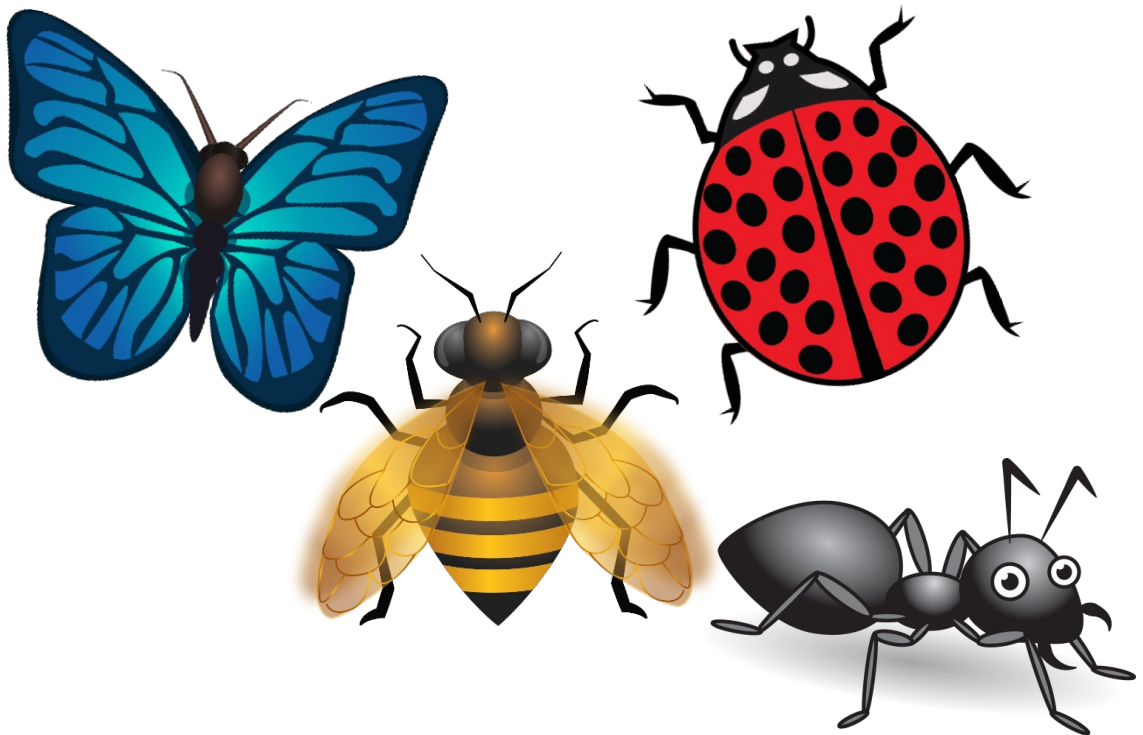


Life Cycles

Lesson Notes



Year 4
Biological Science
5 Day Print Course
Lesson Notes

First published 2016

© Department of Education WA Revised 2020



<https://creativecommons.org/licenses/by-nc/4.0/>

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, no guarantee can be given that all errors and omissions have been excluded. No responsibility for loss occasioned to any person acting or refraining from action as a result of the material in this publication can be accepted by the Department.

Requests and enquiries concerning copyright should be addressed to:

Manager Intellectual Property and Copyright
Department of Education
51 Royal Street
EAST PERTH WA 6004
Email: copyright@education.wa.edu.au



Department of Education

This resource contains information from the Western Australian Curriculum Version 8.1.
© School Curriculum and Standards Authority. The unaltered and most up to date version of this material is located at <http://wacurriculum.scsa.wa.edu.au>

Introduction

Getting started:

This science course should take approximately five days to complete. Home tutors should read the home tutor notes, worksheets and prepare the equipment prior to each day.

“Background information” on the science behind the investigations is for the purpose of the home tutor and not mandatory for the student’s understanding.

Students may need help with reading and understanding the tasks. This should be done together with their home tutors.

Terms such as “investigate, predict, follow a procedure, observe, and record” should be used by the home tutor when working with their students in science. It is important that students become familiar with these terms.

Home tutors should mark their students work with a tick and give written encouragement or use stamps and stickers at the end of each day. Students should be reminded to write their answers using full sentences. They should be encouraged to use scientific words where they can.

Safety:

There is supervision needed in all activities for the purpose of safety. Investigation around heat and sharp objects such as scissors are found in some investigations. A warning sign is used to indicate where this is most necessary.



Materials:

Equipment used for this science course can be found in most households or can be purchased at the local supermarket. Collecting the equipment and ticking off the list together can be the first activity to do with your student in preparation for this course.

Day 1 Characteristics of Living Things

1.1 A living glossary Example answers

1. Use a dictionary to find the meaning of each of the seven characteristics of living things. A useful website: <http://dictionary.kids.net.au/> or <http://encyclopedia.kids.net.au>
2. In the spaces below, explain what they are and why living things need to do each of these. Give an example and as much detail as you can.

Growth:

A purely biological unfolding of events involved in an organism changing gradually from a simple to a more complex level;

Breathing or Respiration:

Respiration is the process or processes involved in the exchange of oxygen and carbon dioxide between an organism and the environment.

Reproduction:

A biological process by which organisms create descendants through the combination of genetic material.

Movement:

A change of position that does not entail a change of location

Excretion:

Excretion is the biological process by which an organism separates waste products from its body. The waste products are then usually expelled from the body by elimination.

Reaction or Sensitivity:

A bodily process occurring due to the effect of some foregoing stimulus or agent; The ability to respond to physical stimuli or to register small physical amounts or differences.

Feeding:

The act of consuming food.



1.2 Which are living? Example answers

1. Complete the table below by making a list of animals and plants and other things you might find in a natural environment under the “Things” column.
2. Place ticks in the column beside to show the characteristics for each. Total each row and decide whether they are living or non-living things. Use the background information from the last page as a reference.
3. Make sure you show at least two non-living things.
4. Two examples have been given to get you started.

Things From The Environment	Characteristics							Total	Living	Non-living
	Breathe	Grow	Reproduc	Feed	Excrete	Move	React			
Humans	✓	✓	✓	✓	✓	✓	✓	7	✓	
Rock	x	x	x	x	x	x	x	0		✓
Sand	x	x	x	x	x	x	x	0		✓
Bird	✓	✓	✓	✓	✓	✓	✓	7	✓	
Tree	✓	✓	✓	✓	✓	✓	✓	7	✓	
Frog	✓	✓	✓	✓	✓	✓	✓	7	✓	
Snake	✓	✓	✓	✓	✓	✓	✓	7	✓	
Cloud	x	x	x	x	x	✓	x	6		✓
Water	x	x	x	x	x	✓	x	6		✓
Dog	✓	✓	✓	✓	✓	✓	✓	7	✓	
Flower	✓	✓	✓	✓	✓	✓	✓	7	✓	

1.3 I'm hungry! Example answers

What herbivores, carnivore and omnivores do you know? Write as many animals as you can and classify them into what they can eat in the using the headings in the following boxes. Some examples have been given to get you started.

Examples:

Herbivores: Rabbit , Cow, Kangaroo, Koala, Deer, Giraffe, Turtles, Mice

Omnivores: Greater Bilby, Magpie, Emu, Opossums, Raccoon, Fox, Chickens, Seagulls, Bears, Pigs, Skunks, Monkeys

<http://examples.yourdictionary.com/examples-of-omnivores.html>

Carnivores: Crocodile, Dingo, Tasmanian Devil, Spotted-tailed Quoll, Goannas, Lions, Cheetahs, Sharks, Wolves

1.4 Life in Grassland matched

Life in Grassland

1.



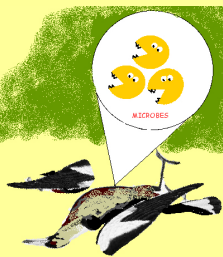
1. Two children are playing in a grassy field and find a dead magpie. They wonder why the magpie died and what will happen to it now. They decide to come back and check it in a couple of days.

2.

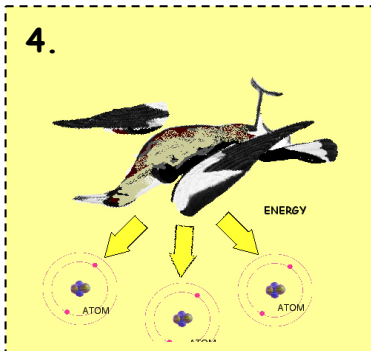


2. The next time the children look for the magpie, they see it is a few feet away under a bush. What they don't know is that last night a dingo found it, dragged it to this hiding place and ate some for dinner. The children use a stick to flip the magpie over and notice some small insects and larvae on the other side. The dingo, insects, and larvae have been using the magpie's body for food. The dingo, insects and larvae are **secondary consumers**.

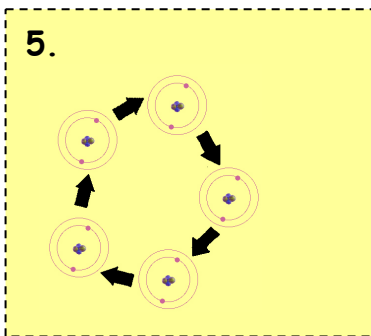
3.



3. Something the children can't see are the microscopic organisms called microbes that are also eating the magpie. Microbes are decomposers. **Decomposers** recycle dead plants and animals back into the ecosystem by breaking down the material into smaller pieces and changing form. Bacteria, fungi and other microbes are breaking down the magpie's body into little parts that can be used again by other forms of life. Some of the microbes were in the



4. Everything on Earth is made of atoms. Atoms are so small that they can only be seen by a special microscope. The microbes decomposing the magpie are breaking it apart into atoms and releasing energy at the same time. This energy is food for the microbes, the dingo, the insects, and the larvae.



5. The atoms on Earth have been around for billions of years and are constantly recycled to become part of something else. It is one of life's many cycles where organisms die but the atoms that they were made of continue on as part of the living and non-living environment.



6. A few months later, when the children go to look at the magpie again, all they can find are bits of feather and bone. It looks like the magpie is disappearing but this is not really the case. Some of the atoms are now in the dingo, the insects, and the larvae and some atoms were released into the soil and the air. The atoms that went into the soil went into the root of a mulberry tree near where the magpie died. The tree absorbed those atoms through its roots. From there, the atoms grouped into a sugar molecule in the mulberries growing on the tree.



The tree is a producer. **Producers** are living things that make their own food. These are plants like grasses, bushes and trees. **Primary consumers** are those animals that eat only plants like the grasshopper that the magpie ate before it died.

7. The children's mother made pancakes for breakfast. She added some of the mulberries she picked from the tree. So now, some of the atoms from the magpie are even in the children too! Not surprising though as recycling atoms on Earth means that atoms in their bodies once could have been part of a dinosaur!

1.5 Decomposers

Students use their imagination as to what the microbes, which break down dead organisms look like.

It is important to label their picture to indicate each different creature and their features.

1. What does the word 'interdependence mean?

'Interdependence' is the idea that everything in nature is connected to everything

else; what happens to one plant or animal also affects other plants and animals.

Animals and plants rely on other animals and plants to live.

2. Explain why the arrow symbols are used to show interdependence.

The arrows show that each part of the system forms a cycle.

The arrows show that there is a direction of movement and it is cyclical.

The colours could represent things like energy, herbivores, omnivores, carnivores and

decomposers working together.

Day 2 Food Chains

A simple food chain shows how each living thing gets food, and how nutrients and energy are passed from creature to creature. Food chains begin with the Sun. The energy from the Sun is passed onto plant-life through photosynthesis. Animals that eat plants gain energy from the plants. The energy is then passed onto animals that eat them.

2.1 Making connections

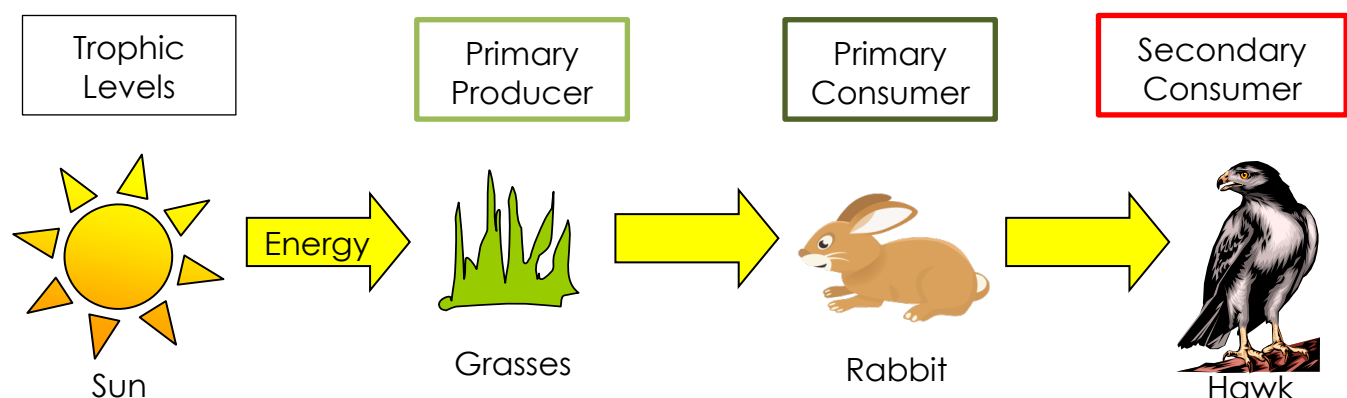
This is an example of a food chain which shows the flow of energy or who eats whom. Energy is passed up the food chain. These are called trophic levels.

What is a Trophic Level?

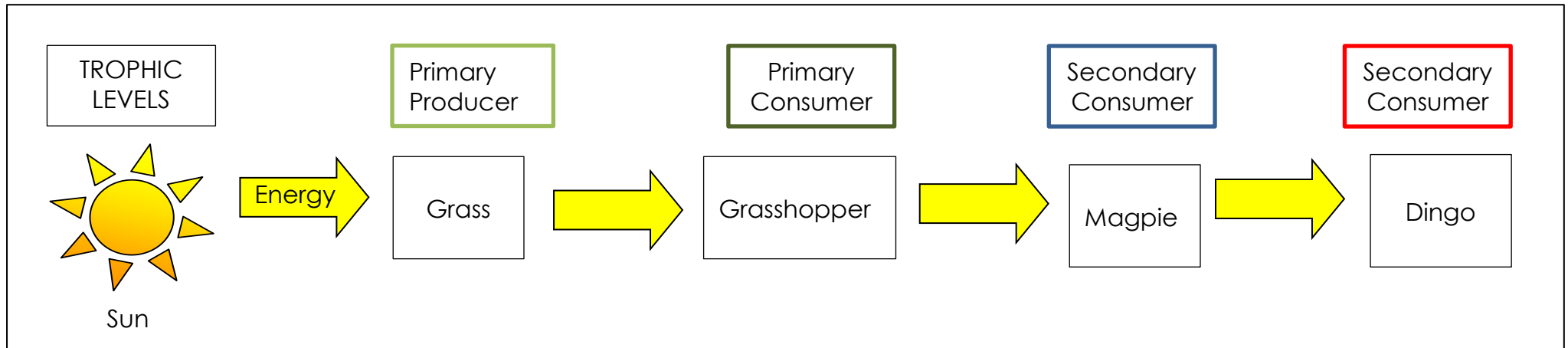
Primary producers: Plants convert the Sun's energy into food. They produce.

Primary consumers: Animals that consume (eat) the plants.

Secondary consumers: Animal which eat primary consumers. They can be omnivores or carnivores



Go back to the story on Day 1, “Life in Grassland” and draw and label the food chain below with the organisms from the story. This time though, the food chain is longer. Start with the Sun.



Answers will vary. Diagram should look similar to the one above. Students may benefit from doing the next activity (2.2 Learning Object) before completing this activity.



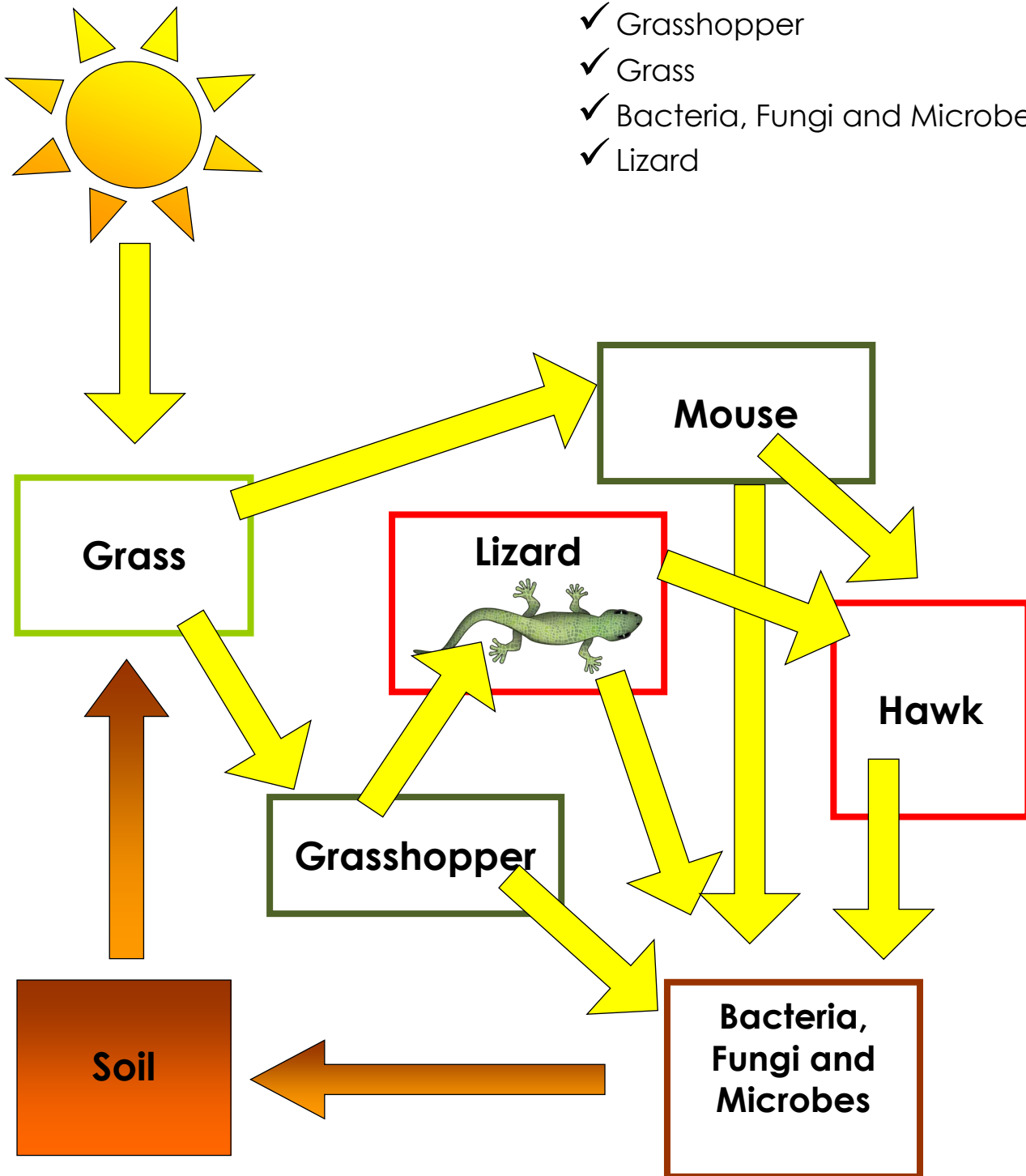
2.3 Food web diagram

Remember use yellow arrows to indicate the flow of energy (or is eaten by). Students should add at least nine more arrows.

They should tick off the list as they use each living thing.

Hint: Start at the sun and think where the energy goes and who eats whom.

- ✓ Mouse
- ✓ Hawk
- ✓ Grasshopper
- ✓ Grass
- ✓ Bacteria, Fungi and Microbes
- ✓ Lizard



2.4 I can show my own food web

1. Show your own example of a food web.
 - Similar to the last two activities use colours to indicate what the animals eat.
 - Make sure that you label your diagram with animal names, arrow to indicate direction of the flow of energy and a title.
 - Some suggestions might be an Arctic Food Web, a Desert Food Web, an Ocean Food Web or a Forest Food Web. These may need to be researched.
 - **Answers will vary.**

Title:

2. Choose one of the animals in your food web and use scientific words to describe its classification by what it eats. Who it eats? What it is eaten by?
Answers will vary.

Animal name:

3. In a paragraph, predict and explain what would happen to the web if that animal is removed or dies out of the area?

If an animal or plant is removed from an area, then a food web can collapse.

Animals that rely on that organism for food will eventually starve and die too.

Likewise with plants. If the animal that dies is a predator, than there will be an

explosion of the population of the animal which is their prey. This too can cause

starvation because of competition for food.



Day 3 Life Cycles - Animals

3.1 Insect Life cycles - Monarch Butterfly life cycle flip book

Students may need help with cutting and stapling.

1. First, watch the video 'Growing Up Butterfly' by National Geographic.
<http://channel.nationalgeographic.com/videos/growing-up-butterfly/>
2. Next, glue the following page to a piece of light weight construction paper.
3. Carefully cut along the dash lines. The more exact you cut the lines the better the flip book pages will work.
4. Put the pages in life cycle order and make sure that the corner where the picture is sitting is lined up and that this edge is very straight.
5. Staple them together on the opposite side to the picture.
6. Squeeze your book into a C-shape to help loosen it up and make it more flexible.
7. Hold the stapled side and flip through the book so that the pictures move.

3.2 Metamorphic Stages of a Monarch Butterfly

1. Go to <http://www.ngkids.com.au/science-and-nature/butterfly-life-cycle>
Read the information on a Butterflies life cycle.
2. In your own words, describe the **physical features** of each stage of metamorphosis.

Stage 1 – The Eggs

- A female butterfly lays her eggs, usually on leaves or stems of plants.
- Inside the tiny eggs, caterpillars grow.
- Eggs can be round, oval or cylindrical, and smooth, bumpy or wrinkled.
- The time it takes for the eggs to hatch can also vary

Stage 2 – The Caterpillar

- Caterpillars eat their way out of the egg
- They immediately start chomping on the leaves of the host plant.
- they shed their skin four or five times
- As the caterpillar grows, its skin becomes too tight and splits open, revealing a new, larger skin underneath.
- A full grown caterpillar can be over 100 times larger than when it hatched.

Stage 3 – The Pupa (Chrysalis)

- when fully grown, the caterpillar forms itself into a 'pupa' (or chrysalis)
- The pupa is a kind of bright green vessel in which the caterpillar changes into a butterfly.
- The pupa is on twigs or safe, hidden areas around the host plant.
- The 'pupa' stage may last a few weeks to several months depending on the species.
- during this time, a hardened case forms around the pupa to protect it from predators and extreme weather conditions.
- The tissue, limbs and organs of the caterpillar transform inside the chrysalis.

Stage 4 – The Butterfly

- When the butterfly is ready to come out of its chrysalis, the case around the pupa splits open.
- The wings are at first wet, soft and wrinkled against its body.
- The butterfly waits for its wings to dry, and pumps a liquid called hemolymph into them so that they become big and strong.
- It then flies to feed on flowers to feed on
- It mates.
- It lays eggs and repeats the cycle.

3.3 Mammal and Bird Life Cycles

Label the following life cycle diagram of a goose. Give the stages and names. (As a reference, look at the butterfly life cycle diagram again.) Don't forget to give the diagram a title.

Egg
Embryo

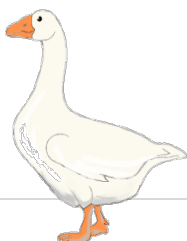


Egg
Foetus

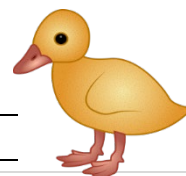


The Life Cycle of a
Goose

Goose
Adult



Gosling
Juvenile



Day 4 Life Cycles - Plants

4.1 Just add water? Not always.

Watch the following video from ABC Catalyst to find out more about how scientist have found that fire helps native plants such as Kangaroo Paw.

4:51mins. <http://www.abc.net.au/catalyst/stories/3318890.htm>

What is cyanide?

Cyanide is a chemical. It is poisonous to humans.

How does cyanide help the Kangaroo Paw?

“The molecule that's produced from bushfire smoke percolates through the soil, enters the seed with that first flush of winter rainfall, and then the cyanide is released inside the seed and it's then cyanide does the work.”
It stimulates the seed to germinate.

You have observed two real scientists at their work. How do the scientists prove that cyanide helps Kangaroo Paw to germinate?

Scientists grow half of the seeds in a smoke chambers and compare them to half of the seeds which are not.

What other seeds germinate because of cyanide?

Apple and sunflower seeds

4.2 Honey Possums, Banksias and Fire

What is a Honey Possum and why does it love the Banksia? Banksias and Honey Possums are interdependent species meaning they need each other to live and their interactions are 'mutually beneficial.'

Honey Possum like Banksias

Honey possums (Latin name: *Tarsipes rostratus*) are a very small marsupial and only found in the southwest of Western Australia. Honey Possums eat nectar and pollen from native flowering plants such as banksias, eucalypts and heath. This is their only food. The Honey Possums long bristled tongue is specialised to dip into the flowers of these plants.



Watch this video to learn about the Honey Possum:

<http://www.nationalgeographic.com.au/videos/sky-safari-australia/honey-possums-3870.aspx>

Time: 1:36

Banksias like Honey Possums

Normally, we mostly think of bees and other insects as pollinators. **Pollinators** are animals which spread pollen from plant to plant helping plants to reproduce. Honey possums are important pollinators for a number of different plants. They are the principle pollinators of Nodding Banksia. Without Honey Possums helping to spread pollen, this Banksia species would not survive.

For more information read:

http://animaldiversity.org/accounts/Tarsipes_rostratus/#ecosystem_roles

The importance of Fire

Banksias are a woodland bushy shrub. They need fire to germinate too. During a bushfire, the heat causes Banksia fruits open, releasing the seeds. The seeds fall to the ground and as the fire has burnt the surrounding bush, the seed has no competition to grow.

Complete the fact sheet on the following page.

To find information to complete the fact cards on the Best Friends Forever fact sheet, use these websites:

<http://www.wanaturalists.org.au/reports/world-honey-possums-2/>

<http://www.bushheritage.org.au/species/honey-possum>

https://en.wikipedia.org/wiki/Honey_possum

<http://www.honeypossum.com.au/facts.php>

https://en.wikipedia.org/wiki/Ecology_of_Banksia

https://en.wikipedia.org/wiki/Banksia_nutans

4.2 Interdependence of Honey Possums and Banksia Fact Cards Examples

Honey Possum features

- Very small, 70 to 105mm
- Weigh between 6 to 18g
- Grey fur, dark stripe down its back.
- White/yellow underneath and orange fur up sides.
- Brush-tipped tongue, the same length as its head.
- Rough pads on hands and feet, short nails

Banksia features

- approximately 1 metre in height
- Pale blue-green fine foliage
- Clusters of flowers called 'inflourences.'
- A variety of species.
- Seeds need fire to

Habitat and Geography

- Honey Possums are found in the Banksia woodlands which is rich in a variety of flowers.
- Found in southwestern Western Australia.

Pollen, Nectar & Pollination

- Nectar is produced by the Banksia tree.
- The Honey Possum eats nectar with its tongue.
- The Honey Possum collect pollen on its feet and fur.
- The pollen is spread to other Banksias.
- The other Banksias are pollinated and produce seeds.
- The Banksias and the Honey Possums are happy.

Day 5 – Communicate and Share

5.1 Life Cycle Report

Students will research an animal or plant from the list and complete a draft report using the criteria from the worksheet. Student may need assistance for their home tutor with finding websites or books for information.

5.2 Final Report

The way in which students present their information is open ended. Student may present information in a way in which interests them provided they include the criteria from their draft report.

TEACHERS AND HOME TUTORS

SCSA Judging Standards:

2013/37286v4 [PDF: 2013/37824] Published: 21 July, 2014

A Excellent Achievement	B High Achievement	C Satisfactory Achievement	D Limited Achievement	E Very Low Achievement
<p>Correctly sequences images of the life cycle of a living thing, with labels and/or a detailed description and explanation of each stage. Explains how the life cycle renews, e.g. the plant develops a seed which grows into a new plant.</p>	<p>Correctly sequences images of the life cycle of a living thing, with labels and /or a simple description of each stage. Provides a brief description about the life cycle renewing</p>	<p>Correctly sequences images of the life cycle of a living thing, using labels and/or an outline with brief or simple comments about each stage. Refers to the life cycle renewing.</p>	<p>Sequences images of the life cycle, with one or two errors or omissions in the order, labelling and/or information.</p>	<p>Sequences images of the life cycle of a living thing, with a number of omissions or errors in the order, labels and/or information.</p>
<p>Describes environmental factors such as hot or cold temperatures, fire, amount of water and sunlight, and explains ways that they can affect the life cycle of a living thing, e.g. seed germination.</p>	<p>Describes environmental factors and makes links to their effect on the life cycle of a living thing</p>	<p>Names simple environmental factors such as water and sunlight and suggests simple ways in which they might influence the life cycle of a living thing.</p>	<p>Identifies that environmental factors affect the life cycle of a living thing, e.g. suggests that living things need water. Makes a general or limited reference to an environmental factor which can affect the life cycle of a living thing.</p>	<p>Makes incorrect claims about or no links to, environmental factors affecting the life cycle of a living thing.</p>



Year 4: Life Cycles

Overview

Western Australian Curriculum

Year 4 Science

Content strands	
Science Understanding	
Science as a Human Endeavour	
Science Inquiry Skills	

Content Descriptions	
Science Understanding	
Biological Science	
Living things have life cycles (ACSSU072)	
Living things depend on each other and the environment to survive (ACSSU073)	
Chemical Science	
Natural and processed materials have a range of physical properties that can influence their use (ACSSU074)	
Earth and Space Sciences	
Earth's surface changes over time as a result of natural processes and human activity (ACSSU075)	
Physical Sciences	
Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076)	
Science as a Human Endeavour	
Nature and Development of Science	
Science involves making predictions and describing patterns and relationships (ACSHE061)	

Use and Influence of Science	
Science knowledge helps people to understand the effect of their actions (ACSHE062)	
Science Inquiry Skills	
Questioning and Predicting	
With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge (AC SIS064)	
Consider the elements of fair tests and use formal measurements and digital technologies as appropriate, to make and record observations accurately (AC SIS066)	
Planning and Conducting	
With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (AC SIS065)	
Processing and Analysing Data and Information	
Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends (AC SIS068)	
Compare results with predictions, suggesting possible reasons for findings (AC SIS216)	
Evaluating	
Reflect on investigations, including whether a test was fair or not (AC SIS069)	
Communicating	
Represent and communicate observations, ideas and findings using formal and informal representations (AC SIS071)	

General Capabilities and Cross Curriculum Priorities

General capabilities	
Literacy	
Numeracy	
Information and communication technology (ICT) capability	
Critical and creative thinking	
Personal and social capability	
Ethical understanding	
Intercultural understanding	

This resource contains extracts from The Western Australian Curriculum Version 8.1. © School Curriculum and Standards Authority.

The unaltered and most up to date version of this material is located at <http://wacurriculum.scsa.wa.edu.au/>



creativecommons.org/licenses/by-nc-sa/3.0/au/



© Department of Education
WA Revised 2020

Year 4

Biological Science

Life Cycles



Department of
Education

© Department of Education WA 2020