# SCIENCE

Year 7
Answers

## Lesson 1

### Topic: Human impact

## Reviewing food webs

### Lesson concepts

- OA OM Interactions between organisms can be described in terms of food chains and food webs
- OM Representations can be constructed and used to represent relationships
- OM Data from secondary sources can be summarised and scientific understanding used to identify relationships
- OA OM Ideas and findings can be communicated using scientific language and representations

### Learning alerts

Be aware of:

- Students thinking that organisms higher in the food web eat everything that is lower in the food web. Explain to students that animals higher in the food chain do not necessarily eat all of the animals lower in the food chain; they generally eat only one or some.
- Students thinking that organisms can occupy only one trophic level. Explain that some organisms occupy more than one trophic level (for example: fish can be omnivores because they can eat both phytoplankton and zooplankton; humans are another example of an organism feeding on two trophic levels).

### Lesson notes

Students will review and construct food webs, identify key species and identify trophic levels in food pyramids. They will develop this understanding by experiencing stimulus materials (for example: constructing a food web) and by responding to questions.

#### Definitions

A **key species** is a species in a food web that holds vital importance in the balance of the food web. If the population of this species changes due to factors outside of the food web, the food web can become unbalanced and possibly become unsustainable.

A **herbivore** is an animal that consumes only non-animal-based matter, including plants, plant products (for example: seeds, roots, leaves, stems) and fungi.

A **carnivore** is an animal that consumes only other animals or animal-based matter, including eggs and milk and products made from them.

An **omnivore** is an animal that consumes both plant and animal matter.

A **trophic level** refers to an organism's position in a food chain or web. Producers such as plants occupy the lowest trophic level. Species in higher trophic levels are higher in their food chains. Many species (such as omnivores) occupy several trophic levels; when this occurs, they are normally listed in their lowest trophic level.

A **food pyramid** refers to the relative number of organisms that make up each trophic level. Producers occupy the bottom of the pyramid, usually with the greatest population, while animals at the top of the food pyramid (the top predators) often have a relatively small population. This pattern comes about because as you move up the pyramid there is a reduction in the amount of nutrients and energy available to each trophic level.

## Science start-up answers

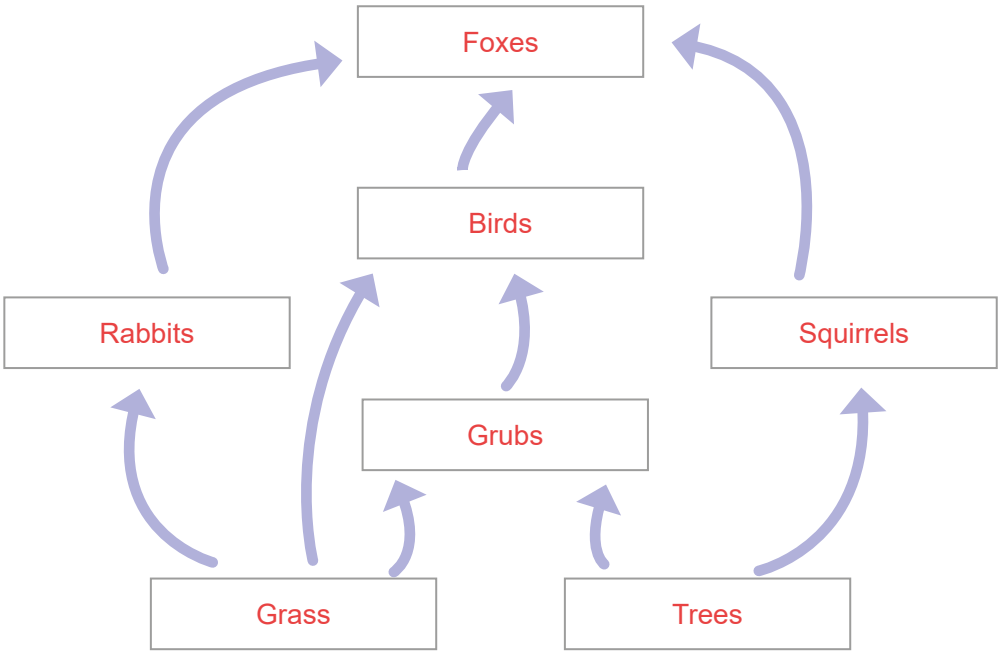
1.

| | Producer | Consumer |
|---|---|---|
| **Grass** | ✓ | |
| **Mouse** | | ✓ |
| **Hawk** | | ✓ |

2. a. The beetle, the grasshopper and the kangaroo are all herbivores.
   b. The grasshopper is eaten by frogs and magpies.
   c. The frog and snake both eat more than one type of food.
   d. The frog, magpie, snake and eagle are all carnivores.
   e. The eagle is at the top of the food web.
   f. The arrows indicate the direction that matter and energy move between organisms and through the community.

## Lesson answers

3. a.



b. If there were fewer rabbits in the ecosystem, there wouldn't be enough to support the population of foxes, who would then target squirrels and birds as a greater proportion of their diet. The population of foxes, birds and squirrels would all likely decline. The cover of grass might increase since there would be fewer rabbits feeding on it. The population of grubs might increase since their predators may have declined in numbers.

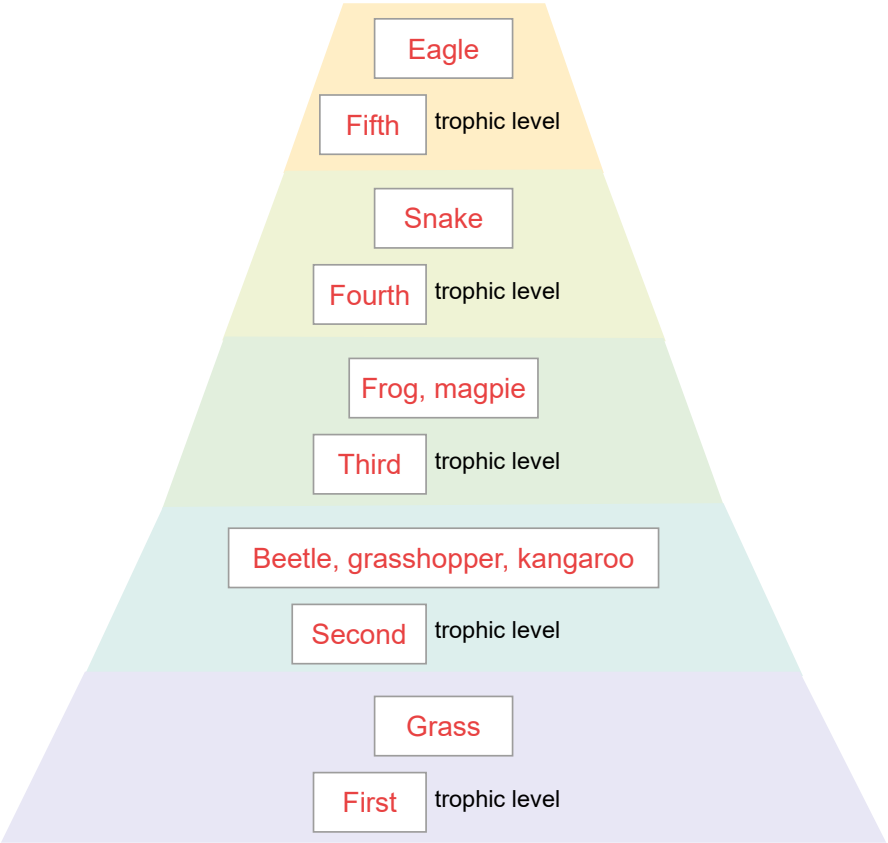
c. If the rabbit population tripled, there would be an increase in the amount of grass eaten. If too much is eaten, there may not be enough to sustain the population and the population may decline as rabbits starve. The lack of grass may also affect the numbers of birds and grubs that feed on the grass. With the extra rabbits, more food would be available to foxes, whose population would increase as a result. The increase in foxes may also lead to further decline in birds and squirrels, which would increasingly be eaten by foxes.

d. The rabbit is a key species in this web since changes in its population can have a dramatic effect on the population of other organisms in the food web.

4. Students complete activity from **Sheet 1 — 'Who eats who' game cards**.

5. **Sheet 2 — Moreton Bay food web** (attached).

6. a–b.




c. Frog, magpie.

d. There will likely be more magpies since a snake must eat a number of magpies in order to survive.

# Lesson 11

## Topic: Native food webs

## Investigating native food webs

### Lesson concepts

- Interactions between organisms can be described in terms of food webs; human activity can affect these interactions.
- Investigations can be collaboratively conducted ensuring safety guidelines are followed.
- Representations can be constructed and used to represent and analyse relationships.
- Data from students' own investigations can be summarised and used to identify relationships and draw conclusions.
- Ideas and findings can be communicated using scientific language and representations.

### Learning alerts

Be aware of students thinking that environmental factors only affect one species in a food web.

### Suggested next steps for learning

- Explain to students that, while some environmental factors may affect one species more than another (for example: a particular disease), the interactions within food webs are complex and usually result in more than one species within the food web being affected.

### Lesson notes

Students will examine the impact of environmental factors on an animal population. They will review the impact on food webs and examine how environmental changes impact on animal populations and relationships.

### Science start-up notes

This start-up has students considering the impact of non-living (abiotic) aspects of the environment on food webs.

### Science start-up answers

1. Successive frosts may kill many of the plants in a certain area. This could mean there are not enough producers in an environment to support the first-order consumers, with flow-on effects for the rest of the food web.
2. Severe drought prevents grass from growing and causes many plants to die off. This decrease in food supply can cause herbivores and omnivores to starve, move out of the area, or die of thirst. Animals further up the food chain would have less to eat and their numbers may also decrease.

## Lesson answers

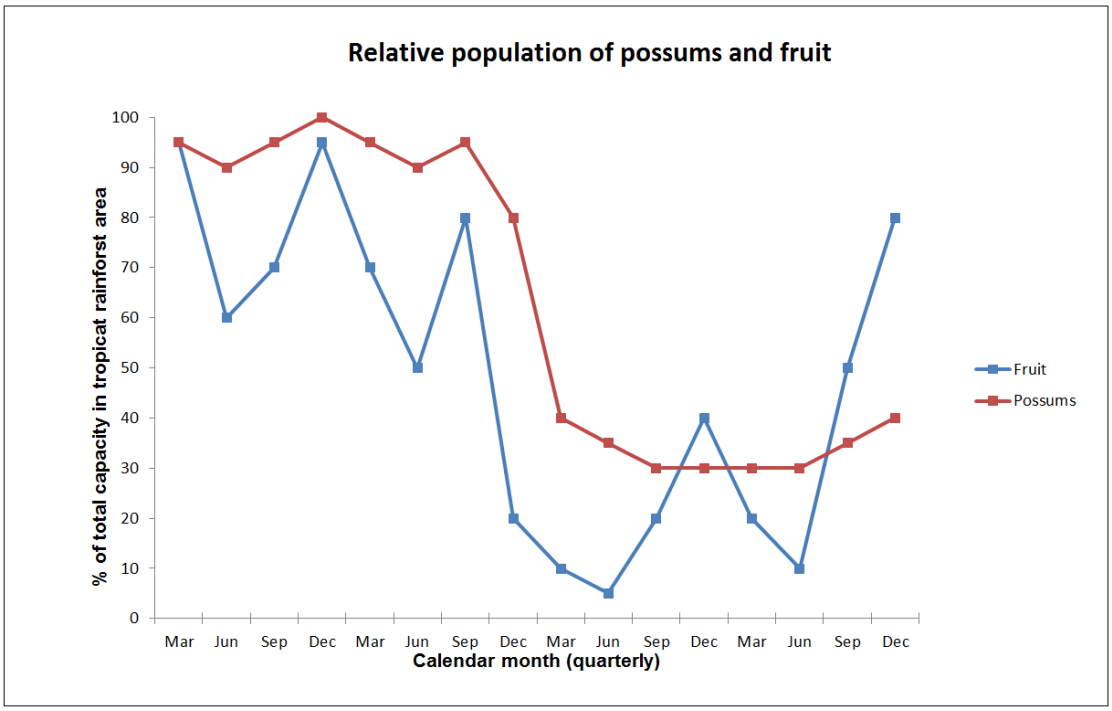
3. a. 2000 was a very wet year. Rainfall decreased in 2001 and decreased even further in 2002. It stayed quite low, though with some variations until it increased again in 2009, reaching the 2000 level in 2010 and 2011.

   b. The kangaroo population declined significantly between 2001 and 2003. The population remained at this lower level until 2010, when it started to rise again.

   c. The population of kangaroos dropped following the decrease in rainfall, and increased after the rainfall increased in 2010. Changes in the kangaroo population were a year behind the rainfall changes.

   d. Lower rainfall caused much of the grass — which is the main food source for kangaroos — to die off. As a result, many kangaroos began to starve and didn't produce any young. The population levelled off and numbers were determined by how many kangaroos the surviving grass could support. The grass would have gradually improved following the increase in rainfall in 2010 and 2011. This increased the survival rate of kangaroos and the number of young being born, resulting in an increase in the population.

4. a.



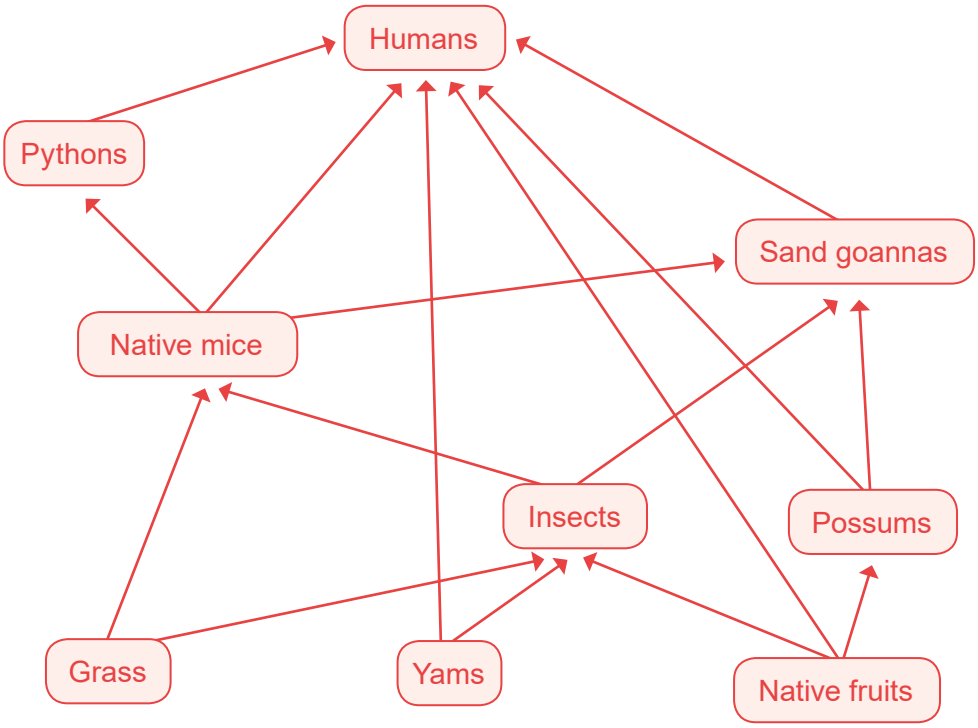

   b. The area experienced a tropical cyclone in the third summer, as indicated on the chart. This can be determined due to the sudden fall in fruit availability at the time.

   c. The fruit availability changes between summer and winter because more species of native plants in the area have fruit during the summer months.

   d. The fruit population dropped from 80 per cent before the cyclone to 20 per cent immediately after the cyclone. The cyclone would have caused physical damage to the plants, causing the fruit to fall to the ground and damaging the trees so that they didn't produce any fruit for a period of time after the cyclone. The cyclone didn't have an immediate effect on the possum population, indicating that few possums died during the cyclone. The possum population declined in response to the food shortage following the cyclone.

e. In the summer following the cyclone, fruit only recovered to 40 per cent, so the possums didn't breed much. The possum population was able to begin to recover once fruit availability recovered to near-normal levels. It takes time for breeding and growth of the new generation of possums for an increase in population size to occur.

5. a.




b. Answers will vary. For example:

| | |
|---|---|
| Producers | Grass, yams, native fruits. |
| First-order consumers | Native mice, insects, possums. |
| Second-order consumers | Pythons, sand goannas, native mice. |
| Omnivores | Humans, native mice. |
| Carnivores | Sand goannas, pythons. |

c. In the food web, the sand goanna depends directly on possums as a food source, so the cyclone would impact the sand goanna population. Humans also rely on possums, sand goannas and fruit as food sources. To survive, both sand goannas and humans would have to find alternative foods, which would impact the food web in a different way because these alternative food sources would then decline in availability.

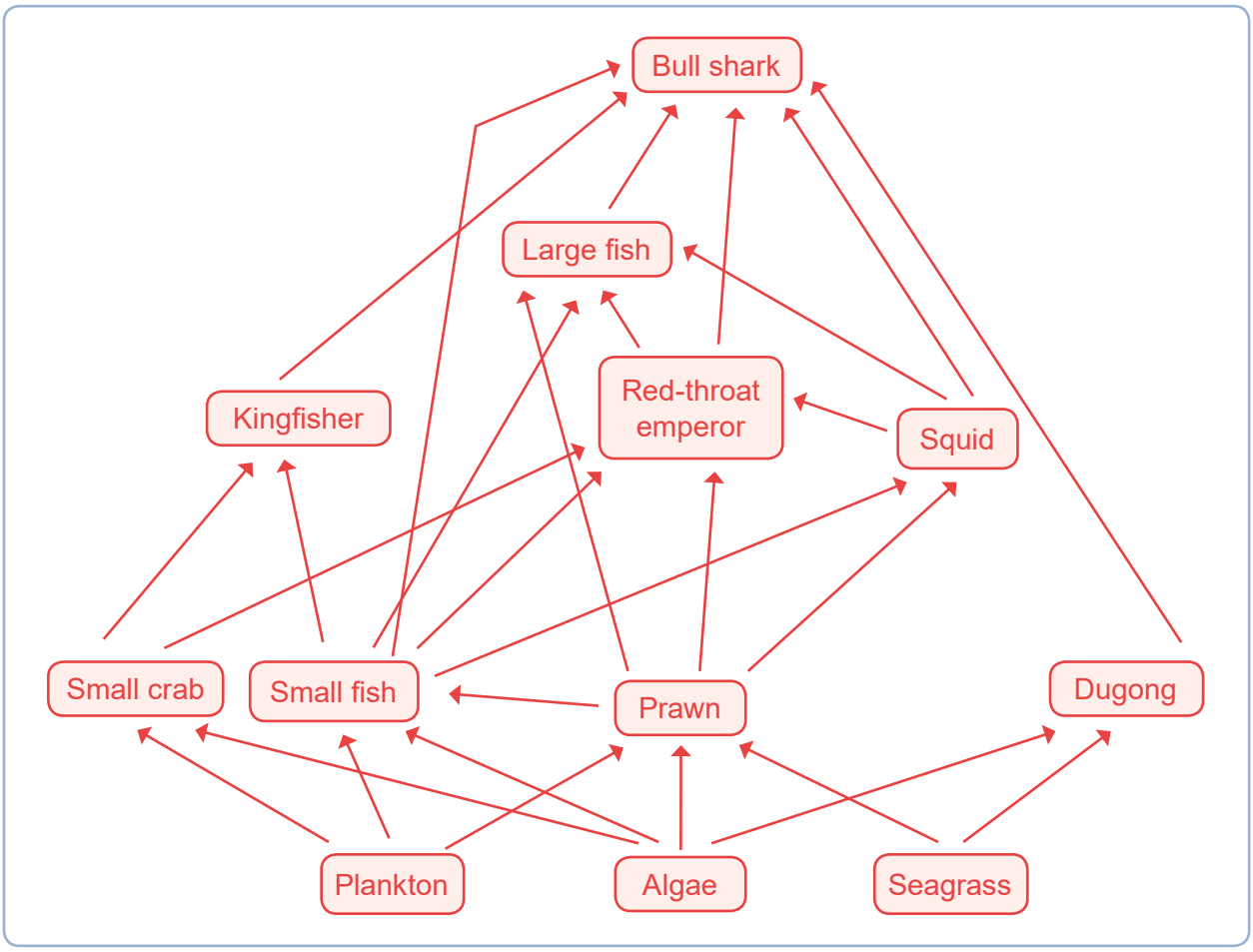

Department of Education and Training
C2C Independent Learning Materials
Queensland Government

# Moreton Bay food web

Sheet 2 Answers

## Instructions

1. Draw a diagram of your food web below.




1. What are the producers of this food web?

   The producers of this food web are algae, seagrass and plankton.

2. The red-throat emperor is considered a key species in this food web.

   a. Which species are eaten by the red-throat emperor?

      Squid, prawns, small fish and crabs are all eaten by the red-throat emperor.

   b. What would happen to the population of these species if the red-throat emperor was removed from the food web?

      These species would thrive, as there are fewer predators. It's likely that their population would increase. However, as the red-throat emperor has been removed, large fish will need to rely more on small fish, prawns and squid as their food sources.

   c. What effect would this have on the population of the producers?

      Increased numbers of prawns and small fish might decrease the number of producers in the area.

   d. How could the animals that eat the red-throat emperor be affected?

      Other large fish and bull sharks might decrease in numbers because one of their food sources, the red-throat emperor, has disappeared from the food web. Large fish and bull sharks will need to consume more of their other food sources.