the interpretation of graphs.
- Unit 2 - Apply skills pertaining to Consumer Arithmetic, Algebra and Matrices and Shape and Measurement in a range of practical contexts, including those involving three-dimensional shapes.

Essential Mathematics

- *Unit 1* Understand and solve problems relating to calculations and application of measurement, using formulas to find an unknown quantity and the interpretation of graphs using mathematical skills.
- *Unit 2* Provides students with the mathematical skills and understanding to solve problems related to representing and comparing data, percentages, rates and ratios, the mathematics of finance, and time and motion.

General Mathematics

- *Unit 1* The 'Shape and Measurement ' extends knowledge and skills associated with shape calculations in a practical context and 'Consumer Arithmetic' reviews money management, rate, percentage and the use of spreadsheets.

Queensland QCAA Senior Secondary Curriculum

Media Arts in Practice

- *Topic 1* Media techniques: Media techniques are the traditional, digital and emerging methods or tools that artists use to experiment with and manipulate media artworks (C1.3)
- *Topic 2* Contexts and audiences: Media artworks reflect the context in which they are created, and audiences read, view, perceive and make meaning from media communications (C2.1).
Purposes: Media communications are designed to achieve a variety of purposes (C2.2). Ideas: Media communications involve the exchange of ideas (C2.3).

Business Studies

- *Assessment Project* - Students engage in a venture or entrepreneurial activity to raise funds for a community business.

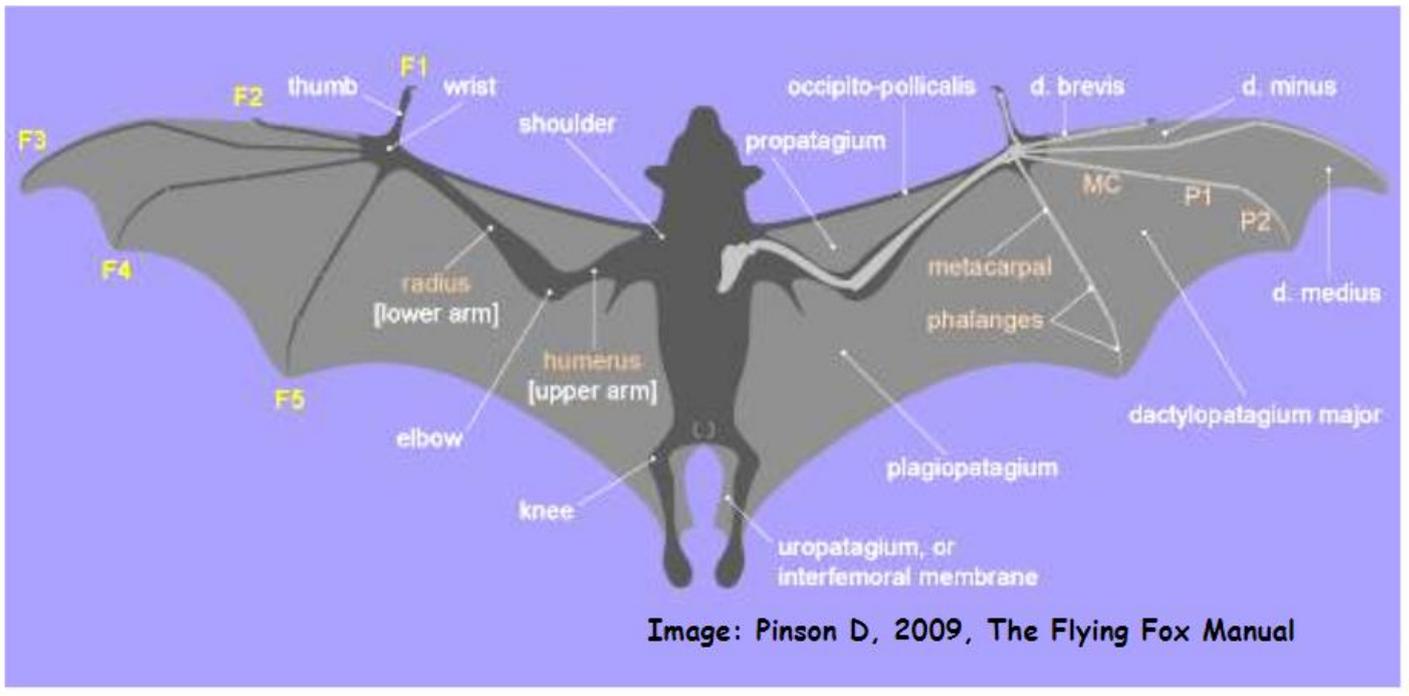
Background notes for Teachers about Flying Foxes and Microbats

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.

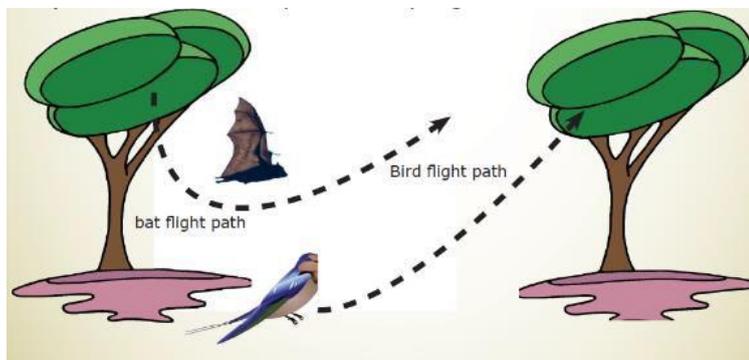


There are over 1000 different species of bats worldwide. Bats are classified into two major groups: Flying Foxes and Microbats.

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.

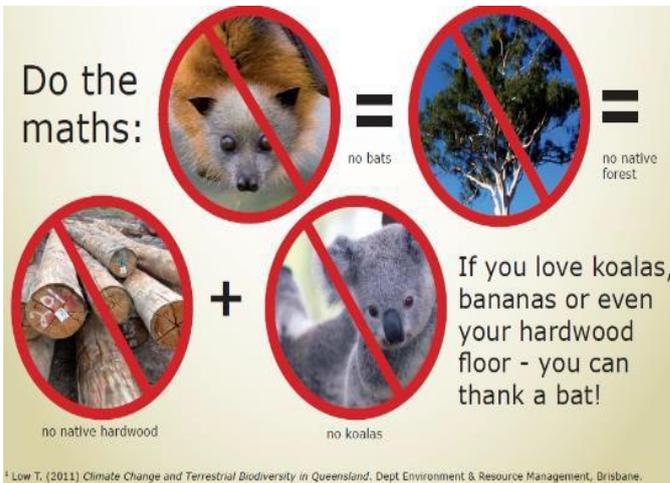
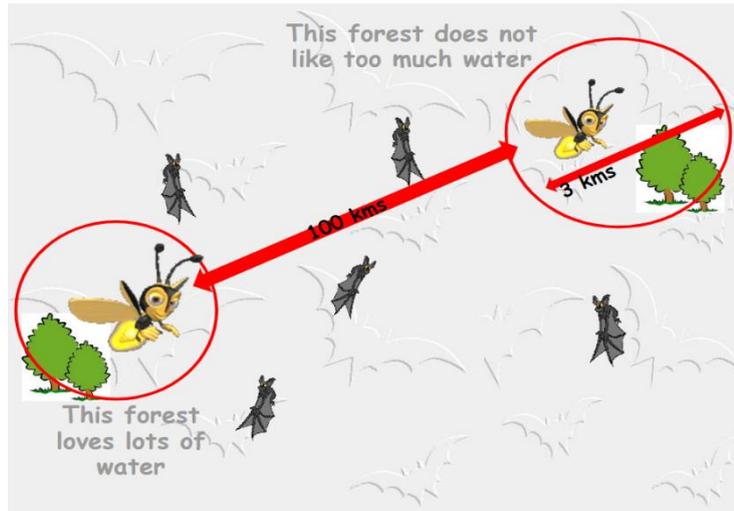


Flying Foxes or Megabats, are the largest sized bats (they also used to be known as Fruit Bats, but Flying Fox is the term that is used today). A Flying Fox has extremely good eyesight (the same as ours during the day and 25% better at night) and hearing and use these, and their strong sense of smell, 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.



¹ Low T. (2011) *Climate Change and Terrestrial Biodiversity in Queensland*, Dept Environment & Resource Management, Brisbane.

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

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This summary was written by Dr. Ali Sammel. If you have any questions, please email (a.sammel@griffith.edu.au)



Activity 1 (suggested for English)

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

Australian Curriculum English:

- Unit 1: Explore how meaning is communicated through the relationships between language, text, purpose and audience.
- Unit 2: Analyse the representation of ideas, attitudes and voices to consider how a text represents the world and human experience.
- Unit 3: Explore representations of themes, ideas and concepts through a comparison of texts.
- Unit 4: Examine different interpretations and perspectives to further develop knowledge and analysis of purpose and style.

Please refer to the start of this document for more detailed links to the Australian Curriculum.

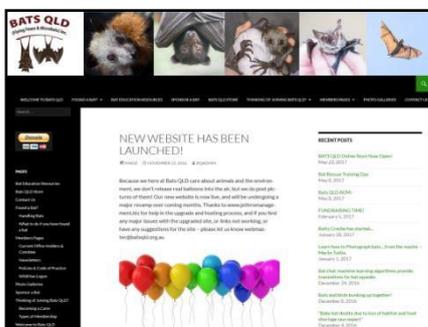
Learning intention: Student are to identify and articulate the purpose, context and audience as well as the messages conveyed through the media text within Bat focused websites. Through exploration, analysis and examination of the text within Bat focused websites, students identify the intended audience giving consideration to language, text and purpose. Applying this knowledge, students document their findings whilst identifying suggestions to enhance the website's ability to reach their audience. For background information about Bats, 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. Ask the students to compare what they found through their research with the information presented in this TED talk explaining about the importance of Flying Foxes to the Australian eco-system

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

The information in Background Notes for Teachers will assist in talking with students about the importance of Microbats and Flying Foxes to our ecosystem.



3. Direct students to the Bats

Queensland website (<https://www.batsqld.org.au/>) and ask them to predict what the overriding purpose of the site may be (i.e. bat protection and education). Provide students the opportunity to briefly look through the headings (either projected on a screen for the whole class to view together or on individual devices).

Brainstorm who students believe the audience would be for this website. Is there just one audience? Some answers may include general public, teachers and animal welfare groups.

4. What is animal welfare? Ask student to explore what the concept of animal welfare is. Engage students in a class discussion about what they believe is the philosophy behind animal welfare. Have them consider animal welfare in relation domesticated, native or introduced species. Does the category of animal impact on

policies pertaining to welfare or rights? Explore the concept of animal rights... e.g. should animals be afforded some basic rights? Should these rights be legislated?

For information about Animal Welfare please see:

- <http://agriculture.vic.gov.au/agriculture/animal-health-and-welfare/animal-welfare>
- http://www.animalwelfarecouncil.org/?page_id=16
- <https://theconversation.com/animal-welfare-and-animal-rights-are-very-different-beasts-26848>
- <https://www.avma.org/KB/Resources/Reference/AnimalWelfare/Pages/what-is-animal-welfare.aspx>
- <http://www.bbc.co.uk/ethics/animals/rights/introduction.shtml>
- http://kb.rspca.org.au/what-is-the-australian-legislation-governing-animal-welfare_264.html

5. Have students investigate the controversy around the Queensland Government to permit culling of Flying Foxes (including the [Grey Headed Flying Fox](#) which is now classified as a *Nationally Vulnerable species*).

- <https://theconversation.com/culling-flying-foxes-is-ineffective-so-why-suggest-slaughter-9817>
- <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/roost-management.html>
- <https://www.couriermail.com.au/news/queensland/cullings-bats-is-now-talk-of-the-town/news-story/2079c7258e9ef3426f3dc9e106b9f29e?sv=17dca0ba395e2f825e29ebfceb260161>

6. Engage the class in a discussion about what term would they suggest (animal protection/welfare/rights etc.) to represent the philosophy of animals being given due consideration within Australian society.

7. Give students time to peruse the site *Don't Shoot Bats* (<http://www.dontshootbats.com/>). Ask students to identify the intended audience giving consideration to language, text and purpose. With the students background knowledge about permits to allowing the culling



of Flying Foxes (generated in point 5), how effective do they believe this website to be to engage their intended audience? What strengths and weaknesses do they believe it has and what suggested changes would they make? In relation to animal welfare or animal rights, what position do they believe this website is based upon? Invite the students to consider historical, religious, legal, philosophical perspectives behind the opposing standpoints of the Queensland Government and the administrators of [dontshootbats.com](http://www.dontshootbats.com).

8. Have a look at the [Bats Qld website](#) again. Ask students to investigate whether how user friendly the site is, or if it easily informs or educates people when they first visit. Ask students to consider the similarities and differences in the impact of the text with or without its visual elements, whilst also addressing the language, structure and conventions and how all the elements combine to deliver the overall message. Students could also comment on the philosophical underpinnings of the site, for example, in relation to animal welfare or animal rights, what position do they believe this website is based upon?

For the purpose of differentiated learning, you may choose some students to analyse the whole site, including how it is set out to reach different audiences, while other students may choose to look at the part of the site from the perspective of just one audience group.

Comparisons with other bat sites could also be suggested. For links to other bat websites, Nationally and Internationally, please see: <http://ausbats.org.au/bat-conservation-links/4580787325>

9. Encourage the students to write a (strengths and weakness) response to the Bats Queensland website by reflecting on other texts they may have encountered and the knowledge they have gained about Bats. Students can offer suggested enhancements for the site to ensure people are emotionally connected to the animals, their plight, as well as the usability and message it conveys. The class can democratically select several recommendations to forward to Bats QLD at webmaster@batsqld.org.au.

Activity 2 (suggested for Essential Mathematics and General Mathematics)

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

Essential Mathematics:

- Unit 1: Understand and solve problems relating to calculations and application of measurement, using formulas to find an unknown quantity and the interpretation of graphs using mathematical skills.
- Unit 2: Provides student with the mathematical skills and understandings to solve problems related to representing and comparing data, percentages, rates and ratios, the mathematics of finance, and time and motion.

General Mathematics:

- Unit 1: 'Shape and Measurement' extends knowledge and skills associated with shape calculations in a practical context and 'Consumer Arithmetic' reviews money management, rate, percentage and the use of spreadsheets.

Please refer to the start of this document for more detailed links to the Australian Curriculum.

Learning intention: Student are to investigate the costing of alterations proposed for the Currumbin Wildlife Hospital (on the Gold Coast). Like many native animal hospitals and care facilities, Currumbin Wildlife Hospital relies on donations and volunteers to reduce overhead expenses and afford to keep operating. As well as the general ongoing costs of running the organisation, occasionally high cost capital improvements and maintenance projects need special funding allocations. In this activity, students are asked to provide costings for maintenance works at the sanctuary by exploring mathematical processes such as shape, measurement and consumer arithmetic.



1. Introduce students to the Currumbin Wildlife Hospital through the story about Elvis the Orphaned Flying Fox <http://www.woaw.org.au/teachers/elvis-the-orphaned-flying-fox/> (attached resource 1).
2. For background information about Bats, 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>
3. Ask the students to compare what they found through their research with the information presented in this TED talk explaining about the importance of Flying Foxes to the Australian eco-system <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>

The information in Background Notes for Teachers will assist in talking with students about the importance of Microbats and Flying Foxes to our ecosystem.



4. Students use the attached map worksheet of Currumbin Wildlife Hospital (**attached resource 2 and answer sheet, resource 3**) to respond to costing requests for the listed maintenance projects.
5. Additional tasks may include:
 - expressing the fencing quotes as a percentage comparison between two prices;
 - prices could be exclusive of GST, with students to calculate the GST component and gross price;
 - you may suggest a percentage discount off one style of fencing and creating a spreadsheet to record this data. Calculation of discounted prices or increased prices due to inflation are additional tasks for students to complete.
6. Have students draw a graph to represent the variance in fencing quotes. These activities can be aligned to your specific Australian Curriculum unit requirements.



Activity 3 (suggested for General Mathematics and Media Arts in Practice)

This learning suggestion can be modified to fit within the learning requirements of the specific Maths or Media Arts unit you are presently working on.

General Mathematics:

Unit 2: Univariate data analysis and the statistical investigation processes develop students' ability to organise and summarise univariate data in the context of conducting a statistical investigation.

Media Arts in Practice:

- Topic 1: Media techniques: Media techniques are the traditional, digital and emerging methods or tools that artists use to experiment with and manipulate media artworks (C1.3).
- Topic 2:
 - Contexts and audience: Media artworks reflect the context in which they are created, and audiences read, view, perceive and make meaning from media communications (C2.1).
 - Purposes: Media communications are designed to achieve a variety of purposes (C2.2).
 - Ideas: Media communications involve the exchange of ideas (C2.3)

Please refer to the start of this document for more detailed links to the Australian Curriculum.

Learning intention: Student are to conduct a short survey to identify what people in their local community know about the local wildlife care groups. The students are asked to analyse this data and design a way to communicate information about these groups, or their findings, to their local community.

Wildlife care groups rely on public support to continue their work in rescuing and rehabilitating injured and orphaned wildlife. Students are to create and conduct a survey to investigate what their local community knows about their wildlife care groups. This data is then collated and analysed by students. This information can be communicated to the local wildlife care groups.

1. Ask students to identify all the local wildlife care groups. Students may need to go online or phone local animal care groups or veterinarians.
2. Students are to make a [short survey](#) inviting people within their community to communicate what they know about these local wildlife care groups. This can be an online or paper survey. The survey could be different for each student or group, or it could be developed and conducted by everyone in the class.

Questions could include:

- If you found an injured native animal who would you call?
- What local wildlife care groups have you heard about or do you know?
- Do you think groups who rescue or rehabilitate native wildlife are important within our community?
- Where would you go to find out information about identifying if your local community had an animal care group?
- What information would you need to know about these local wildlife care groups?



3. Once the survey has been approved by the teacher, students are to ask as many people in their community as they can to complete it. Once the students have collected their data, they are to collate this information and display the responses to each question in at least 2 formats (e.g. table and graph).
4. Students are encouraged to share their findings with the local animal care groups they identified. The care groups may be invited into the class so students can discuss their findings.
5. From the data, and after meeting with the wildlife groups, students create an information page that communicates to the general public who these local groups are, what they offer, and how to get in contact with them if you find an injured native animal. This can take the form of a website, newspaper article or students could create an advertisement of their own to support the identification of their local animal care groups based on their research findings.
6. Students are to focus on the effectiveness of the communication of the message with consideration of use of language, text and purpose. Promote the use of text and images.
 - Media students: what techniques and tools have been used to create these images?

Activity 4 (suggested for 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 Maths or Media Arts unit you are presently working on.

Australian Curriculum English:

- Unit 1: Explore how meaning is communicated through the relationships between language, text, purpose and audience.
- Unit 2: The way ideas, attitudes and voices are represented, for example, how events are reported differently in the media.

English as an Additional Language:

- 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.

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, context, individual points of view and responses.

Please refer to the start of this document for more detailed links to the Australian Curriculum.

Learning intention: Student will investigate the Health and Safety aspects associated with Australian Bat Lyssavirus (ABLV) and bats. They will then critique online texts and documents to explore the representation of ABLV, specifically in relation to Flying foxes. Students are then asked to create informed opinions and be able to communicate this opinion in written and verbal form.

The Australian Bat Lyssavirus (ABLV) is the only disease that humans can catch from bats. Despite the extremely low risks associated with the contraction (3 people), Flying Foxes are subject to mandatory euthanasia requirements if they scratch or bite humans. For this reason, wildlife rescue organisations instruct the public not to handle injured bats. Most bats care groups have trained, and vaccinated handler would aid an injured bat, for free.



Flying fox pups suffering from hypothermia were found on the ground at Mount Ommanney in south west Brisbane last week

1. For background information about Bats, ask students to research why Scientists and Governments believe Flying Foxes are important to Australian ecosystems. The information in background *Notes for Teachers* will assist in talking with students about the importance of Microbats and Flying Foxes to our ecosystem. 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. Ask the students to compare what they found through their research with the information presented in this TED talk explaining about the importance of Flying Foxes to the Australian eco-system <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>
3. Invite the student to generate an understanding of the Science, Health and Safety, and legal aspects associated with the one disease Flying Foxes can give to a human: [the Australian Bat Lyssavirus \(ABLV\)](#). Research indicates that ABLV is present in less than 1% of all free-living bats. And ABLV is very rare in humans; only three cases of human infection with ABLV have been recorded since the virus was first identified in 1996. However, if ABLV is not treated, it's fatal. It's assumed that any bat in Australia could potentially carry ABLV.

Currently, it is a [legal requirement](#) that if a bat scratches or bites a person it must be collected, euthanised and laboratory tested in the unlikely event it carries Australian Bat Lyssavirus (ABLV). It is legally classified as a 'C3 incident' when a bat has bitten or scratched a human, and a 'C2 incident' when bat may have bitten or scratched a domestic animal (mammal). This is despite there being a readily available antidote vaccine and the Queensland Government stating the risk of acquiring ABLV is low. Due to the cost of testing for ABLV, many councils are now moving away from this procedure and advising the person to go to a public hospital and receive the post bite vaccines for free.

For more information, please see

- http://www.dpi.nsw.gov.au/data/assets/pdf_file/0007/722860/Australian-bat-lyssavirus.pdf
- https://www.daf.qld.gov.au/data/assets/pdf_file/0020/90416/australian-bat-lyssavirus-guidelines_original2.pdf
- <http://conditions.health.qld.gov.au/HealthCondition/condition/14/33/14/Bats-human-health>.

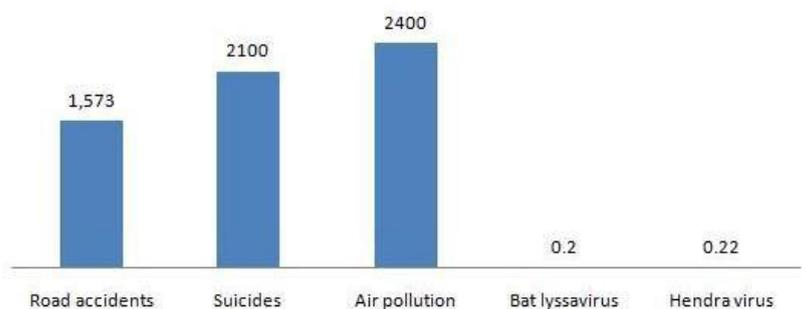
- <https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/>
- <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-law>
- <http://www.health.nsw.gov.au/environment/factsheets/Pages/flying-foxes-questions.aspx>
- https://www.health.qld.gov.au/data/assets/pdf_file/0019/433351/guideline-collect-c3-bats.pdf

4. [Flying Foxes cannot give Hendra Virus to humans](#). Evidence suggests that the virus causes flu-like symptoms in Flying Foxes but does not affect them. However, there is evidence that Flying Foxes can transmit the Hendra virus to horses, and horses can transmit it to humans. There is a Hendra vaccine for horses, however, unvaccinated horse will suffer and died. Students can do an online search to better understand this relationship.

5. Students are asked to investigate the [Australian Bureau of Statistics](#) to see the formal information for ABLV attributed

deaths in Australia. Students are to click go to the link above and click on the green Excel button to the right of the screen for point 1 - Underlying causes of death (Australia). Students are to search for 'bats', 'Flying Foxes' or 'Mircobats' and they will see there are no associated death.

Average deaths per year in Australia (2000-2013)



6. Ask students to reflect on this graph. Students can research to compare the percentage of people killed or injured by other animals such as dogs (25 deaths in Australia since 2000) or monkeys when on holiday in Bali or Thailand? This link provides interesting consideration <http://www.australiangeographic.com.au/topics/wildlife/2016/03/here-are-the-animals-really-most-likely-to-kill-you-in-australia>

Two of these causes of death are causing a national outrage. Can you guess which?

7. Students are asked to search online media articles about Flying Foxes (and ABLV) and identify and articulate the purpose, context and audience, as well as the messages conveyed through these text.

When exploring these online articles ask students to identify if the information:

- Is it emotive or impartial?
- Is based upon Science and Statistical information?
- Could cause the reader to feel anxious when they see a Flying Fox?

8. Students can explore a [2016 research article that investigates the perceptions of disease risk](#). Given the statistical evidence, students are to discuss if and why they think the general public believes bats are diseased and dangerous.

9. The teacher can introduce the concept of [distinguishing between Fact, Opinion, Belief, and Prejudice](#). Students are then asked to construct an opinion piece about what they now understand about Flying Foxes. The teacher may provide a specific question that the students have to argue in favour or against based upon informed opinions.

Activity 5 (suggested for General Mathematics and Business Studies)

This learning suggestion can be modified to fit within the learning requirements of the specific Maths or Business Studies unit you are presently working on.

General Mathematics:

- Year 12 Unit 2: Project planning and scheduling using critical path analysis.

Business Studies:

- Assessment Project: Students engage in a venture or entrepreneurial activity to raise funds for a community business.

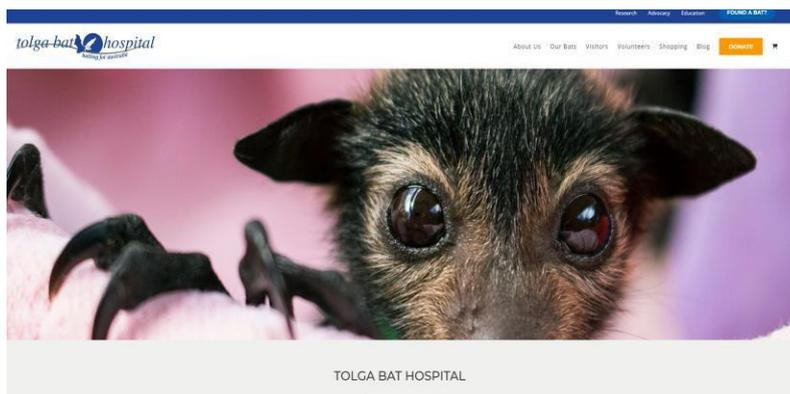


Please refer to the start of this document for more detailed links to the Australian Curriculum.

Learning intention: Students are asked to investigate ways they can generate funds for a local bat care group. They then undertake a micro business activity to raise funds for a bat care group of their choice. For a list of Bat conservation groups in Australia, please see: <http://ausbats.org.au/bat-conservation-links/4580787325>

Although wildlife hospitals rely heavily on volunteers and their community to remain operational, there are still considerable costs associated with the ongoing feeding and medical care of sick and injured wildlife.

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. Show students the [Baby Bat Burritos](https://www.youtube.com/watch?v=Uuvaos1WHTk) (<https://www.youtube.com/watch?v=Uuvaos1WHTk>) video, which shows baby bats being cared for by humans after losing their mothers. Ask students to explore why it is important to care for young Flying Foxes.
3. The Tolga Bat Hospital website shows the ways funding is obtained for these wildlife hospitals (https://www.tolgabathospital.org/about_funding.htm).

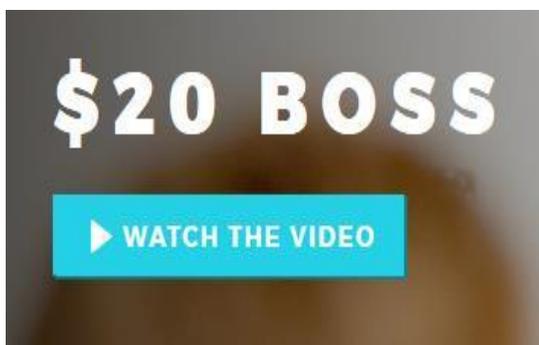


These funding methods include:

- Visitor centre admission and merchandise sales
- Grants and donations
- Memberships
- Volunteers and volunteering organisations
- Bat colleagues (carers, scientists, etc.) around the world
- Local community groups
- Research

4 Ask students what they think they could do to raise funds effectively, from a business standpoint. Show the \$20 Boss Trailer video (<https://www.fya.org.au/programs/20boss/>). This video explains the basic concept of the \$20 boss program. The \$20 Boss Program was created by The Foundation for Young Australians through partnership with the National Australian Bank. It is a program where students are given a \$20 loan to start a business and at the end of the program are required to pay it back with \$1 interest and are encouraged to donate the profits.

5 The students will choose a charity organisation for Flying Foxes in Queensland, such as;



[Bats QLD](#), [Bats Conservation and Rescue QLD](#), [Australasian Bats Society](#) and [Tolga Bat Hospital](#). Students are asked to research their chosen organisation and create a brochure promoting the importance of Flying Foxes, as well as information about their chosen charity. Students are then to use the \$20 Boss Program to create a business to raise money for their chosen charity. Working in groups is encouraged, but not necessary.

6 The initial sequence will not take long, but it is suggested that students are able to use a term to practice their businesses during lunch hours. Students will need to include the brochure for their customers.

7 After the \$20 Boss Program is complete and the profits are donated to the respective charities, students will write a reflection about managing their not-for-profit business. Students will write an overview of how they hope their donated funds will benefit Flying Foxes.



What could your students do with \$20?
The answer might surprise you.

\$20 Boss is an immersive entrepreneurship program for secondary school students. Students are provided \$20 of start-up capital to create, launch and operate their venture over the course of a school term.

Teachers are supported through a comprehensive toolkit that enables end-to-end delivery in the classroom, and student engagement through a dynamic cloud based platform. Even better- all materials are aligned to the Australian Curriculum.

Developed by FYA - the \$20 Boss program is the largest entrepreneurship program in Australia. In just three years - over 27,750 students across Australia in over 500 secondary schools, 33% from low socio-economic areas have participated.

Join the entrepreneurial evolution!

Resources



- Bats Queensland <https://www.batsqld.org.au>
- Don't Shoot Bats <http://www.dontshootbats.com/>
- Bat Resuce Inc (Australia) <https://batrescue.org.au/new/>
- WIRES <https://www.wires.org.au/>
- Queensland Wildlife Rehabilitation Council Inc <http://www.qwrc.org.au>
- Australasian Bat Society <http://ausbats.org.au/>
- Sydney Bats <http://sydneybats.org.au/>
- Tolga Bat Hospital https://www.tolgabathospital.org/about_funding.htm
- Bats Conservation and Rescue QLD <http://bats.org.au/>
- Australasian Bats Society <http://ausbats.org.au/>
- World of Animal Welfare: 'Elvis the Orphaned Flying Fox'_ <http://www.woaw.org.au/teachers/elvis-the-orphaned-flying-fox/>
- 2015 Northern Territory Government Department of Primary Industry & Fisheries document about the national veterinarian's AUSVETPLAN ABLV strategy https://nt.gov.au/_data/assets/pdf_file/0019/241048/nt-ablv-guidelines-vets.pdf
- Queensland Government, Department of Health, Guideline for the Collection and Transport of Category 3 (C3) Bats https://www.health.qld.gov.au/_data/assets/pdf_file/0019/433351/guideline-collect-c3-bats.pdf
- Queensland Government, Department of Health, Guideline for the Collection and Transport of Category 3 (C3) Bats https://www.health.qld.gov.au/_data/assets/pdf_file/0019/433351/guideline-collect-c3-bats.pdf
- Disease Risk Perception and Safety Practices: A Survey of Australian Flying Fox Rehabilitators <http://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0004411>
- Here are the animals really most likely to kill you in Australia_ <http://www.australiangeographic.com.au/topics/wildlife/2016/03/here-are-the-animals-really-most-likely-to-kill-you-in-australia>
- Baby Bat Burritos <https://www.youtube.com/watch?v=Uuvaos1WHTk>



- In Defence of the Flying Fox <http://www.abc.net.au/catalyst/stories/3000668.htm> (10.13)
- No Tree No Me <http://sydneybats.org.au/education/bat-videos/no-tree-no-me/>
- \$20 Boss Trailer video (<https://www.fya.org.au/programs/20boss/>)

Attachments

LESSON	RESOURCE	DETAILS
2	1	Elvis the Orphaned Flying Fox (http://www.woaw.org.au/teachers/elvis-the-orphaned-flying-fox/).
2	2	Currumbin Wildlife Hospital Worksheet
2	3	Currumbin Wildlife Hospital Answer Sheet

Resource 1



RSPCA Humane Education for
Teachers

Last updated: January 23, 2013

Meet Elvis, an orphaned Flying Fox.

<http://www.woaw.org.au/teachers/elvis-the-orphaned-flying-fox/>

Elvis the Orphaned Flying Fox



Bats are often victims of road accidents and getting caught in barb wire or tree netting. This article is about Elvis a Flying Fox, who was lucky enough to be rescued. Elvis was found on the road after his mother was hit by a car. He was taken to Currumbin Wildlife hospital where a foster home was found for him. Jasmin Croft an RSPCA worker at the Currumbin Valley Community Farm became his foster mother.

Looking after a baby bat is, in some ways, like looking after a human baby!

Here are a few similarities:

Bats have dummies. Yep hard to imagine but they do! You see in real life the bat would be suckling its mother, feeding and helping it to hold on to her body when she is flying around. Baby bats will cry if they don't have their dummy, as the dummy makes them feel secure.

Bats need to be fed during the night. Yes, that's right, Jasmin feeds Elvis bat milk every 4 hours until he is four weeks old, then five hourly until he is weaned off milk and can begin to eat fruit.

Bats go to Bat Crèche. All teenage bats who are in foster care attend Bat Crèche. This is so the bats can learn to behave like a bat. For example, during their time at Bat Crèche they will learn how to fly, learn to find food in the wild and learn how to clean themselves. Bat crèche prepares the bats for release into the wild.

When Elvis is old enough to be released, he will graduate from Bat Crèche. Elvis will be transferred into a release aviary, which is a large flight aviary that is close to a bat colony. Bats are social animals that live together in a camp. Being close to the colony in his aviary, Elvis will meet and interact with wild bats.

When Elvis has made some new friends from the colony he will be released into the wild. If you see a sick or injured bat please don't touch it as, although rare, it may be carrying Lyssavirus, which is a form of Rabies. Gloves must always be worn when handling bats. If a bat needs help call **1300 264 625** or **1300 ANIMAL** for a trained professional.

If you think you've got what it takes to become a bat carer you can contact your local bat rescue organisation. To become a bat carer, you will need to attain a vaccination against Rabies and attend an orphan bat rearing training course. Being a bat carer is normally a voluntary job for people who are passionate about our local wildlife. You can also get further information by calling the number above.

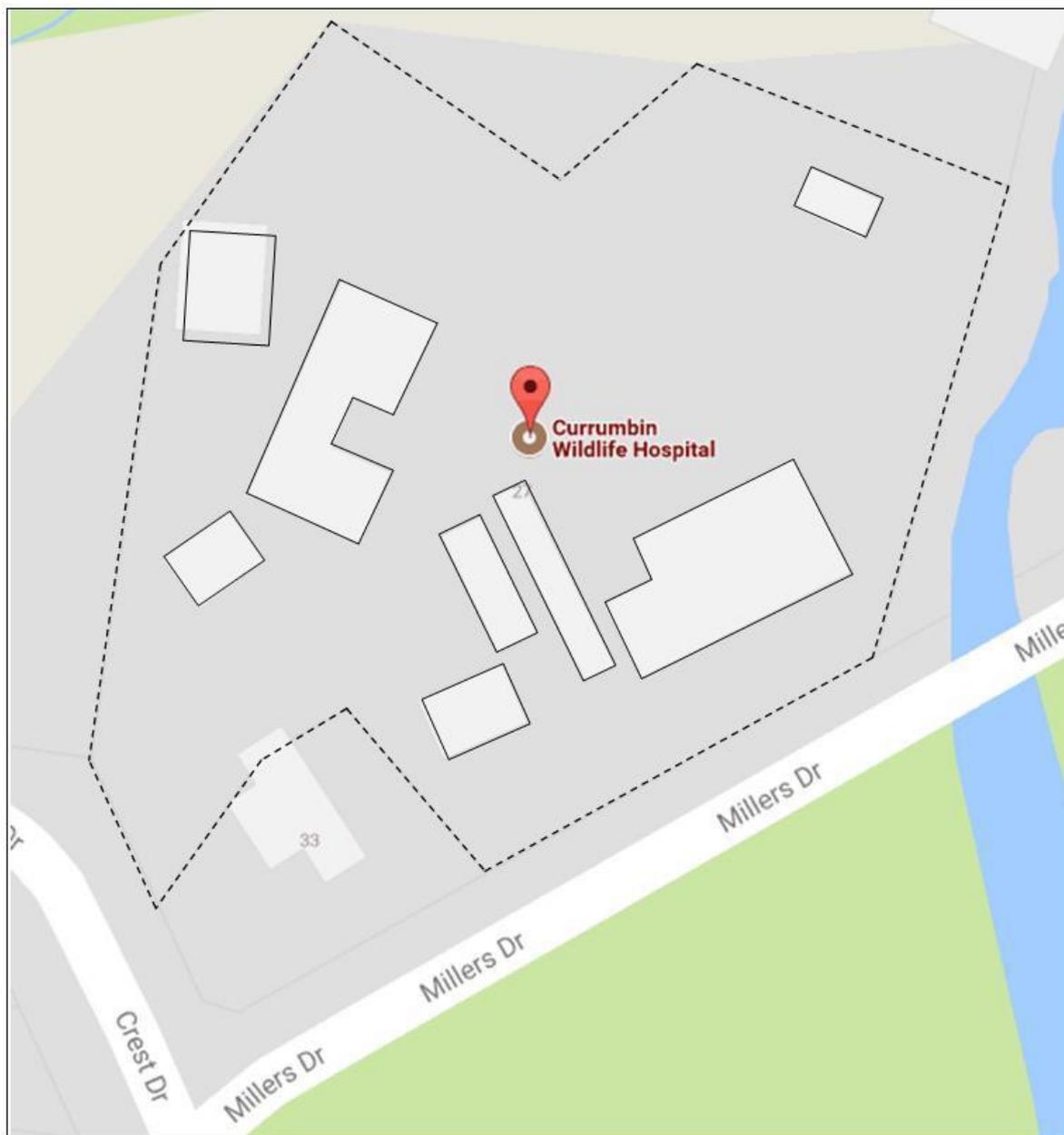
CURRUMBIN WILDLIFE HOSPITAL
SITE PLAN



Using the scale provided, help Currumbin Wildlife Sanctuary answer the following questions:

1. The cross-hatched building is the Flying Fox Release Aviary and it needs to be remeshed. Fixing materials have been donated and volunteers will be doing the installation.
 - Each sheet of mesh measures 2200mm wide x 1200mm high. An extra sheet of mesh is to be included in calculations for remeshing the access gate. If the aviary is 35 metres long, 6 metres wide and 2.2 metres high how much will it cost to remesh it if the mesh costs \$55.00 per sheet?
2. The perimeter fencing is needing to be replaced.
 - What is the length of fencing required (write measurements on your plan)?
 - Provide 4 quotes to the sanctuary for new fencing. Allow for a 3m wide gate on the Millers Drive boundary. Quotes are based on the following pricing:

Fence prices including labour and installation			
Treated pine paling fence	\$98 per lineal metre	Hardwood paling fence	\$103 per lineal metre
Tubular metal fence	\$265 per lineal metre	Brick/or block fence	\$675 per lineal metre
Additional costs			
Remove old fence	\$3 per lineal metre	3m wide driveway gate	\$770.00



1. Tip: turn mesh on its side to maximise width (as the mesh width is the same as the enclosure height).
 $= 1 + 2[(35m \div 1.2m) + (6m \div 1.2m)] = 1 + 2[30+5] = 1 + 70 = 71$ sheets x \$55 each = \$3905.00
2. Perimeter = 425m (subtract 3m for gate when calculating fencing).

FENCE TYPE	REMOVAL	GATE	FENCING	TOTAL
Treated pine paling fence	\$1,266	\$770	\$41,356	\$43,392
Hardwood paling fence	\$1,266	\$770	\$43,466	\$45,502
Tubular metal fence	\$1,266	\$770	\$111,830	\$113,866
Brick/or block fence	\$1,266	\$770	\$284,850	\$286,886