SCIENCE

Lesson 1

Year 7

Topic: Human impact

Reviewing food webs

Today you will:

- ► review and construct food webs, and identify key species
- ► identify trophic levels in food pyramids.

Resources

Find and prepare

Sheet 1 — 'Who eats who' game cards (cut out)

Sheet 2 — Moreton Bay food web

Exercise book

Key terms

carnivore, energy arrow, food chain, food pyramid, food web, herbivore, key species, omnivore, trophic level

For definitions and explanations of terms, please see the Glossary.

Science start-up

Animals can be grouped according to the type of food they eat. Three commonly used groups are herbivore, carnivore and omnivore.

Review food chains and food webs

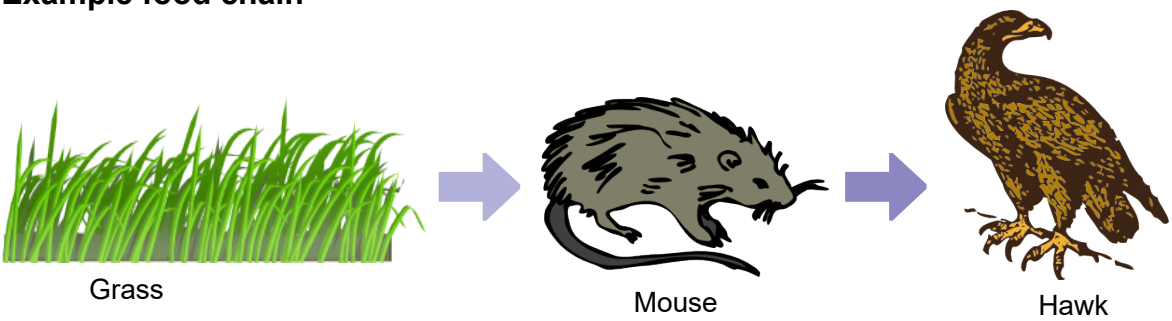
A **food chain** is a representation of a series of feeding relationships between organisms within a community or defined area. A food chain always starts with a **producer** and contains one or more **consumers**.

Energy arrows are used in **food webs** and **food chains** to indicate the direction of the flow of matter and energy (from prey to predator).

A **producer** is an organism that, usually through the process of photosynthesis, uses sunlight energy to convert carbon dioxide and water into glucose and oxygen.

A **consumer** is an organism that consumes other organisms to gain energy and essential nutrients for survival. Consumers may feed on producers and/or other consumers.

Example food chain



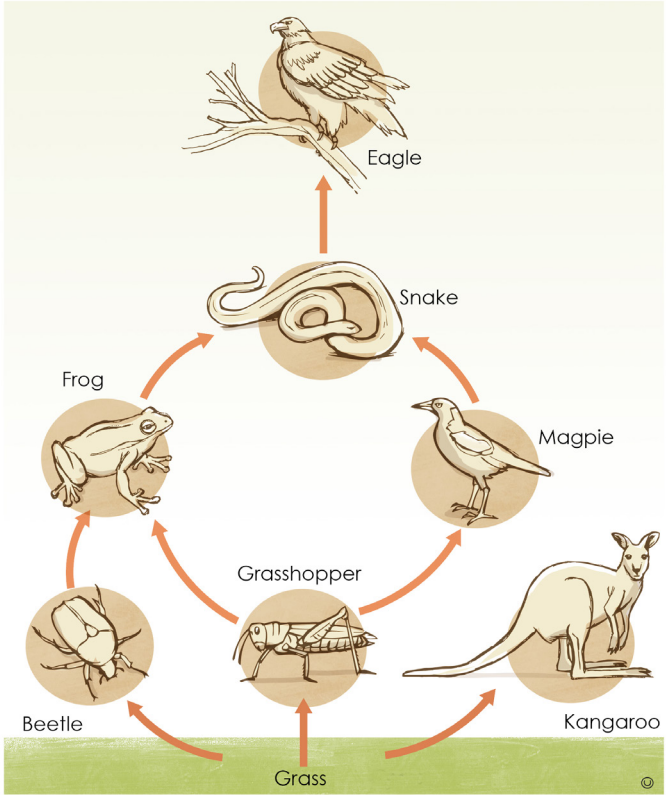
Images from clker.com

1. Identify each organism in the food chain above as either a producer or consumer.

	Producer	Consumer
Grass	☐	☐
Mouse	☐	☐
Hawk	☐	☐

A **food web** is a series of interrelated **food chains** where energy arrows indicate the direction in which nutrients and energy move between organisms and through the community.

Example Australian food web



2. Use the food web to answer the following questions.
   a. Which animals are herbivores?
   b. Which animal gets eaten by more than one type of animal?
   c. Which animals' diets consist of more than one type of food?
   d. Which of the animals in the food web are carnivores?
   e. Which animal is at the top of the food web?
   f. What do the arrows in a food web and food chain indicate?

Lesson

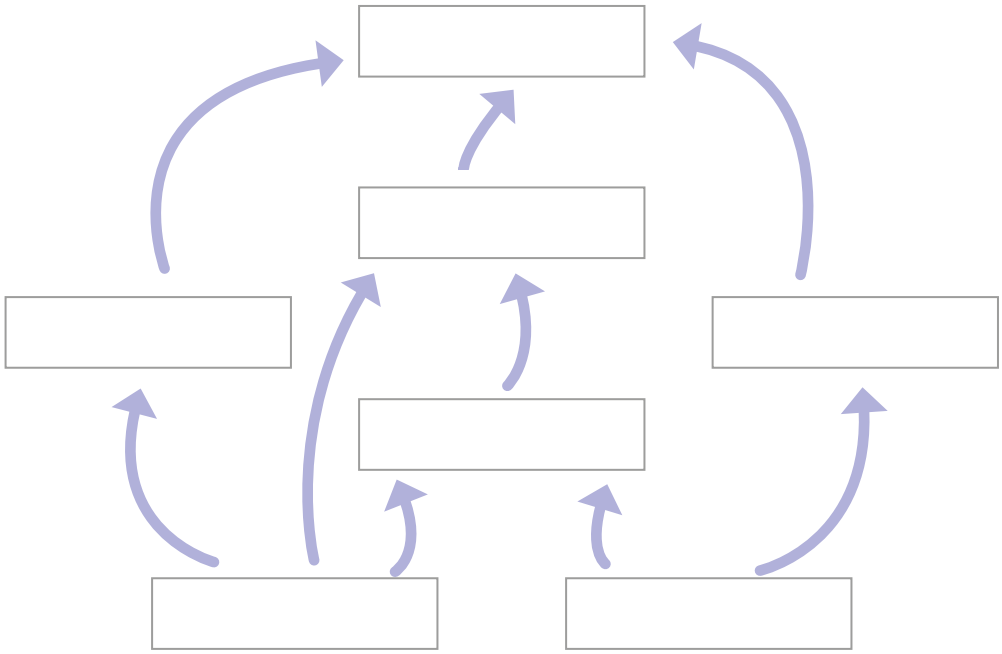
A **key species** has a greater influence on the balance of a food web than any other species. It has the important role of 'holding' the food web together. A change in the key species (such as overpopulation or population decline) can have a dramatic effect on the rest of the food web.

Overpopulation can lead to a species consuming more food, which leaves little for other species that feed on the same food source.

Population decline can lead to predators of the key species starting to die due to lack of food or to rely more on other species for food. This can affect the population of other species.

If the key species is an 'apex' predator — one that is at the top of a food chain or web — then the numbers of species that are preyed upon can increase and lead to imbalance in the food web.

3. Complete the food web below using rabbits as a key species.
   a. Use the following information to assist you.
   - Rabbits eat grass.
   - The main diet of foxes is rabbits, but they also eat birds and squirrels.
   - Birds eat grubs and the seeds of grass.
   - Grubs eat the decaying plant matter of grass and trees.
   - Squirrels eat the seeds of trees.



   b. Look at the way in which rabbits are connected to other organisms in the food web. Predict what would happen to populations of other organisms if rabbits caught a disease and their population began to decline.

   c. Predict what would happen to other species if the rabbit population tripled.

d. Explain how the rabbit is a key species in this food web.

Create a food web using a key species

4. Open **Sheet 1 —** 'Who eats who' game cards. You will be using these game cards to create a food web of some of the species found in Moreton Bay. Follow the instructions below to create your food web.

> **Hot tip**
>
> Use a large table free of clutter on which to build your food web.
>
> Create your food web on a large piece of paper. You may draw arrows to show the feeding relationships or use paper offcuts to construct arrows.
>
> Try to align animals that belong to the same trophic level at the same level in your food web.

a. Carefully cut out the game cards from the pages of the sheet.

b. Sort the cards into three piles: producers, herbivores/omnivores and carnivores.

c. Place the producers at the base of the food web (at the bottom of the sheet or table).

d. Arrange the herbivores and omnivores above the producers. Use arrows to connect the organisms that have a feeding relationship.

e. Place the carnivores that eat the herbivores and omnivores in the space above. Connect the organisms that have a feeding relationship.

f. Place the remaining carnivores in the top level(s) of the food web.

g. Ensure arrows are placed between all species that have a feeding relationship and are pointing in the correct direction.

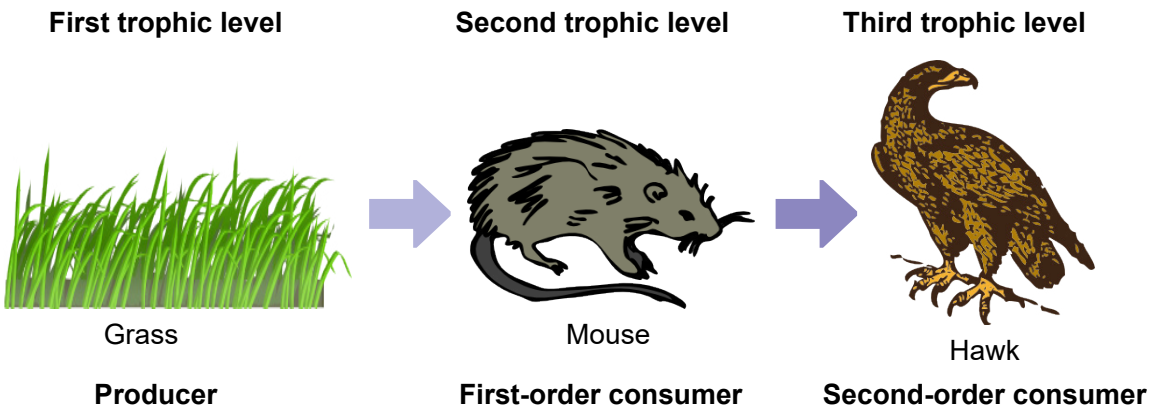
> **Hot tip**
>
> You may need to rearrange the position of the cards at each level a few times to make the food web neater and easier to follow.
>
> Use this constructed food web for the task outlined below.

5. Open **Sheet 2 —** Moreton Bay food web. Draw a diagram of the food web you constructed in Task 4 onto the sheet. Complete the questions on **Sheet 2** and keep a copy of your answers. Your teacher may ask for your answers to these questions.

Review trophic levels and food pyramids

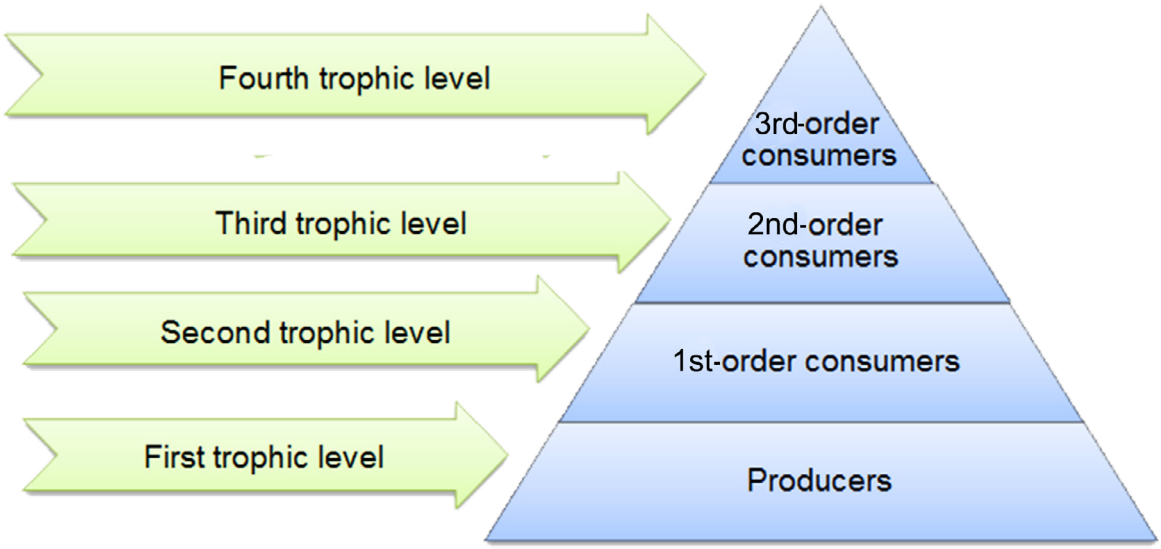
A **trophic level** refers to the feeding or energy level within a food chain or food web. The first trophic level contains the producers. Consumers occur in the second and higher trophic levels.

Consumers can be grouped according to their position in the food web. The herbivores in the second trophic level are the first consumers, so they are called 'first-order consumers'. The 'second-order consumers' occur in the third trophic level, and so on.



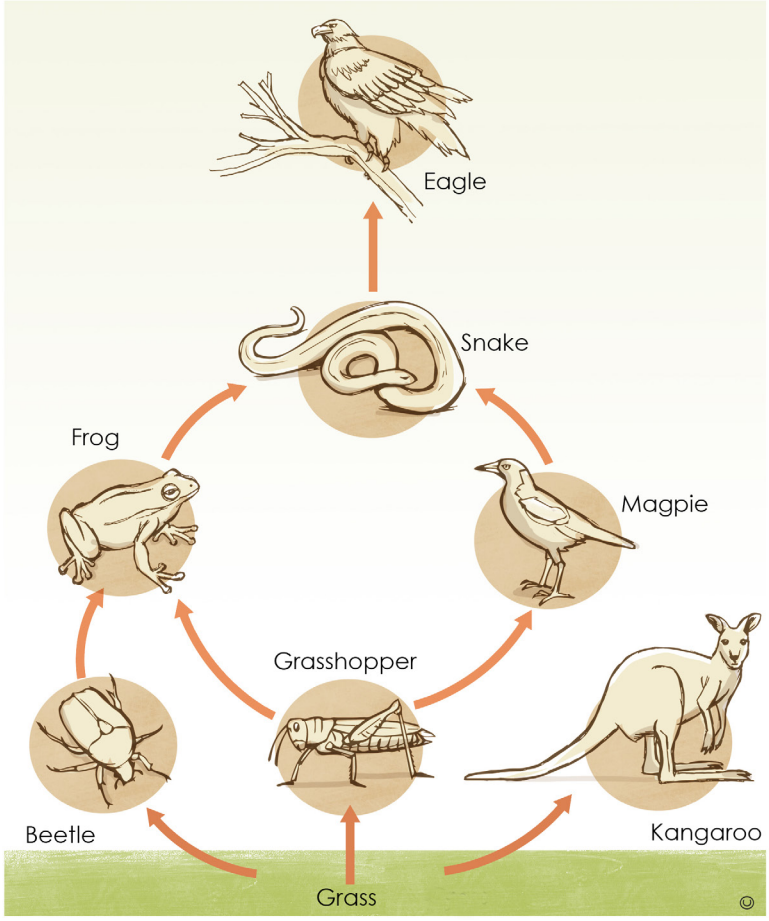
Images from clker.com

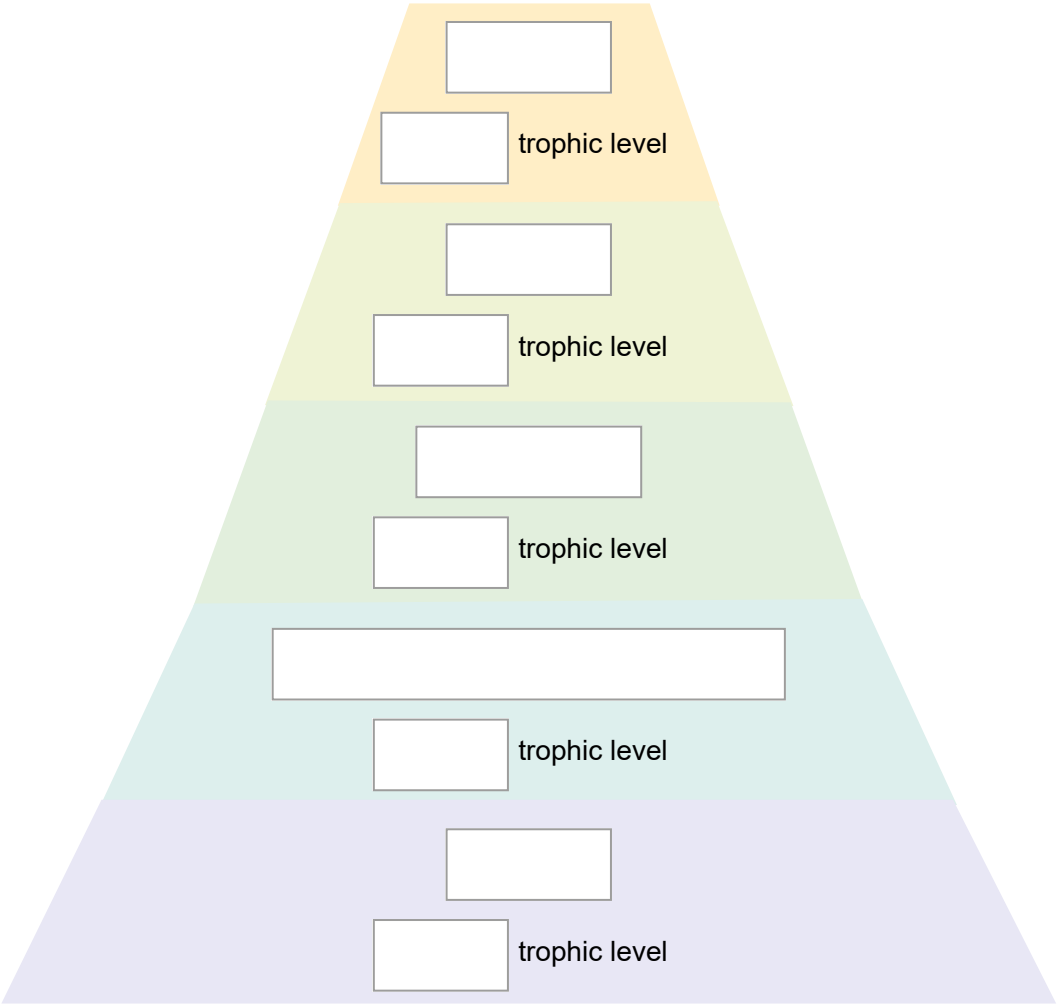
A food pyramid can be used to represent the relative numbers, mass or energy of individuals at each trophic level.



- The large number of producers supports the energy requirements of a smaller number of first-order consumers.
- These first-order consumers provide energy to a smaller number of second-order consumers.
- The second-order consumers provide energy for a smaller number of third-order consumers, and so on.
- When an organism dies, decomposers (such as fungi and bacteria) break down the plant and animal tissue into nutrients which are returned to the environment.

6. Refer to the food web below to answer the following questions.
   a. Correctly label the trophic level for each layer of the food pyramid.
   b. Assign the organisms from the food web to the appropriate trophic levels.





c. Name the second-order consumers.

d. Will there be more snakes or magpies in this food web? Why?

In the next lesson, you will explore the impact of human activity on food webs.