



# Answers

## Food Webs

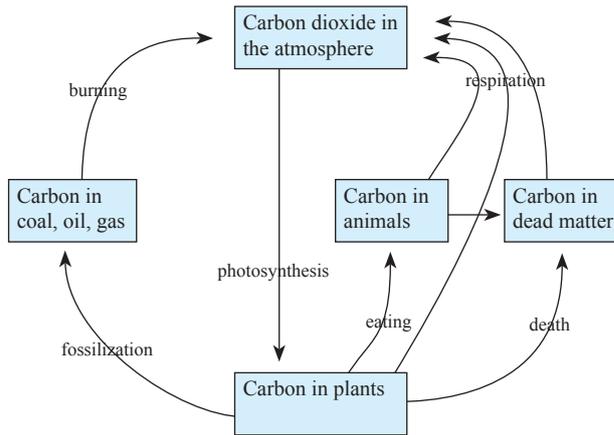
### Year 7 Science

### Chapter 3

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| <b>p43</b> | <ol style="list-style-type: none"><li>1 Herbivores are animals that eat primary producers such as plants.</li><li>2 Carnivores eat primary consumers such as herbivores.</li><li>3 Omnivores eat plants and animals.</li><li>4 Detritivores feed on and break down dead plant or animal matter. Microorganisms such as bacteria and protists are detritivores and so are fungi, insects, worms, and some crustaceans.</li><li>5 Primary consumer are animals that eat primary producers.</li><li>6 Tertiary consumer eat secondary consumers.</li></ol> <ol style="list-style-type: none"><li>1 Magpie → secondary consumer<br/>Grasshopper → primary consumer<br/>Grass → primary producer</li><li>2 Grasshoppers eat a variety of plants.</li><li>3 Magpies eat a variety of animals.</li><li>4 Dry weather causing the death of grass, and most likely a number of other plants, would reduce the food supply for primary consumers. The number of grasshoppers would be reduced and magpies would need to rely on other food sources.</li><li>5 If all magpies were removed from the food chain, the number of grasshoppers would increase. It would also be expected that the grasses would be reduced as more grasshoppers eat more grass.</li></ol> |
| <b>p45</b> | <ol style="list-style-type: none"><li>1 Photosynthesis is the process by which green plants make food using sunlight</li><li>2 <math>6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2</math></li><li>3 Ingredients for photosynthesis: Carbon dioxide from the air, water travels to the leaves from the roots of the plant, the sun as the source of energy, chlorophyll to absorb the energy from the sun.</li><li>4 Photosynthesis is crucial to life on Earth because; it produces food for plants and all animals in the food chain, it produces the oxygen that plants and animals need for life, it reduces the carbon dioxide in the air.</li><li>5 a) There would be more oxygen during the late afternoon as the plant produces oxygen through photosynthesis during the day.<br/>b) There would be more carbon dioxide during the night as the plant consumes carbon dioxide through photosynthesis during the day.</li></ol>   |
| <b>p47</b> | <ol style="list-style-type: none"><li>1 <b>Respiration</b> is the release of energy from glucose, or other carbohydrates. This energy is used for cell growth and repair.</li><li>2 <math>\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}</math></li><li>3 Ingredients for respiration: Foods such as glucose, taken to the cells by a circulatory system, oxygen, from the air, taken from the lungs/stomata to the cells by a circulatory system.</li><li>4 Both plants and animals need energy to live and grow. Respiration occurs in plants and animals throughout the day and the night.</li><li>5 a) no    b) yes    c) no    d) yes    e) yes    f) no</li></ol>  |

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- 1 Matter is anything that has mass and takes up space (has weight and volume).
- 2 True. Primary consumers eat food producers and thus matter moves up the food chain.
- 3 True. Oxygen, carbon dioxide, and water vapour are matter because they have mass and take up space.
- 4 Diagram of the carbon cycle:



- 5 A 'carbon sink' absorbs carbon dioxide from the atmosphere (Plants absorb carbon dioxide from the atmosphere through photosynthesis).
- 6 Increase photosynthesis through increasing the quantity of plants. Reduce the burning of carbon.
- 7 Carbon is returned to the air and soil when dead animals decompose.

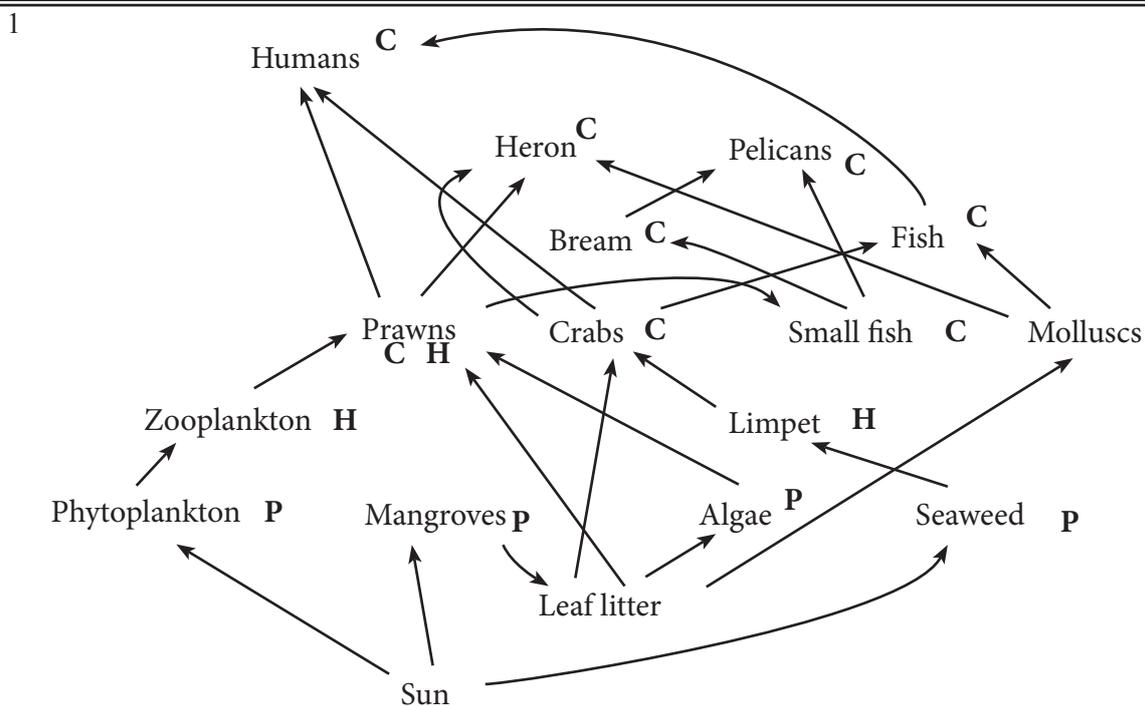
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- 1 Phytoplankton are microscopic plants that drift with the ocean currents.
- 2 True.
- 3 Producers store their energy in the form of chemical energy in compounds such as sugars and starches.
- 4 Herbivores store their energy in the form of chemical energy in compounds such as fats and proteins.
- 5 Carnivores store their energy in the form of chemical energy in compounds such as fats and proteins.

Respiration equation:  
 $\text{Sugars} + \text{Oxygen} \Rightarrow \text{energy} + \text{carbon dioxide} + \text{water}$

- 6 The respiration equation suggests that compost bins should: allow the entry of sufficient oxygen, ensure that a sufficient source of sugars (leaves and wood) and ensure that the compost doesn't become too soggy (excess water).
- 7 The pile of lawn clippings is decomposing (respiring) and heating because respiration is an exothermic reaction (produces heat).

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| <p><b>p55</b></p> | <p>5 The main source of the detritus is dead animals and plants.</p> <p>6 The population of prawns will eventually reduce: Reduced shelter from predators, and eventually reduced detritus such as leaf litter.</p> <p>7 Explosion in number of herons will reduce the number crabs, prawns, and molluscs as herons eat more of these animals. Reduced numbers of crabs, prawns, and molluscs will reduce the food supply for fish and humans. The populations of zooplankton and algae will increase as their consumers are reduced.</p> <p>8 Mangroves provide shelter from predators, habitats for reproduction, shelter from the environment such as the sun, waves, etc. Mangroves also provide ideal habitats for food sources for fish.</p>   |
| <p><b>p59</b></p> | <p>1 A habitat is an environmental area that is home to certain organisms. A habitat is a place where an organism lives. The habitat provides food and shelter. Most organisms can only live in one or two habitats.</p> <p>2 The abiotic factors are the <b>non-living</b> things that affect an organism (temperature, air, sunlight, soil, water).</p> <p>3 The biotic factors are the <b>living</b> things that affect an organism (primary producers, primary consumers, secondary consumers, tertiary consumers).</p> <p>4 Biotic factors: presence of eucalypts and other koalas. Abiotic factors: Temperature between 0°C and 40°C, annual rainfall between 500mm and 1000mm.</p> <p>5 An open forest habitat with poor granite soils, annual rainfall of 700mm and temperature range of -5°C to 35°C.<br/>Freshwater habitat in poor granite soils, prone to drying out most years. Likely to include runoff from fertilised paddocks.</p> <p>6 Deforestation, invasive species, agriculture, burning off, building dams.</p> <p>7 Dams hold sediments that would have supplied nutrients to organisms further down the river.<br/>Dams block fish migration.<br/>Dams alter the temperature, oxygen content, light penetration of immediate upstream habitats.<br/>Dams alter the flooding intervals of habitats beside the river affecting many organisms.</p> <p>8 Use a narrow strip and then underground mine to each side of the strip.<br/>Use shafts and then underground mine. Each of these ways of reducing the amount of strip mining are more expensive and can later cause sinkholes and ground subsidence.</p> |
| <p><b>p63</b></p> | <p>1 An invasive species is a species that is not natural to the habitat.</p> <p>2 Feral pigs destroy the abiotic factors of frog populations by digging up vast areas of moist soil.</p> <p>3 African love grass is displacing native grasses from large habitat areas.</p> <p>4 Crown of thorns starfish eat large areas of corals and reduce the food source for other organisms.</p> <p>5 Indian mynas compete for the shelter of tree hollows with other native wildlife.</p> <p>6 Crown of thorns starfish eat large areas of corals and reduce the shelter for other organisms.</p>   |
| <p><b>p66</b></p> | <p>1 Herbivores are animals that eat primary producers such as plants.</p> <p>2 Carnivores eat primary consumers such as herbivores.</p> <p>3 Omnivores eat plants and animals.</p> <p>4 Detritivores feed on and break down dead plant or animal matter. Microorganisms such as bacteria and protists are detritivores and so are fungi, insects, worms, and some crustaceans.</p> <p>5 Primary consumer are animals that eat primary producers.</p> <p>6 Tertiary consumer eat secondary consumers.</p> <p>7 Kookaburra → tertiary consumer<br/>Lizard → secondary consumer<br/>Insect → primary consumer<br/>Plant → primary producer</p>   |

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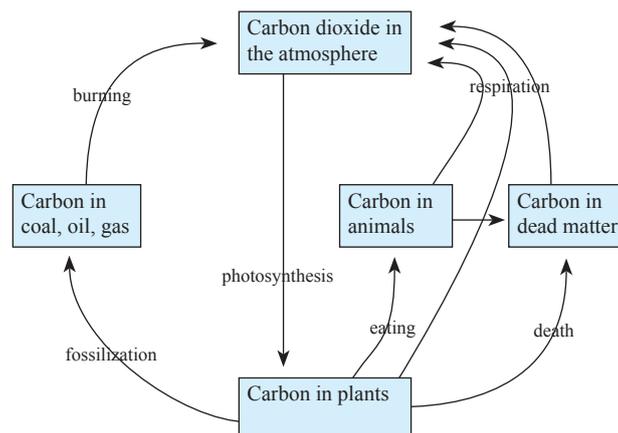
- 1 Kookaburra → tertiary consumer  
Centipede → secondary consumer  
Worm → primary consumer
- 2 Grasshoppers eat a variety of plants.
- 3 Magpies eat a variety of animals.
- 4 Dry weather causing the death of grass, and most likely a number of other plants, would reduce the food supply for primary consumers. The number of grasshoppers would be reduced and magpies would need to rely on other food sources.
- 5 If all magpies were removed from the food chain, the number of grasshoppers would increase. It would also be expected that the grasses would be reduced as more grasshoppers eat more grass.
- 6 Large numbers of producers are needed to support a herbivore. Large numbers of herbivores are needed to support a carnivore. For example, one herbivore will not support one carnivore. Thus there are many more herbivores than carnivores.
- 7 Similarly, there are many more detritivores than herbivores.
- 8 Omnivores are able to eat producers and consumers (plants and animals). Omnivores might be expected to outnumber carnivores because they are able to be supported by plants and animals whereas carnivores are supported by herbivores only.

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- 1 Photosynthesis is the process by which green plants make food using sunlight
- 2  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- 3 Ingredients for photosynthesis: Carbon dioxide from the air, water travels to the leaves from the roots of the plant, the sun as the source of energy, chlorophyll to absorb the energy from the sun.
- 4 Photosynthesis is crucial to life on Earth because; it produces food for plants and all animals in the food chain, it produces the oxygen that plants and animals need for life, it reduces the carbon dioxide in the air.
- 5 a) There would be more oxygen during the late afternoon as the plant produces oxygen through photosynthesis during the day.  
b) There would be more carbon dioxide during the night as the plant consumes carbon dioxide through photosynthesis during the day.
- 1 **Respiration** is the release of energy from glucose, or other carbohydrates. This energy is used for cell growth and repair.
- 2  $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$
- 3 Ingredients for respiration: Foods such as glucose, taken to the cells by a circulatory system, oxygen, from the air, taken from the lungs/stomata to the cells by a circulatory system.
- 4 Both plants and animals need energy to live and grow. Respiration occurs in plants and animals throughout the day and the night.
- 5 a) no    b) yes    c) no    d) yes    e) yes    f) no

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- 1 The carbon cycle is the to and fro movement of carbon from the environment to living things and back again.
- 2 True - Carbon flows through the food chain.
- 3 Diagram of the carbon cycle.

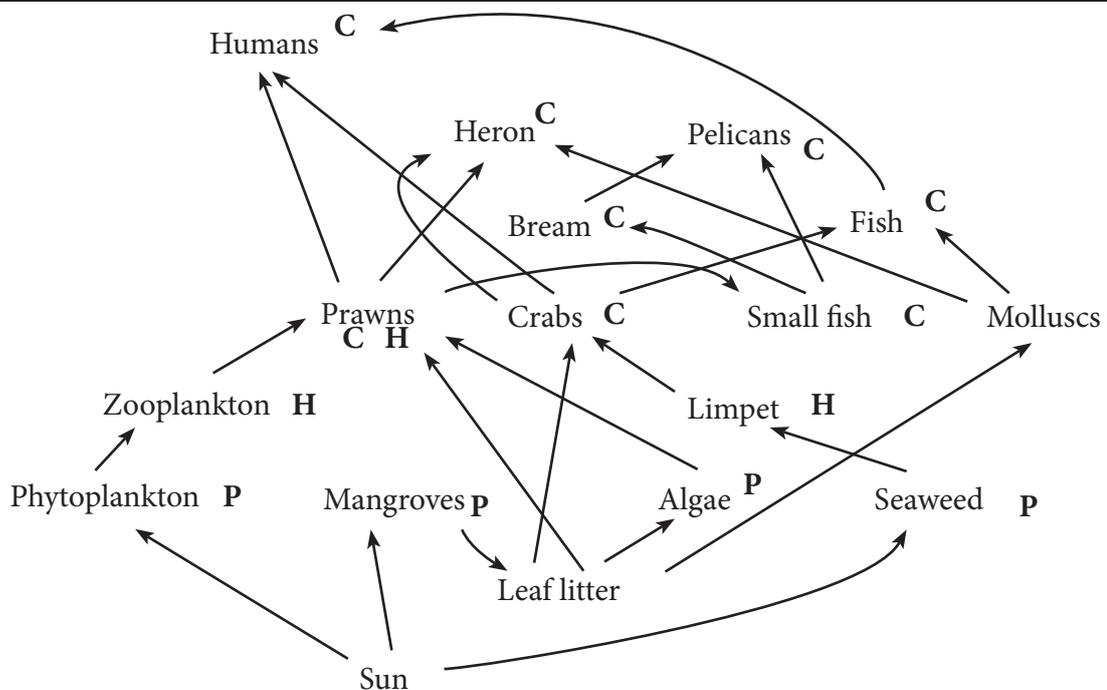


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- 4 Carbon gets into the air through respiration and burning.
- 5 Carbon gets into plants through photosynthesis.
- 6 Carbon gets into animals when they eat plants.
- 7 Carbon gets into the soil when plants and animals die.
- 8 A 'carbon sink' absorbs carbon dioxide from the atmosphere (Plants absorb carbon dioxide from the atmosphere through photosynthesis).
- 9 Carbon dioxide can be reduced by increasing photosynthesis and by reducing burning.
- 1 Food chains show the flow of energy. The Sun is the primary source of energy. The energy flows through the food chain from the producers to the consumers.
- 2 True. Sunlight is the primary source of energy.
- 3 True. During photosynthesis most of the input energy is lost.
- 4 Producers store their energy as chemical energy in sugars and starches.
- 5 Herbivores store their energy as chemical energy in fats and proteins.
- 6 Carnivores store their energy as chemical energy in fats and proteins.
- 7 A pile of lawn clippings can become warm as microbes respire and produce heat.
- 8 The respiration equation suggests that compost bins should: allow the entry of sufficient oxygen, ensure that a sufficient source of sugars (leaves and wood) and ensure that the compost doesn't become too soggy (excess water).

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- 2 The main source of the detritus is dead animals and plants.
- 3 The population of prawns will eventually reduce: Reduced shelter from predators, and eventually reduced detritus such as leaf litter.
- 4 Explosion in number of herons will reduce the number crabs, prawns, and molluscs as herons eat more of these animals. Reduced numbers of crabs, prawns, and molluscs will reduce the food supply for fish and humans. The populations of zooplankton and algae will increase as their consumers are reduced.

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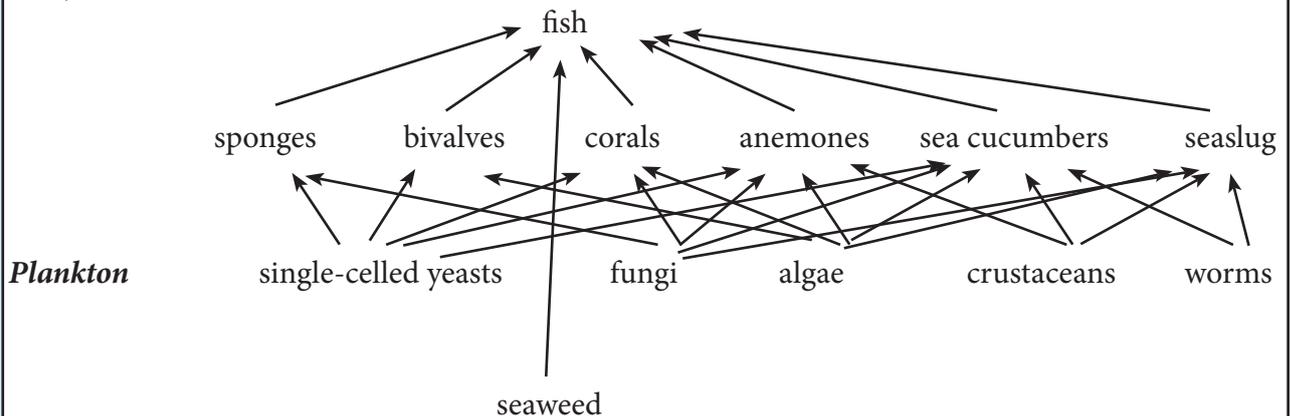
- 1 A habitat is an environmental area that is home to certain organisms. A habitat is a place where an organism lives. The habitat provides food and shelter. Most organisms can only live in one or two habitats.
- 2 The abiotic factors are the **non-living** things that affect an organism (temperature, air, sunlight, soil, water).
- 3 The biotic factors are the **living** things that affect an organism (primary producers, primary consumers, secondary consumers, tertiary consumers).
- 4 Biotic factors: presence of eucalypts and other koalas. Abiotic factors: Temperature between 0°C and 40°C, annual rainfall between 500mm and 1000mm.
- 5 The massive areas of agriculture, with accompanying deforestation, probably has the largest impact on native habitats.
- 6 Dams hold sediments that would have supplied nutrients to organisms further down the river.  
Dams block fish migration.  
Dams alter the temperature, oxygen content, light penetration of immediate upstream habitats.  
Dams alter the flooding intervals of habitats beside the river affecting many organisms.
- 7 An invasive species is a species that is not natural to the habitat.
- 8 Feral pigs destroy the abiotic factors of frog populations by digging up vast areas of moist soil.
- 9 African love grass is displacing native grasses from large habitat areas.
- 10 Crown of thorns starfish eat large areas of corals and reduce the food source for other organisms.
- 11 Indian mynas compete for the shelter of tree hollows with other native wildlife.
- 12 Crown of thorns starfish eat large areas of corals and reduce the shelter for other organisms.

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- 1 c) There is less energy available.  
There is more energy available from producers. If humans ate producers only, then many consumers would live and not be needed to supply the same amount of energy to humans as could be obtained from producers..
- 2 a) D is an autotroph (make their own food).  
b) B is a heterotroph (eat other plants and/or animals).  
c) A is a detritivore (eat dead plants and/or animals).

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1 a)



- b) Corals are not similar. They feed on plankton.  
c) The number of carnivores on the reef are larger in number than carnivores on land because of the significantly larger number of producers (zooplankton) and first order consumers (plankton) in the sea.
- 2 A is a herbivore, B is a predator. There are more herbivores than predators. The graph suggests that the B population is dependent on the A population.
- 3 Plants that are not green can produce food. Green plants photosynthesise using mainly red and blue light from the spectrum of sunlight. Some plants, non-green, can photosynthesise using other colours from the sunlight spectrum.

- 4** The energy pyramid is possible but not sustainable. The 1st order consumers will not get enough energy from the producers to survive.
- 5** **a)** The cereal field would probably produce the largest quantity of producers while the forest would produce the largest variety of producers.  
**b)** The cereal field would sustain the largest numbers of consumers while the forest would sustain the largest variety of consumers.
- 6** **a)** More oxygen in cold water.  
**b)** More oxygen in a deep pool because the water would be colder.  
**c)** Fresh water animals would have a higher survival rate in deeper fresh water pools.  
**d)** The oxygen is released into the atmosphere as the water heats up.