

Fill The Bill

Objectives

Questions with answers in this document will help teacher in providing a guideline for students to have correct solutions for the problems in all the activities of the topic. To ensure that students achieve higher levels of teaching standard.

Activity 1 – The Best Tools to Use for Different Food Sources

Expected answers for Results

Station	Best Tool
1	<i>Eyedropper or straw</i>
2	<i>Chopsticks or forceps</i>
3	<i>Nutcracker or pliers</i>
4	<i>Large scoop or slotted spoon</i>
5	<i>Tongs</i>
6	<i>Forceps or tweezers</i>
7	<i>Forceps or tweezers</i>
8	<i>Tongs</i>

Description of expected answers for Extension of Results

Food	Best beak shape
Nectar	Long and thin beak.
Worms in mud	Relatively long and thin beak, slightly wider than beak designed for feeding on nectar.
Seeds	Short, sharp and mid- width beak.
Fish	Large long and wide beak, with scoop like structure.
Tiny aquatic plants and animals	Mid-width and mid-length beak, with rounded edges.
Flying insects	Short beak with tweezer-like pointed end.
Caterpillars and insects	Mid-length beak with tweezer-like pointed end.
Fruit	Mid-length and width beak with tweezer-like pointed end.

Expected answers for Discussion questions

Question 1. How do their beaks compare with your drawings?

To what extent do you think this modelling activity allows you to understand bird beak adaptation?

Beak drawings are relatively well-matched to actual bird beaks adapted for the same food types. This modelling activity shows that only certain types of 'beaks' will pick up particular food types and so demonstrates that if a particular 'beak' is not available then the food source cannot be accessed

Question 2. What do these models **not** show about bird beak adaptation?

This model simulates a beak shape yet does not show the actual beak and its 3D structure that along with the tongue and any other mouth parts that may assist a bird to access food

Question 3. How do these activities represent the way that scientists study adaptations?

Scientists study organisms and observe them in their environment where they eat their food to determine how their food source is accessed and which animal and its mouth-parts are suited to eat the food source. These activities enable students to interact with the environment in this case the simulation, make observations and conclusions based on their observations

Question 4. Can you link this modelling activity to the scientific practice of palaeontology (scientists interpreting dinosaur fossils)?

Palaeontologists are able to identify what different types of dinosaurs fed on by looking at their teeth and jaw shape. An example is the sharp canine teeth that the Tyrannosaurus rex had which demonstrated this species was a carnivore.

Activity 2 - ATLAS OF LIVING AUSTRALIA PRACTICE

Expected answers for Task A Results

Bird	No. of records	Habitat(s)
<i>Anas platyrhynchos</i> Common Mallard	108	Primarily vegetated cultivated & managed lands Herbaceous Griminoids
<i>Manorina melanocphala</i> Noisy miner aasa	410	Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Shrubs
<i>Turdus merula</i> Common blackbird	5600	- Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Shrubs

		- Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees
<i>Pelicanus conspicillatus</i> Australian pelican	217	Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees
<i>Rhipidura leucophrys</i> Willie wagtail	4258	- Primarily Vegetated Cultivated & Managed Lands Herbaceous Graminoids - Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation
<i>Cacatua galerita</i> Sulphur-crested cockatoo	2086	- Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees - Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees
<i>Anthochaera carunculata</i> Red wattle bird	4	- Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees - Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees
<i>Cracticus torquatus</i> Grey butcherbird	2760	Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees

Expected answers for Task B Results

Results will vary as there are more than 6 bird species that have 10-30 recorded sightings.

Summary to the Geelong council will vary from student to student depending on what species they have identified and the habitats in which those species have been recorded. Although below is some points to expect in an answer.

- Geelong council should aim to preserve Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation & Primarily Vegetated Cultivated & Managed Land habitats.
- These habitats are the most common habitats where the above rare species of birds have been recorded.
- Conserving these habitats will most likely increase the above listed species numbers.

Bird	No. of records	Habitat(s)
<i>Acanthiza (Geobasileus) reguloides</i>	18	<i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i>
<i>Anas (Spatula)</i>	14	- <i>Primarily Vegetated Cultivated & Managed Lands Herbaceous Graminoids</i> - <i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i>
<i>Ardea (Mesophoyx) intermedia</i>	25	- <i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i> - <i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i>
<u>Chlidonias (Chlidonias) leucopterus</u> : <i>White-winged Black Tern</i>	10	<i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation</i>
<u>Cincloramphus (Cincloramphus) cruralis</u> : <i>Brown Songlark</i>	19	- <i>Primarily Vegetated Cultivated & Managed Lands</i> - <i>rimarily Vegetated Natural &</i>

		<i>Semi-Natural Terrestrial Vegetation Woody Trees</i>
<u>Coturnix (Synoicus ypsilophora</u> : Swamp Quail	14	<ul style="list-style-type: none"> - <i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i> - <i>Primarily Vegetated Natural & Semi-Natural Terrestrial Vegetation Woody Trees</i> - <i>Primarily Vegetated Cultivated & Managed Lands</i>

Activity 3 – Case study

Expected answers for Results

	Dates of Record	Number of difference	Useful data for Report (Yes/No)
Regent honeyeater	1993-05-01 1895-12-01	Only 2 dates out of 4 sightings	No
Australian bustard	No data	No data	No
Rufous songlark	1967-01-01 1968-10-27 1978-02-26 1978-02-26	There are 4 recorded sightings	No
Rainbow bee-eater	Most recent record: 2017-10-18	31 records	Yes

Decide whether you think that the information on the location of each bird is current and reliable enough to use in your submission to council.

Not reliable if there are some species with undated sightings and others with last sightings from the 1800s.

Expected answers for Discussion questions

Student conclusions will vary, although some expected answers are shown below.

Question 1. Choose one of the above that is unreliable.

What could be done to generate more accurate data about

a) Distribution

Would need to get someone to conduct sighting tests in a range of places over a long period of time.

b) Habitat

Take photos and samples where birds are sighted.

Question 2. If a scientist is to work for the Geelong City Council in recommending habitat management what range of things should they consider? For example, food sources.

- *Wetland health and maintenance*
- *Tree cover (Habitat for a number of species)*

Question 3. A local Councillor objects to spending money on bird preservation. He suggests that the money would be better spent on upgrading the football ground/facilities. How would construct an agreement in support for bird preservation?

- *The football ground can be upgraded and surrounding it money can be spent on creating a woody vegetation habitat or wetland which provides habitat for several bird species.*
- *Birds are part of larger food webs and if they are not conserved they become extinct, resulting in a domino effect which influences the survival of other organisms, such as those that rely on them as a food source.*

Acknowledgments

Special thank you to Atlas of Living Australia (ALA) for allowing for their content to be used for this activity.

Copyright and Creative Commons

The moral rights of the authors, Kieran Lim, Ian Bentley, Peta White, John Long, Maria Vamvakas with the support of Michael Arnold, Stella Baziotopoulos, Mika Sutawan, Arya Kutti and Josie Lam (as part of the Community Science Project unit with the Faculty of Science - 2018) have been asserted under the Australian Copyright Act 1968 (Cth).

Excepting logos, trademarks or other third-party content as indicated, this resource is distributed under a Creative Commons 'Attribution-Non Commercial-Share Alike' 4.0 International License.

