Life Cycles

Year 4

Biological Science

5 Day Print Course

SIDE
SCHOOL OF ISOLATED & DISTANCE EDUCATION

First published 2016

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

Department of Education

Home Tutors

As your student will be working independently on this activity book, please remove the Home Tutor Guide from the back as it contains information and solutions.

It is important to read the Home Tutor Notes before your student starts each day.

Home Tutors:
It is important to read the Home Tutor Daily Notes before your student starts each day.

Contents

Think safely when you see this sign.

Check with your home tutor.

Materials You Will Need

(most are household supplies)

- ✓ 1 Large Sheet of Newsprint
- ✓ 2 x Light weight cardboard A4
- ✓ Scissors

Day 1 Characteristics of Living Things

In this activity, you will determine the differences between living and non-living

Living things include all animals and plants. We know that all living organisms need food and water for growth, reproduction and energy. All living things must show **seven characteristics** to be considered living; they breathe, take in energy by eating, can excrete waste, can grow or change, can reproduce, can move and can react to the environment.

Non-living things can possess some but not all of the characteristics of living things or no longer possess all of the characteristics. Some non-living things (like clouds, fire, and water) have a few characteristics of living things like movement, change and growth. However, if they do not breathe, reproduce, excrete, or react too, they are not living things. Non-living things can be divided into two groups – things that were **never** living and things that were **once** living.

I, as a human, show all seven of the characteristics of a living thing.

1.1 A living glossary

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/
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:

Excretion:

Breathing or Respiration:

Reproduction:

Reaction or Sensitivity:

Movement:

Feeding:

1.2 Which are living?

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	Reproduce	Feed	Excrete	Move	React			
Humans	✓	✓	✓	✓	✓	✓	✓	**7**	✓	
Rock	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**0**		✓

1.3 I'm hungry!

Animals can generally be classified by what they eat. The three classifications are herbivores, omnivores and carnivores.

Herbivores eat plant material only. This word comes from the Latin words 'herba' meaning herb and 'vorus' meaning devour.

Carnivores eat meat only. 'Carno' means meat or flesh in Latin.

Omnivores will eat both meat and plants. The word 'Omni' in Latin means all. An example of an omnivore is a magpie which will eat both mulberries and insects.

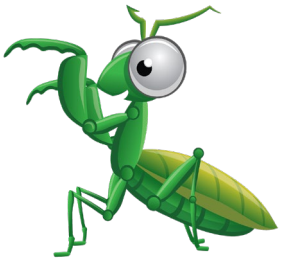
An animal's teeth are usually good indicators of what they can eat. For example, animals with sharp pointy eye teeth called 'K9s' are usually able to eat meat. Unlike us, a lion cannot use a knife and fork so their teeth allow them to rip and tear.

Animals that eat plants usually have teeth which are flat with squared edges, instead of pointy.

Omnivores have a combination of flat and pointy teeth.

An animal's digestive system also determines what they can or can't eat. Animals which eat meat have strong acids in their stomach to break down protein. A cow has four stomachs to break down plant material.

Sometimes within a class of animals like insects there can be both herbivores and carnivores. Grasshoppers and Praying Mantis are both insects. The Grasshopper is an herbivore and the Praying Mantis is a carnivore.



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.

Herbivores

Rabbit

Omnivores

Greater Bilby

Magpie

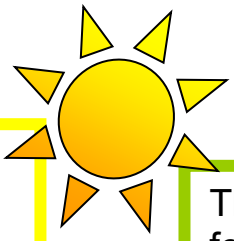
Carnivores

Crocodile

1.4 Life in grassland

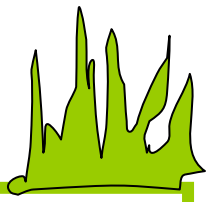
In this activity you will learn about the interdependence of living things.

'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. It is the combination of the prefix, "inter" which means between or among and "dependence" which means the state of relying on or needing someone or something. It begins with simple food chains like this one:



All food chains start with a **primary energy source** like the sun or boiling-hot deep-sea vents. The arrows in the chain show the flow of energy.

ENERGY



The energy source provides the energy for organisms that are able to convert that raw energy into their own food. They do this through a process called "photosynthesis." These organisms are called **primary producers.** They are things such as plants, phytoplankton and algae.

E N E R G Y

The next link in the chain is organisms that eat primary producers. They are called **primary consumers.** They are also called herbivores because they eat plants, phytoplankton or algae only. Rabbits, mice and some insects are examples of these.

ENERGY

The next link in the chain is organisms that eat primary consumers. These are organisms called **secondary consumers.** They can be omnivores or carnivores. An omnivore eats both meat and plants where as a carnivore has a diet of meat only.

1.4 Life in Grassland mix and match

1. The pictures from the following story are in order while the paragraphs are mixed up. Read the paragraphs and match them to the pictures.

2. Cut them out and glue them in the right order on newsprint.

Life in Grassland

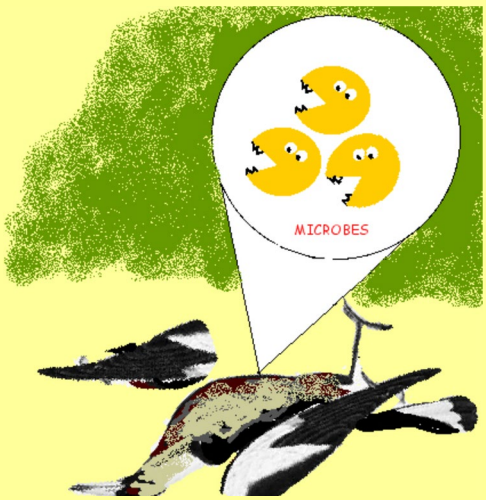
1.

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 magpie before it died while others came from the ground and the air.

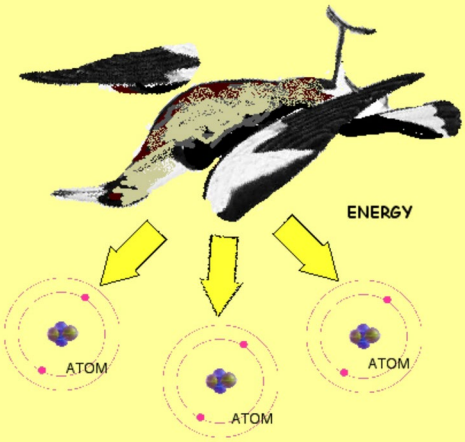
2.

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.

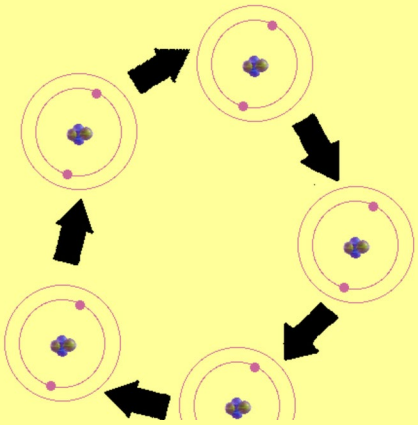
3.



4.



5.



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

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.

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!

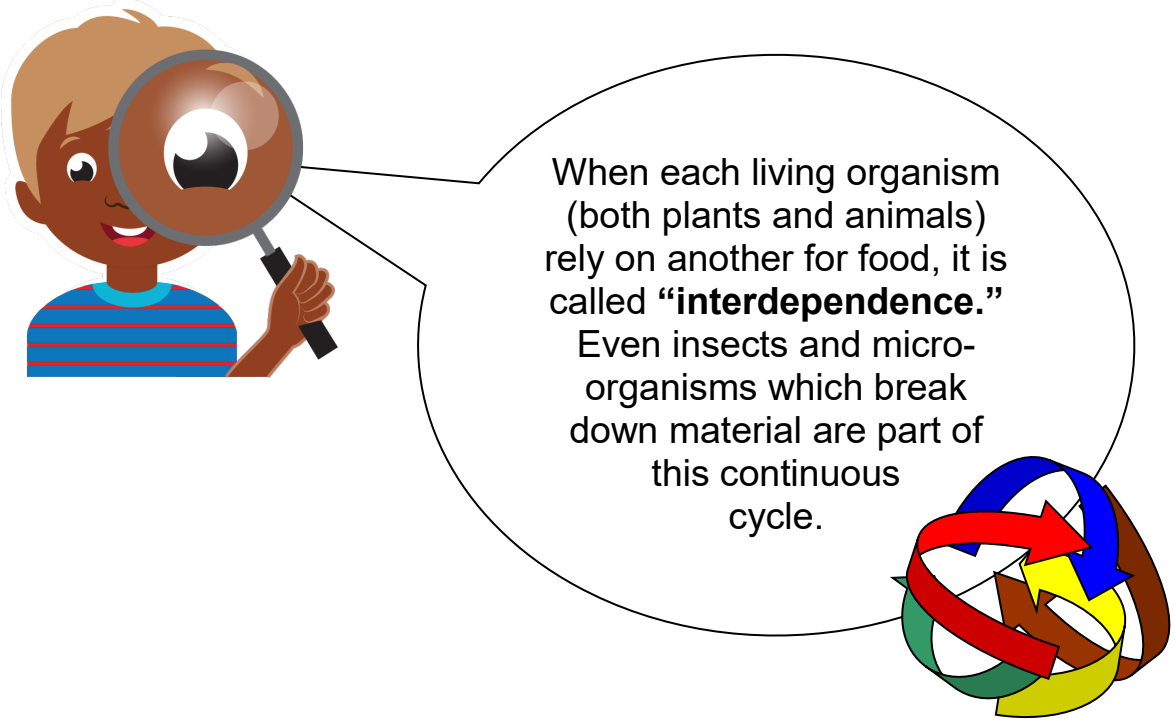
6.

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.

7.

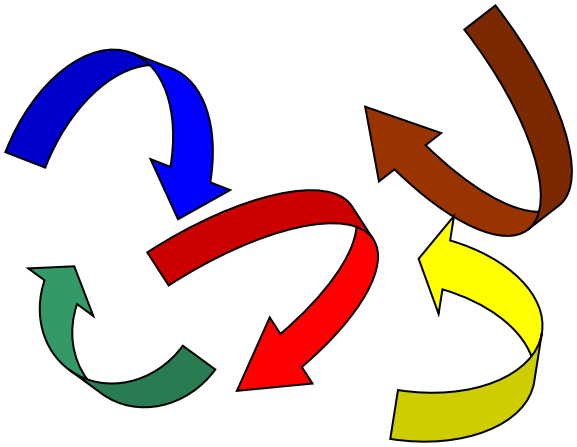
The next time the children look for the magpie, they see it is a few feet away under a bush. What they don't know is that last night a dingo found it, dragged it to this hiding place and ate some for dinner. The children use a stick to flip the magpie over and notice some small insects and larvae on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

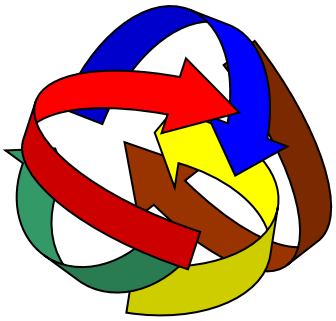
1.5 Decomposers



1. In the space below, show the microbes, which break down dead organisms that you read about in the story, "Life in Grassland."
2. Draw pictures of what you think these microscopic creatures might look like.
3. Label your picture to indicate each different creature and their features.

DECOMPOSERS





1. What does the word 'interdependence mean?

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

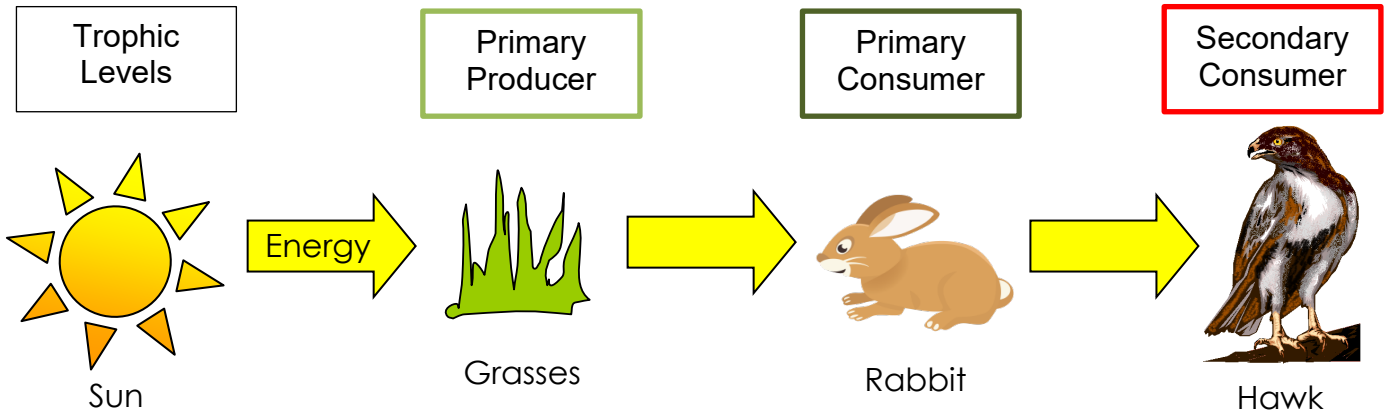
Day 2 Food Chains

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.

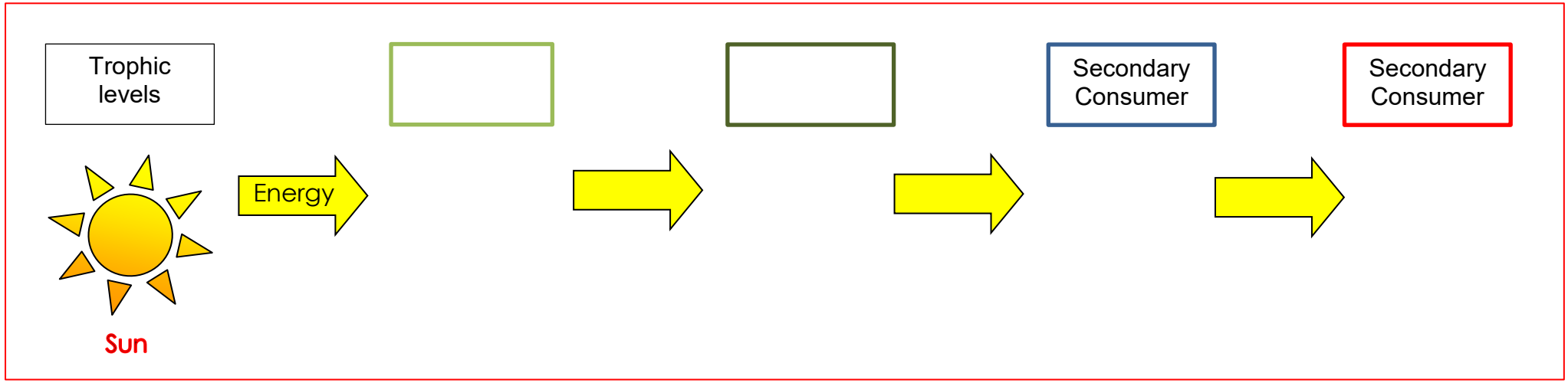
2.1 Making connections

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



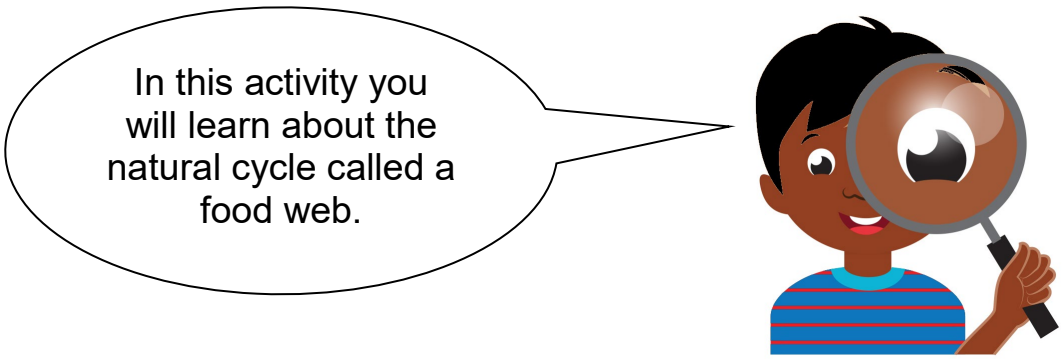
Go back to the story on Day 1, “Life in Grassland” and draw and label the food chain below with the organisms from the story. This time though, the food chain is longer. Start with the Sun.



Now show an example of your own food chain. Label each of your images.

2.2 Food Webs

Another way to show interdependence is in a food web. This is a more accurate way of showing what happens to the *flow of energy* since every organism is involved with several other organisms. The *flow of energy* is the same as *"is eaten by".*

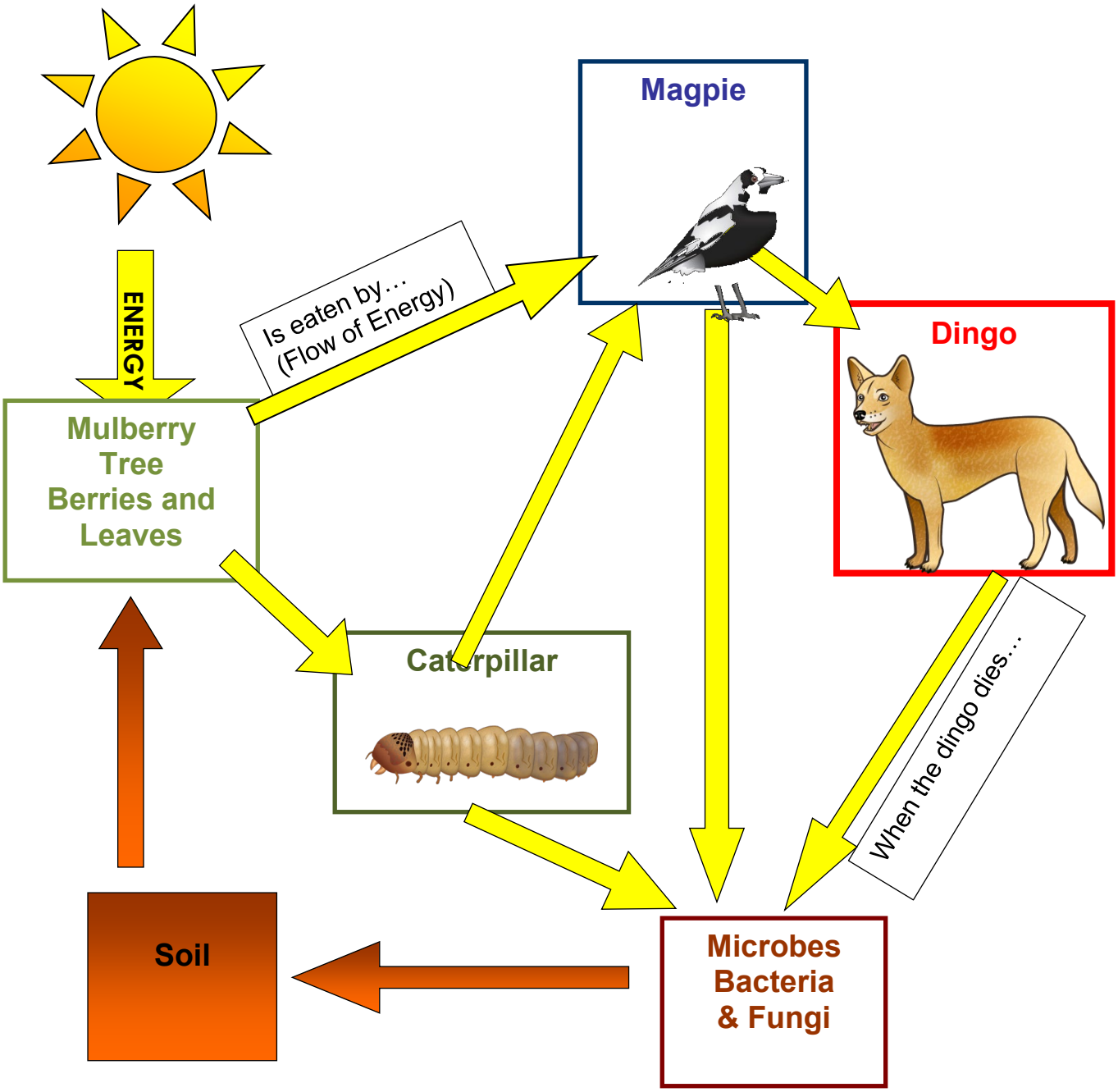


A food web consists of many food chains linked together. A **food chain** only follows one path as animals find food. In contrast, a **food web** shows the many different paths in which plants and animals are connected.

Non-living (abiotic) forces, including temperature, sun, water availability, and elevation, influence where primary producers (plants and algae) are able to grow. These producers, in turn, help define specific communities.

Here is a diagram of a food web of the organisms from the story on Day 1. **Diagrams** use words, colours, symbols and pictures to explain something. The diagram shows that the magpie is coloured blue and plays the role of omnivore. It eats mulberries as well as insects like the caterpillar and also provides food for the dingo. The original energy is passed on to the bacteria and microbes when the animals die. This all becomes soil to help the trees and plants grow.

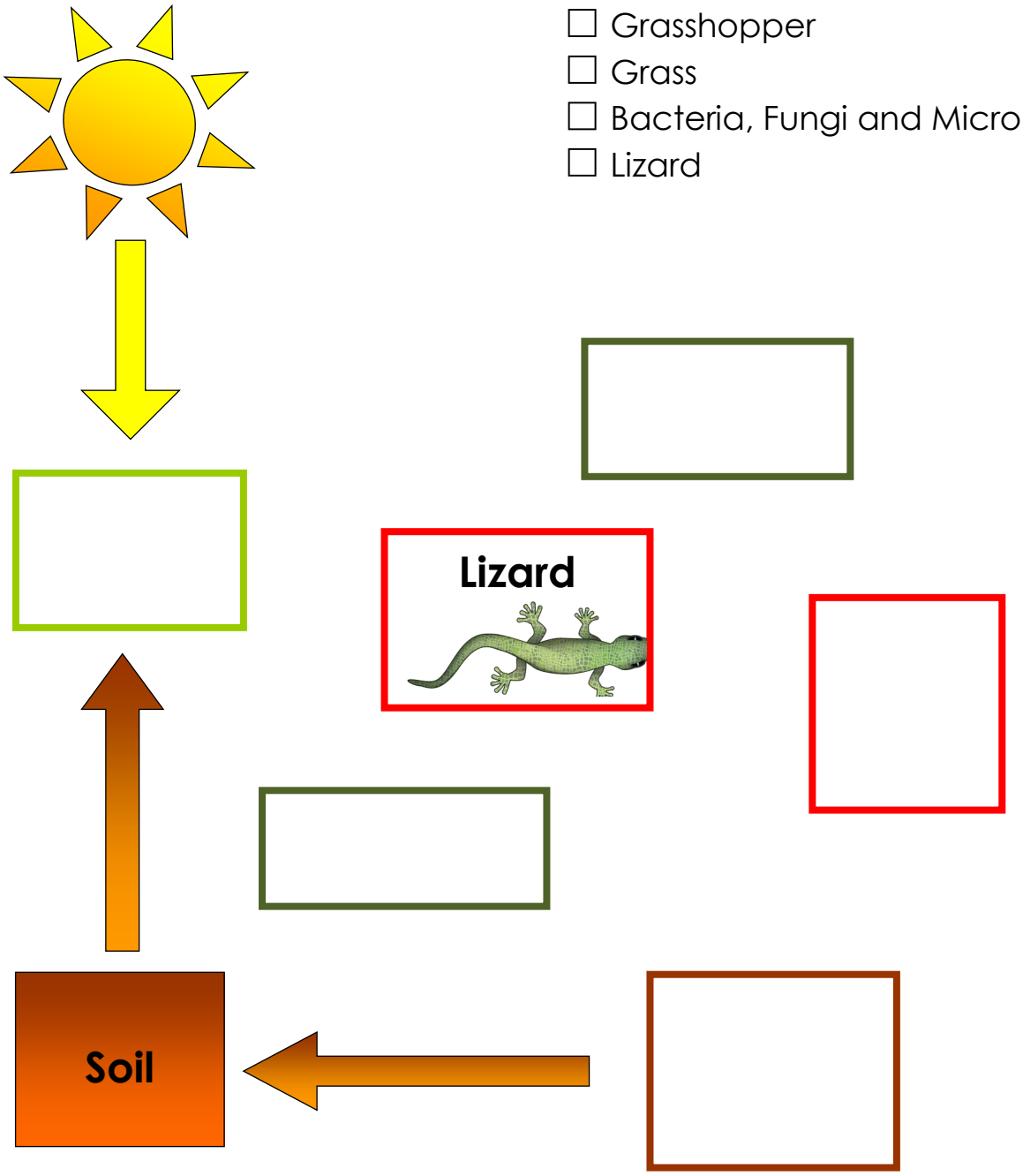
Start at the Sun and use your fingers to trace the flow of energy into the soil.



2.3 Food web diagram

Use the diagram and this new list of animals and plants to show a food web. Remember use yellow arrows to indicate the flow of energy (or is eaten by). Tick off your list as you 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 in the space below using different animals than the ones already used. Similar to the last two activities use colours to indicate what the animals eat. Make sure that you label your diagram with animal names, arrows 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.

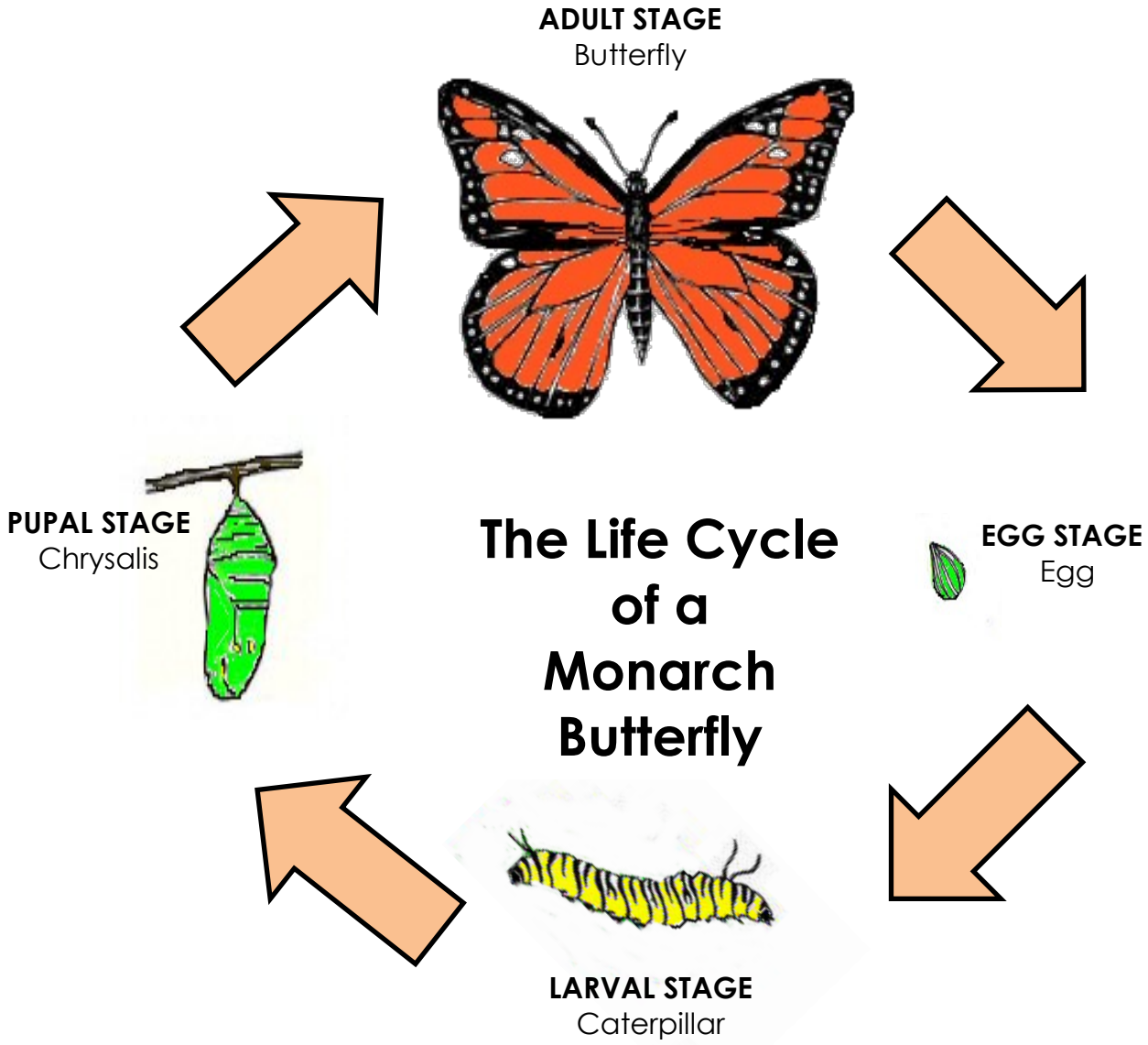
Title:

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?

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?

Day 3 Life Cycles - Animals



A life cycle is a period of time involving all different generations of a species, animal or plant. Throughout their lifetime, animals and plants will undergo changes of development. Usually there are four stages.

For example, an insect will develop from an egg, to a larva, then to a pupa, and finally an adult. The scientific name for these changes is **metamorphosis**. Once the organism has gone through all of these stages, the adult will lay eggs to start the cycle again.

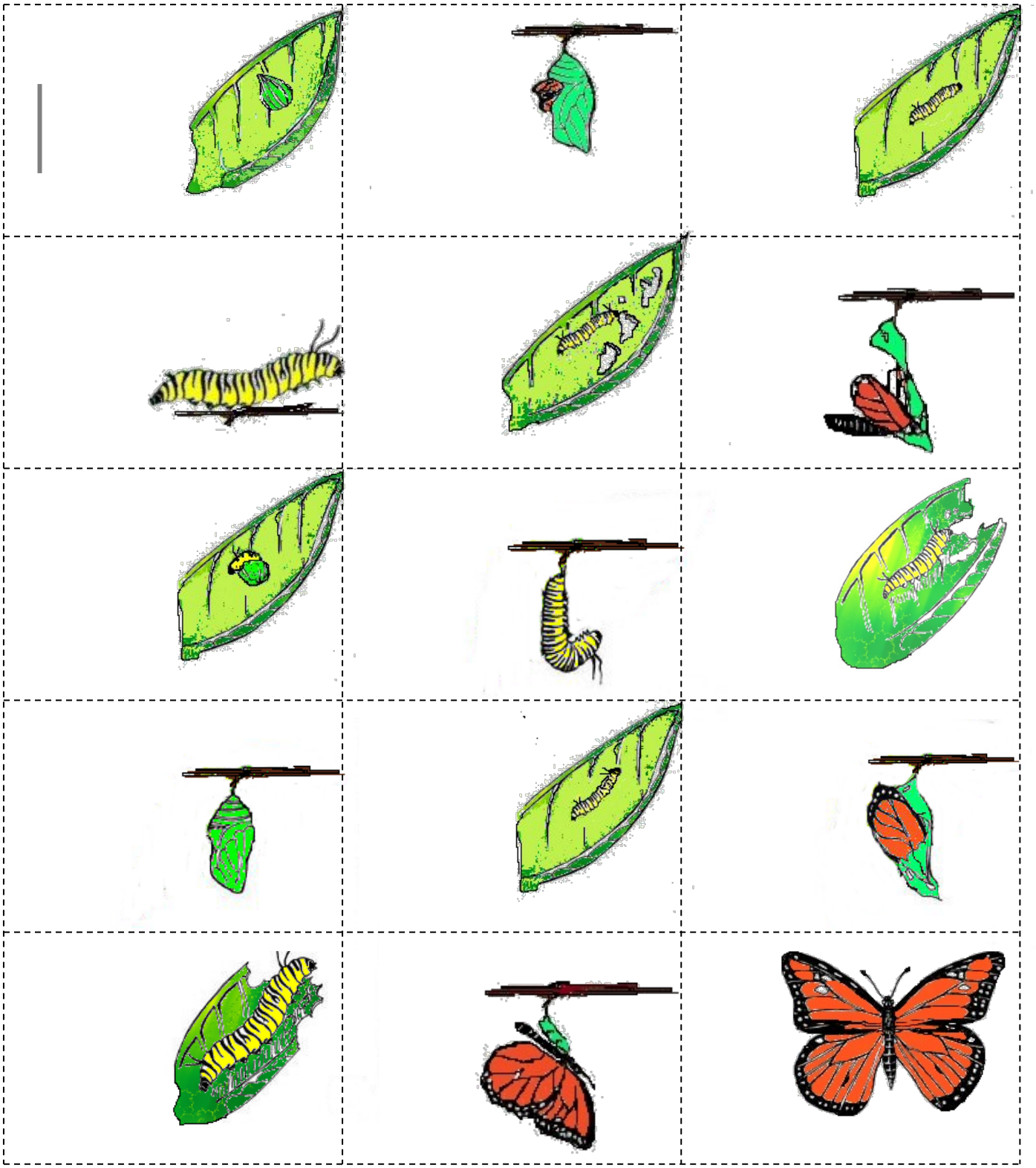
3.1 Insect Life cycles - Monarch Butterfly life cycle flip book

In these activities, you will learn about the continuous life cycle of insects.

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.

Staple on grey line



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

Stage 2 – The Caterpillar

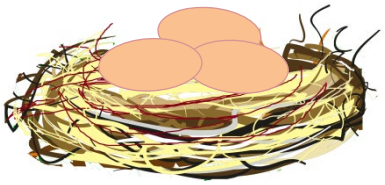
Stage 3 – The Pupa (Chrysalis)

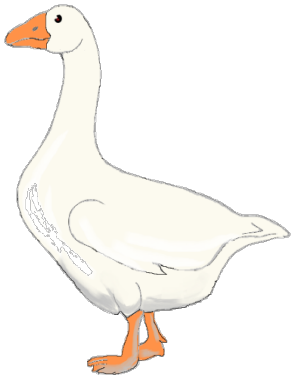
Stage 4 – The Butterfly

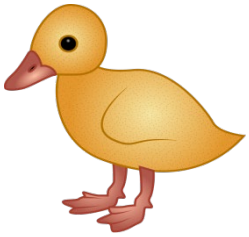
3.3 Mammal and Bird Life Cycles

Birds and mammals have different stages of growth than butterflies. These life cycles include the egg, the foetus, the juvenile and the adult.

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.







3.4 My own life cycle flip book

There are many other animals that go through a life cycle. (Frogs, snakes, ants, honeybees are some examples)

Research any animal and make a flip book of your own life cycle.

Here is a link to a video which you might like to use.
National Geographic Red-Eyed Tree Frog's Life Cycle Video (2mins. 50 secs)
http://video.nationalgeographic.com/video/frog_greentree_lifecycle

What animal have you chosen?

_____

What website(s) did you use to find information?

_____

_____

_____

_____

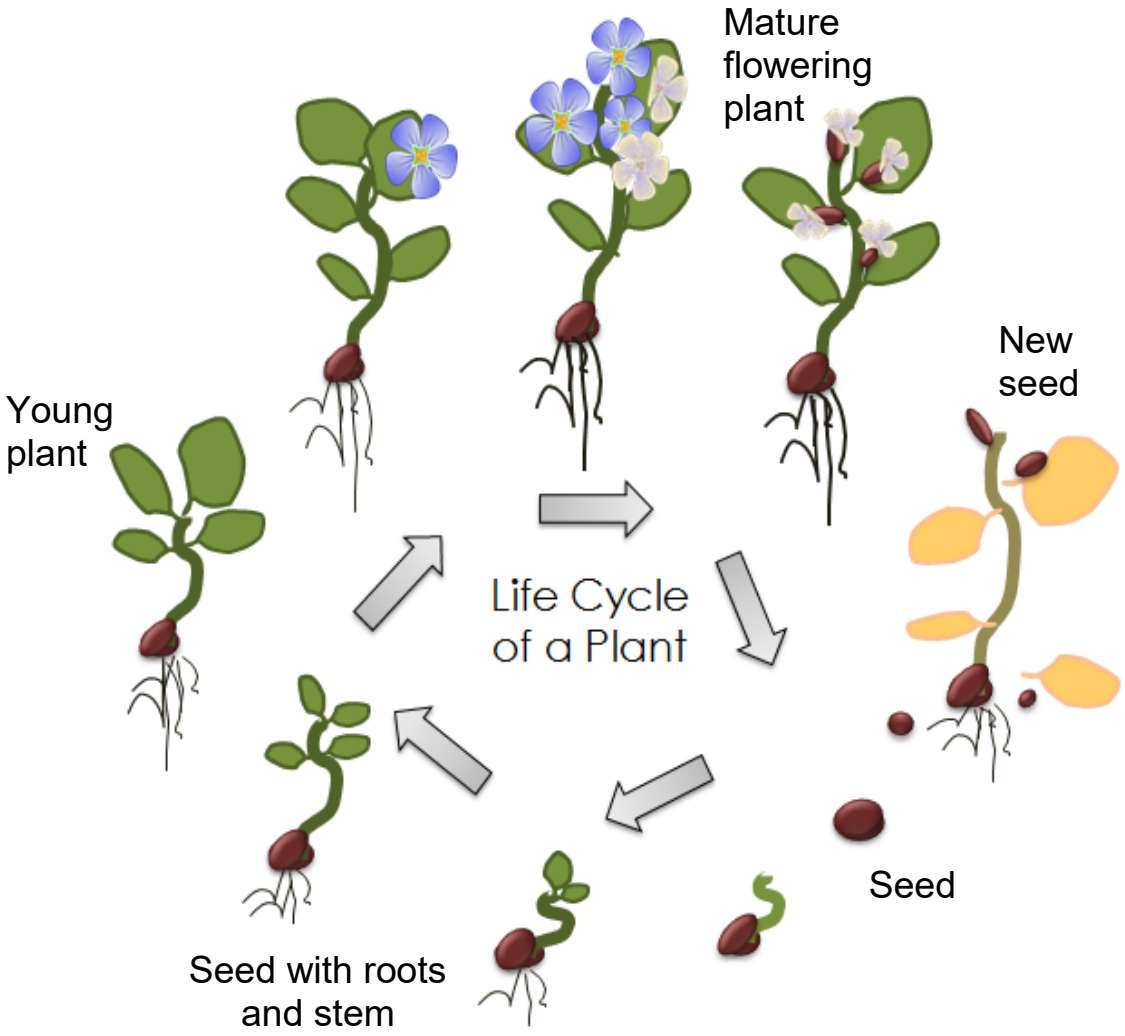
My own life cycle flip book

Use this template to make your own life cycle flip book

Day 4 Life Cycles - Plants

Plants go through a life cycle too. When a plant produces seeds and the seeds are successful, then the species of plant can survive.

We know most plants start from seed, grow roots and produce a stem and leaves. The mature plant produces new seeds and then the seeds fall to the ground and start the cycle all over again.



Watch the germination of a seed over a one week time lapse.
https://vimeo.com/30074251

4.1 Just add water? Not always.

We know that plants need certain conditions in order to grow and survive. Many plants start their growth when their seeds are exposed to water. This is called **germination**. Plants need water to grow. However, there are some plants which only germinate under other special conditions.

For millions of years, fire has been a part of the natural cycle of ecosystems in Australia. Fires have naturally occurred through lightning strikes and for centuries lit by Indigenous people who managed the land for hunting and living. Today, controlled burns are a practise by land management agencies for bushfire prevention.

In the past, bushfires destroyed and changed many ecosystems with the result that plants and animals either adapted to the fires or gradually died out from the area. Many native plants and animals **adapted** to bushfires by developing special characteristics that enabled them to survive during and after a fire. These specialised characteristics mean that now some native plants require fire to release their seeds. An example of this is the Kangaroo Paw.

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

After watching the video, answer the following questions:

What is cyanide?

How does cyanide help the Kangaroo Paw?

Draw a diagram showing where the cyanide molecules come from and what it does to the Kangaroo Paw seed.

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

What other seeds germinate because of cyanide?

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

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

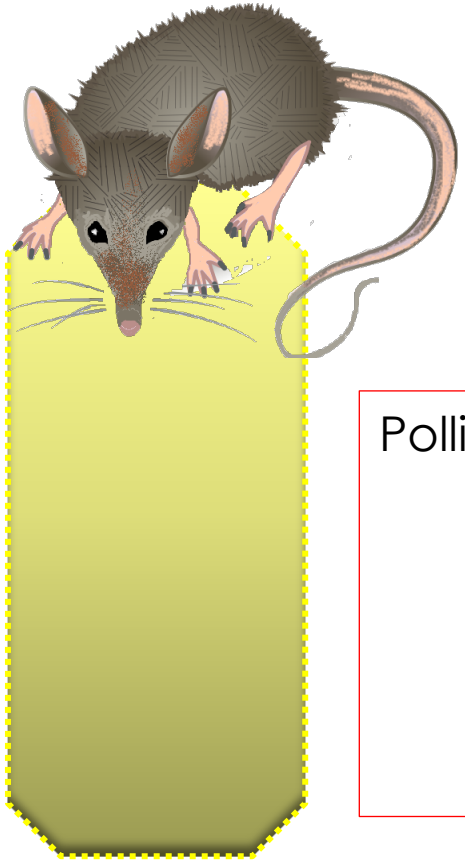
https://en.wikipedia.org/wiki/Banksia_nutans

4.2 Interdependence of Honey Possums and Banksia Fact Cards

Best Friends Forever!

Honey Possum physical features

Banksia physical features



Pollen & nectar

Pollination

Why we are friends…

Day 5 – Communicate and Share

5.1 Life Cycle Report

As your final activity, you will be writing a report about the life cycles of a plant or an animal of your choice.

1. Choose one plant or one animal from the following list of living things and research its life cycle and interdependence (what they rely on and what relies on them:

Watermelon plant	Mosquito	Crocodiles
Sunflower	Snakes	Turtles
Maple Tree	Grasshoppers	Ladybird beetles
Coconut Tree	Rhinoceros Beetle	Frogs
Banana	Emus	Apple Tree

2. Use the following draft science report to collect your information for your report.

3. Draw or find images of the different stages of the life cycles in the table on the next pages.

4. Correctly sequence and label parts of the images of the life cycle of the living things

5. Add a detailed description and explanation of each stage of the life cycle. Include observable changes and environmental factors that effect this part of the life cycle and identify functions of parts of the plant or animal.

6. Explain how the life cycle renews: for example, the plant develops a seed which grows into a new plant/ the animal has one offspring.

7. Add any other interesting information about this living things' life.

8. What are some things/problems which could stop this living thing's life cycle?

9. Present the good copy of your science report in an interesting way.

Draft Science Report	**The Life Cycle of**
Species:	
Description of the physical features (what it looks like):	
Description of its environment (where it lives):	
What other living things depend on it? How?	
Name and image of the life cycle stage	Description of this stage and changes occurring

Other interesting facts:

Factors which negatively affect the life cycle.

Websites and books where I found information.

5.2 Final Report

Now it is time to communicate and share all of the fantastic things you have learned. There are a lot of interesting ways to present the information you have found on the life cycle of your living thing. You can do an audio presentation, create a slide show, write a written report, do a play etc.
Use your imagination and make it enticing for the audience.

Student Reflection

Tick the box you feel best describes your work in this set.
☺ = I had a lot of help.
☺☺ = I had a little help.
☺☺☺ = I did it by myself!

Science Understandings	☺	☺☺	☺☺☺
I can make and record observations of living things as they develop through their life cycles.			
I can describe the stages of life cycles of different living things such as insects, birds, frogs and flowering plants.			
I have compared life cycles of animals and plants.			
I can recognise that environmental factors can affect life cycles such as fire and seed germination			
I have investigated how plants and animals benefit each other.			
I have investigated the roles of living things in a habitat, for instance producers, consumers or decomposers.			
I can predict the effects when living things in feeding relationships are removed or die out in an area.			
I can recognise that interactions between living things may be competitive or mutually beneficial.			
Science Inquiry Skills	☺	☺☺	☺☺☺
I was able to make a prediction in most of my investigations.			
I followed the steps to a procedure in my investigation.			
I recorded my observations (what I saw) in my investigations in a table.			
I made a graph from the data in my table.			
I presented my research as drawings, photos and words.			

Science as a Human Endeavour	☺	☺☺	☺☺☺
I understand that it is important to ask questions and make observations when working in science.			
I can describe situations where understanding the relationships and interactions of plants and animals can influence my own and others' actions.			

Which was your favourite activity and why?

Home Tutor Reflection

Tick the box you feel best describes your student's work in this set.

☺ = With a lot of help
☺☺ = With some help
☺☺☺ = On their own

Science Understandings	☺	☺☺	☺☺☺
My student can make and record observations of living things as they develop through their life cycles.			
My student can describe the stages of life cycles of different living things such as insects, birds, frogs and flowering plants.			
My student have compared life cycles of animals and plants.			
My student can recognise that environmental factors can affect life cycles such as fire and seed germination.			
My student has investigated how plants and animals benefit each other.			
My student has investigated the roles of living things in a habitat, for instance producers, consumers or decomposers.			
My student can predict the effects when living things in feeding relationships are removed or die out in an area.			
My student can recognise that interactions between living things may be competitive or mutually beneficial.			
My student can make and record observations of living things as they develop through their life cycles.			
Science Inquiry Skills	☺	☺☺	☺☺☺
My student was able to make a prediction about what would happen in their investigation.			
My student followed the steps to a procedure in their investigation.			
My student understood what observations to record when doing their investigations.			
My student presented their investigation with drawings, photos and words.			

Science as a Human Endeavour	☺	☺☺	☺☺☺
My student understands that it is important to ask questions and make observations when working in science.			
My student can describe situations where understanding the relationships and interactions of plants and animals can influence my own and others' actions.			

Other comments:

Well done!

You have finished this science unit and learned about the life cycles and how plants and animals interact.

Now that you have finished, send all worksheets to your teacher. Do not forget to include any photos and the video you have taken too.

Check this list to make sure all of your work is complete:

Worksheet Checklist:

1.1 A living glossary
1.2 Which are living?
1.3 I'm hungry!
1.4 Life in Grassland mix and match
1.5 Decomposers
2.1 Making connections
2.2 Learning Object (L9953) Food Chains Wetlands Assessment
2.4 Food web diagram
2.5 I can show my own food web
3.1 Insect Life cycles - Monarch Butterfly life cycle flip book
3.2 Metamorphic stages of a Monarch Butterfly
3.3 Mammal and bird life cycles
3.4 My own life cycle flip book
4.1 Just add water? Not always.
4.2 Interdependence of Honey Possums and Banksia fact cards
5.1 Life cycle report draft
5.2 Final report
Student Reflection
Home Tutor Reflection

Life Cycles

Year 4

Biological Science

5 Day Print Course

SIDE
SCHOOL OF ISOLATED & DISTANCE EDUCATION

Home Tutors:
It is important to read the Home Tutor Daily Notes before your student starts each day.

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;

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.

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.

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.

Movement:

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

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	Reproduce	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

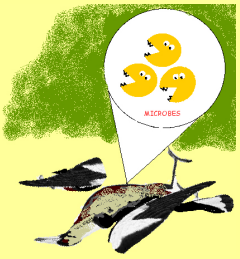
1.

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**.

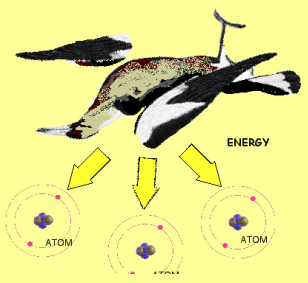
3



.

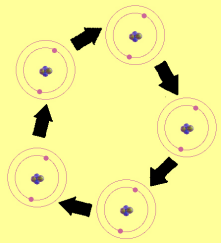
3. Something the children can't see are the microscopic organisms called microbes that are also eating the magpie. Microbes are decomposers. **Decomposers** recycle dead plants and animals back into the ecosystem by breaking down the material into smaller pieces and changing form. Bacteria, fungi and 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.



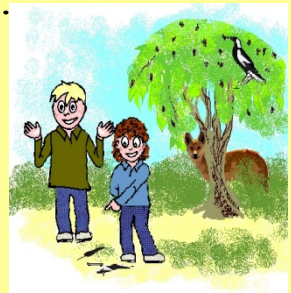
4. Everything on Earth is made of atoms. Atoms are so small that they can only be seen by a special microscope. The microbes decomposing the magpie are breaking it apart into atoms and releasing energy at the same time. This energy is food for the microbes, the dingo, the insects, and the larvae.

5.



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.



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.

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.

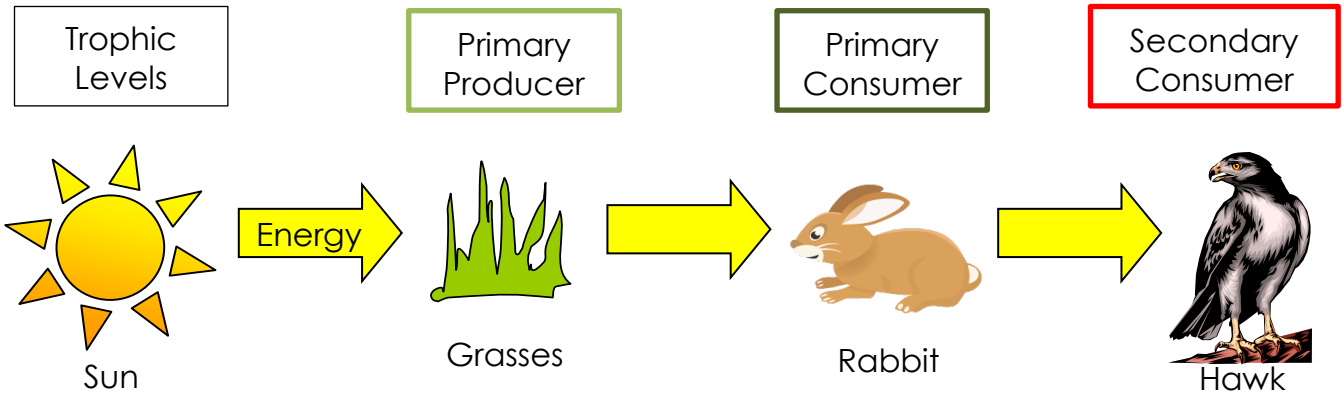
Day 2 Food Chains

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.

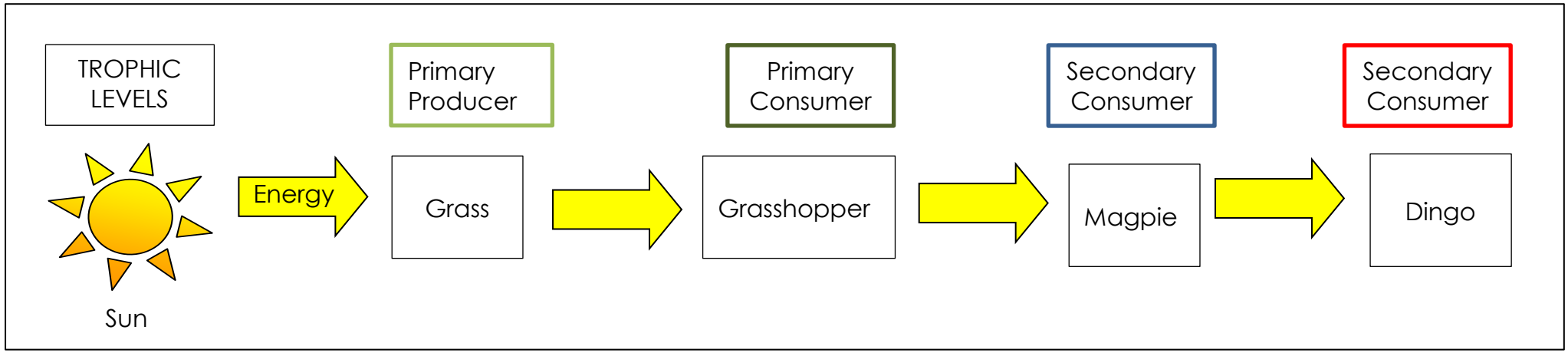
2.1 Making connections

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.

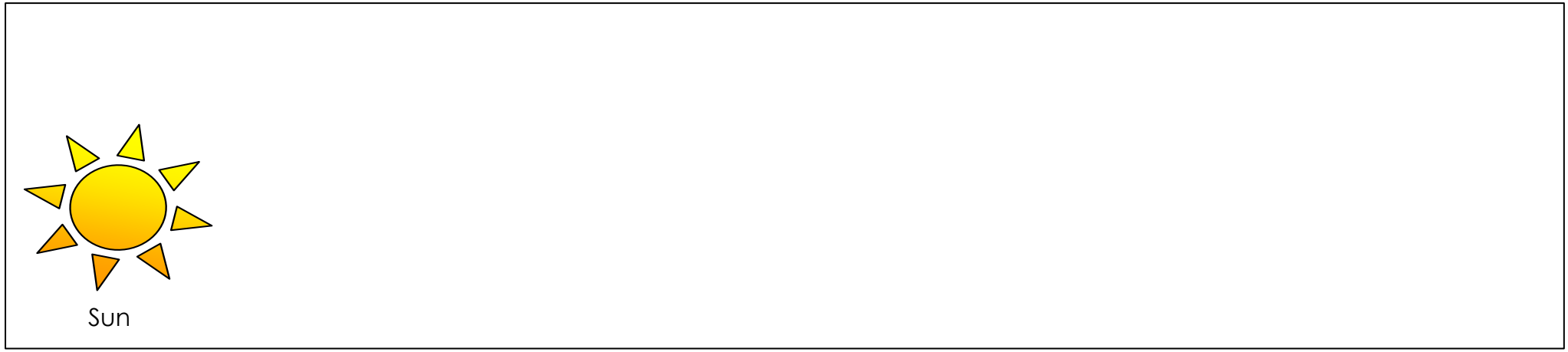
What is a Trophic Level?
Primary producers: Plants convert the Sun's energy into food. They produce.
Primary consumers: Animals that consume (eat) the plants.
Secondary consumers: Animal which eat primary consumers. They can be omnivores or carnivores



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.



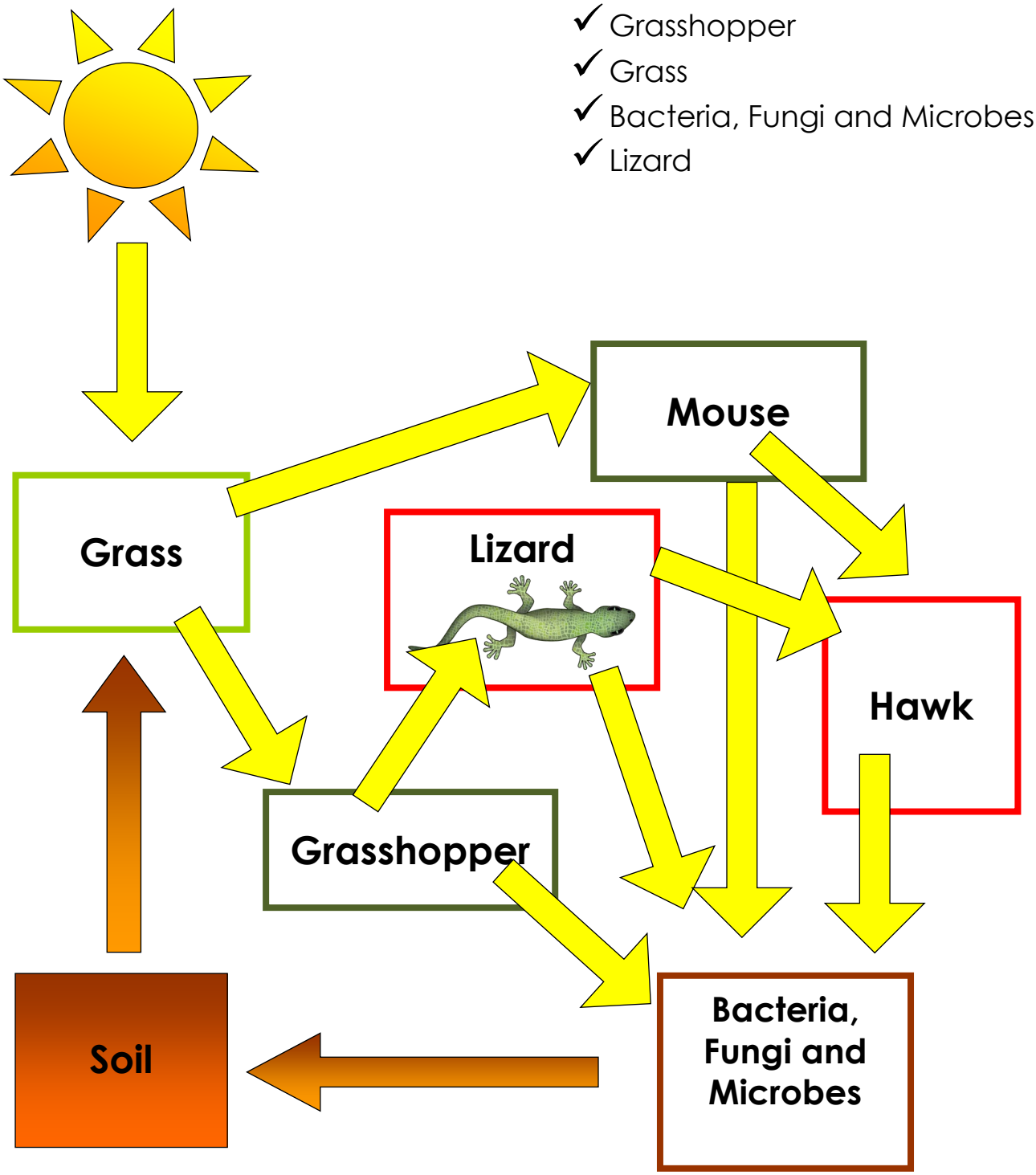
Answers will vary. Diagram should looks similar to the one above. Students may benefit from doing the next activity (2.2 Learning Object) before completing this activity.



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

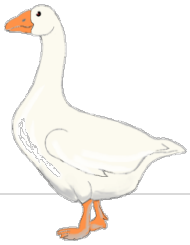
Label the following life cycle diagram of a goose. Give the stages and names. (As a reference, look at the butterfly life cycle diagram again.) Don't forget to give the diagram a title.

Egg
Embryo

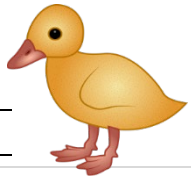
Egg
Foetus

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. With out 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 to18g
- 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

Habitat and Geography

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

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

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 pollenated 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 form 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
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.	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	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.	Sequences images of the life cycle, with one or two errors or omissions in the order, labelling and/or information.	Sequences images of the life cycle of a living thing, with a number of omissions or errors in the order, labels and/or information.
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.	Describes environmental factors and makes links to their effect on the life cycle of a living thing	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.	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.	Makes incorrect claims about or no links to, environmental factors affecting the life cycle of a living thing.

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 (ACSIS064)	
Consider the elements of fair tests and use formal measurements and digital technologies as appropriate, to make and record observations accurately (ACSIS066)	
Planning and Conducting	
With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (ACSIS065)	
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 (ACSIS068)	
Compare results with predictions, suggesting possible reasons for findings (ACSIS216)	
Evaluating	
Reflect on investigations, including whether a test was fair or not (ACSIS069)	
Communicating	
Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS071)	

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	

Year 4

Biological Science

Life Cycles

Department of Education