

Bats

<p style="text-align: center;"><u>Outcomes R-7</u> <u>Australian Curriculum</u> <u>Science Inquiry Skills</u></p> <ul style="list-style-type: none"> • multiple <p style="text-align: center;"><u>Science as a Human Endeavour</u></p> <ul style="list-style-type: none"> • multiple <p style="text-align: center;"><u>Science Understandings</u></p> <ul style="list-style-type: none"> • Biology - multiple - see broadsheet • Biodiversity and urban ecology of bats • investigation of different species of bats • identification/monitoring of bats in school yard 	<p style="text-align: center;"><u>Engage</u></p> <p style="text-align: center;">Diagnostic assessment</p> <ul style="list-style-type: none"> • pictures or models of bats • books about bats • DVD on bats • make models/draw pictures of bats, label them • list questions about bats • brainstorm what students already know • sort cards with animals from different groups • predict where bats might be found 																																
<p style="text-align: center;"><u>Explore</u></p> <p style="text-align: center;">Formative assessment</p> <ul style="list-style-type: none"> • observe bats on bat identification cards • investigate where bats live and what bats eat • research different species of bats with focus on habitat, diet, life cycle, special features, threats etc • construct models of bats -label body parts • construct an annotated diagram of a bat • compile a list of 'bat facts' for the 'bat cave' • what is the difference between a microbat and a megabat • investigate the importance of bats in insect control, seed dispersal in the rainforest, pollination etc. • explore popular misconceptions/myths about bats • make a diorama of a bat cave/habitat • bat range maps • difference between bats and birds • vibrations activity • exploring sound waves activity • exploring echolocation activity • 'bat ears' activity 	<p style="text-align: center;"><u>Questions</u></p> <p>elicit questions from students - what do they want to know about bats?</p> <ul style="list-style-type: none"> • how do bats get around at night? • why do they come out at night? • how do bats know where they are going? • are bats blind? • what is the most common bat? • what bat species are specific to Australia? • what is a baby bat called? • why do bats migrate? • why do bats hibernate? <p>discuss how questions can be investigated - guided research</p> <p style="text-align: center;"><u>Word Wall/Bat Cave</u></p> <table border="0"> <tr> <td>sonar</td> <td>nocturnal</td> <td>native</td> <td>omnivores</td> </tr> <tr> <td>hibernate</td> <td>mammal</td> <td>guano</td> <td>pollinators</td> </tr> <tr> <td>echolocation</td> <td>roost</td> <td>insectivorous</td> <td>spelunkers</td> </tr> <tr> <td>forage</td> <td>megabats</td> <td>anticoagulant</td> <td>conservation</td> </tr> <tr> <td>radar</td> <td>cave</td> <td>fingers</td> <td>vampire</td> </tr> <tr> <td>furry</td> <td>fruit</td> <td>insects</td> <td>microbats</td> </tr> <tr> <td>thumb</td> <td>migrate</td> <td>fur</td> <td>pollinate</td> </tr> <tr> <td>claws</td> <td>wings</td> <td>patagium</td> <td>uropatagium</td> </tr> </table>	sonar	nocturnal	native	omnivores	hibernate	mammal	guano	pollinators	echolocation	roost	insectivorous	spelunkers	forage	megabats	anticoagulant	conservation	radar	cave	fingers	vampire	furry	fruit	insects	microbats	thumb	migrate	fur	pollinate	claws	wings	patagium	uropatagium
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Explain

- view clips from website www.Arkive.org, David Attenboroughs 'Planet Earth' DVD, or youtube.
- organise a visit from Adelaide Batcare's Mary Crichton, (mob 0422182443) -info at www.adelaidebatcare.
- visit Adelaide Zoo - Nocturnal Animal House and Flying Fox colony or Cleland Wildlife Park - Ghost Bat display
- Parts of bats - fur, wings, arm bones, finger bones, five-toed feet, thumb, and function of bats, skin between fingers etc
- Bats are the only flying mammals, and they are nocturnal
- Echolocation - how does it work?
- found in all types of habitats, except poles
- over 900 species -microbats and megabats
- usefulness of bats within ecosystems, to humans, in agriculture

Elaborate

- investigate questions posed
- research a bat species
- make lists of micro and megabats
- bat species of world fact chart/poster
- venn diagram showing similarities between types, species
- produce a power point about a bat species
- compare wingspans of different species
- look at structural differences, types of wings
- produce posters, projects on bats that answer some of the questions posed

Literacies of Science

drawings
ideas map
word wall
labelled diagrams
annotated drawings
science journal/class journal
oral presentation
TWLH chart
factual texts
report
poster
persuasive text

Mathematics of Science

measurement - size of bats, wingspan, compare, graph
tables of data
temperature
number
maps - location
weight of bats

Evaluate

Summative Assessment

What do you want students to know?

- Bats are important indicators of the health of our environment.
- There are two groups of bats - microbats and megabats and there are many species of bats, each with their own characteristics, food preference etc
- Bats use echolocation to navigate

- what are scientists finding out about bats? Hendra virus spread by fruit bats
- how are bats important in an ecosystem?
- design your own bat quiz
- write a persuasive text about why bats are useful and unique
- produce a podcast about bats

Presentations of research - projects/posters/podcasts on bats

Use of ICT

- 'Anabats' - hand held, or overnight digital recorders of bat 'calls'
- powerpoint, publisher for Bat projects
- internet
- podcasts
- audacity

Outside Agencies

The NRM Education website has information on 'Engaging with Nature'. School groups throughout Adelaide and Mount Lofty Ranges have been involved in a range of monitoring and taking action activities as part of this program. Watch this website for information on Bat monitoring, currently being investigated by this NRM.

Mt Pleasant Natural Resource Centre has information on the availability of Anabats - bat-monitoring devices which can be borrowed for use by schools. These devices digitally record the presence of bat species in the school grounds overnight. These data loggers can be plugged into a USB port on a computer and the 'calls' recorded can then be identified using the 'Bat Identification Charts'.

Other useful resources

Books

'Bat Conservation -Project Book', Shirley Thompson and Phil Richardson
'Extremely Weird Bats', Sarah Lovett
'Stella Luna' by Jannell Cannon

DVDs

'Planet Earth', 'Life of Mammals' - David Attenborough
Magic School Bus - 'Going Batty', on echolocation

Websites

www.arkive.org

www.adelaidebatcare.au

www.bats4kids.org - an excellent site for information, that is kid friendly, with links to a good echolocation game

<http://projects.edtech.sandi.net/chavez/batquest/task.html>- (this is a webquest based on Stella Luna)

Other

Bat Identification Cards

AUSTRALIAN CURRICULUM: SCIENCE Links with Bat Unit

SCIENCE UNDERSTANDING

BIOLOGICAL SCIENCES

CHEMICAL SCIENCES

EARTH & SPACE

PHYSICAL SCIENCES

<u>yr</u>	<u>Structure & Function</u>	<u>Diversity & Evolution</u>	<u>Interdependence</u>	<u>Properties & Structure</u>	<u>Interaction & Change</u>	<u>Systems in Space</u>	<u>Changes to the Earth</u>	<u>Transformation & conservation of energy</u>	<u>Forces & Motion</u>
R			Living things have basic needs, including food & water What do bats eat? How do bats drink?	Objects are made of materials that have observable properties.			Daily & seasonal changes in our environment, including the weather, affect everyday life.		The way objects move depends on a variety of factors, including their size and shape. structure of wings
1	Living things have a variety of external features. label the parts of a bat		Living things live in different places where their needs are met. Where do bats live?		Everyday materials can be physically changed in a variety of ways.		Observable changes occur in the sky and landscape.	Light and sound are produced by a range of sources and can be sensed. echolocation and sonar	
2	Living things grow, change and have offspring similar to themselves. Lifecycle of bats				Different materials can be combined, including by mixing, for a particular purpose.		Earth's resources, including water, are used in a variety of ways.		A push or pull affects how an object moves or changes shape.
3		Living things can be grouped on the basis of observable features and can be distinguished from non-living things. What types of bats are there? microbats and megabats			A change of state between solid and liquid can be caused by adding or removing heat.	Earth's rotation on its axis causes regular changes, including night and day.		Heat can be produced in many ways and can move from one object to another.	

4	Living things have life cycles. Lifecycle		Living things, including plants and animals, depend on each other and the environment to survive. relationships between bats, their food sources and environment	Natural and processed materials have a range of physical properties; these properties can influence their use.			Earth's surface changes over a time as a result of natural processes and human activity.		Forces can be exerted by one object on another through direct contact or from a distance.
5	Living things have structural features and adaptations that help them to survive in their environment. echolocation adaptations hibernation			Solids, liquids and gases have different observable properties and behave in different ways.		The Earth is part of a system of planets orbiting around a star (the sun).		Light from a source forms shadows and can be absorbed, reflected and refracted.	
6		The growth and survival of living things are affected by the physical conditions of their environment. cave or tree dwelling, etc			Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting.		Sudden geological changes or extreme weather conditions can affect Earth's surface.	Electrical circuits provide a means of transferring and transforming electricity. Energy from a variety of sources can be used to generate electricity.	
7		There are differences between groups of organisms; classification helps organise this diversity. classification of bats according to size and food eaten	Interactions between organisms can be described in terms of food chains and food webs; human activity can affect those interactions. food chain/web of bats		Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques.	Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and moon.	Some of Earth's resources are renewable, but others are non-renewable. Water is an important resource that cycles through the environment.		Change to an object's motion is caused by unbalanced forces acting on the object. Earth's gravity pulls objects towards the centre of the Earth.

Also covers the following Strand and sub-strand descriptors:

SCIENCE AS A HUMAN ENDEAVOUR

Nature and development of Science

- R-Science involves exploring and observing the world using the senses
- 1-2 Science involves asking questions about, (and describing changes in), objects and events

If you get to do some bat monitoring with your students the following also applies:

Use and influence of Science

- 1-2 People use science in their daily lives, including when caring for their environment and living things
- 3-4 Science knowledge helps people to understand the effects of their actions
- 5-6 Scientific knowledge is used to inform personal and community decisions

SCIENCE INQUIRY SKILLS

Questioning and Predicting

- 1-2 Use measurements in the collection and recording of observations, with the assistance of digital technologies
- 3-4 Safely use appropriate ... equipment to make and record observations using formal measurements and digital technologies as appropriate

When students prepare and present reports they will be covering most descriptors in Communicating sub-strand, particularly

- 3-4 -Presenting and communicating ideas and findings in a variety of ways such as diagrams, physical representations (models) and simple reports