

## Reading: Chains, webs and pyramids

### 4.11 Vocabulary for reading

#### Climate areas

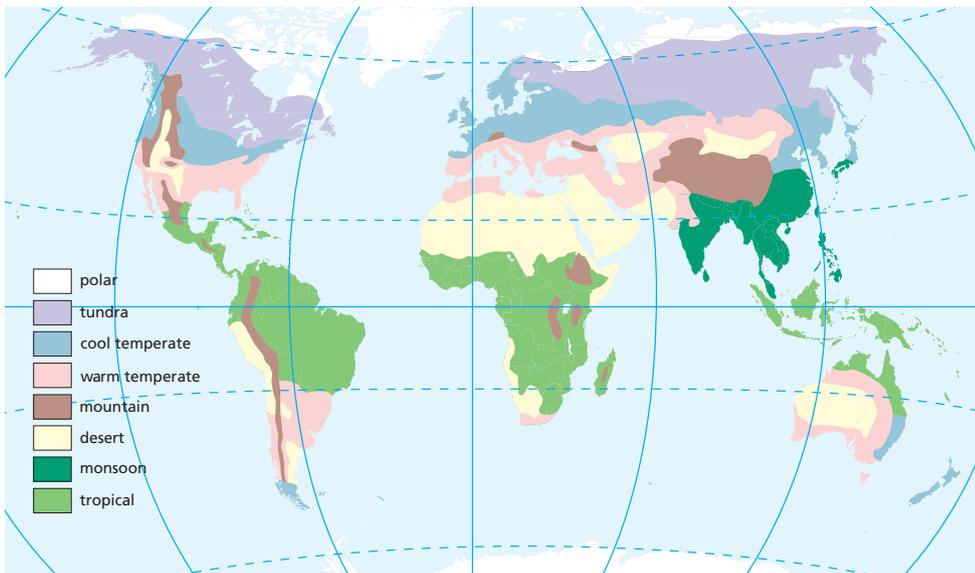


Figure 1: World climate areas (worldclimate.com)

#### A Understanding world maps

1. Label Figure 1 with the words from the box.
2. What do the different colours indicate?
3. What colour is your country?
4. What does that colour mean?

Equator    Tropic of Cancer  
Tropic of Capricorn  
North Pole    South Pole

#### B Understanding new words in context

Read the encyclopedia entries below. Copy a climate name from Figure 1 into each space.

desert

An area with less than 25 cm of rain a year. These areas have hot days and cold nights.

An area near the North Pole or the South Pole with a maximum temperature of 10°C.

An area with generally mild summers and mild winters but there can be extremes of temperature. These areas are divided into cool and warm.

An area normally between latitude 10 degrees north and 20 degrees south of the Equator. These climates have an average temperature around 25°C and at least 150 cm of rain a year.

An area near the North Pole with no trees. The area under the surface of the earth is permanently frozen.

A tropical area with very high rainfall in the summer season.

An area of very high land with cold winters and mild summers.

#### C Developing critical thinking

1. Which climate area do you live in?
2. Do you agree with the climate description in Exercise B for your area?

carnivore (*n*)  
chemical energy  
consumer (animal)  
convert (*v*)  
desert (climate)  
destroy (*v*)  
ecology (*n*)  
ecosystem (*n*)  
endangered (*adj*)  
environment (*n*)  
Equator  
extant (*adj*)  
extinct (*adj*)  
food chain  
food pyramid  
food web  
habitat (*n*)  
heat energy  
herbivore (*n*)  
in the first place  
omnivore (*n*)  
organism (*n*)  
photosynthesis (*n*)  
polar (climate)  
process (*n*)  
producer (plant)  
solar energy  
survive (*v*)  
temperate (climate)  
transfer (*v*)  
tropical (climate)

**4.12 Real-time reading** Chains and webs

**A** Activating ideas

1. What does each photograph on the right show?
2. How many links are there in each photograph?
3. How do we use the words *chain* and *web* in everyday life?



**B** Understanding text organization

Scan the text on the opposite page.

1. How is the text organized?
2. Where can you find this kind of text?
3. What does the sign  $\Rightarrow$  mean?

**C** Preparing to read

Write some research questions to prepare for this lecture.

School of Biological Sciences

Lecture 3

In this lecture, we look at *ecology* and we see the difference between an *environment* and an *ecosystem*. We also examine some of the relationships between living things.

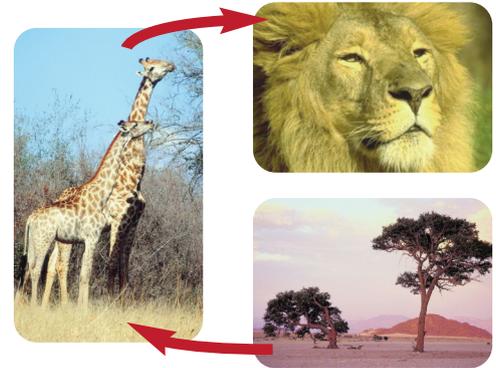


Figure 1: \_\_\_\_\_

**D** Understanding the text

1. Use the highlighted parts of the science encyclopedia opposite to find answers to your research questions in Exercise C. Follow any links.
2. Write a caption for each figure on the right.
3. What are some of the relationships between the living things in the figures?

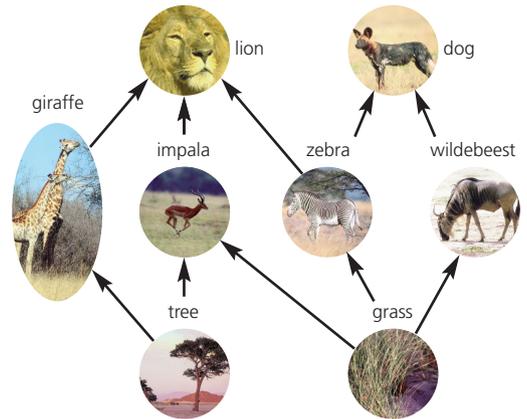


Figure 2: \_\_\_\_\_

**E** Understanding vocabulary in context

Find a verb in the highlighted entries for each definition.

1. <i>convert</i>	change from one state to another
2.	continue to live, not die
3.	move from one place to another
4.	help, assist, enable to exist
5.	damage so repair is not possible
6.	take away



**F** Developing critical thinking

Look at the pictures below Figure 2.

1. Draw arrows to show the links between the items.
2. What will happen to this food chain if:
  - fishermen catch all the fish?
  - sealers kill all the seals?
  - the ocean water gets too warm for the plankton to survive?

<i>ecology</i>	The study of the relationship between living things and their ⇒ <b>environment</b> . We learn from ecology that living things depend on each other to survive. This is because all living things are involved in ⇒ <b>food chains</b> and ⇒ <b>food webs</b> .
<i>ecosystem</i>	All the animals and plants which live in a particular area, and the relationship between them. An ecosystem supports the animals and plants but a change in the ⇒ <b>environment</b> may destroy an ecosystem, e.g., the advance of a ⇒ <b>desert</b> may destroy a grassland. People can change or destroy an ecosystem as well, e.g., by building towns in green areas.
<i>emigration</i>	Movement of an ⇒ <b>organism</b> from one location to another, often as a result of a change in the ⇒ <b>ecosystem</b> .
<i>endangered</i>	An animal or plant which is close to becoming ⇒ <b>extinct</b> .
<i>energy</i>	The power which enables us to do work. All energy comes from the Sun in the first place. Some plants convert the Sun's energy into chemical energy. They are the first link in every ⇒ <b>food chain</b> .
<i>environment (an)</i>	A place which has a particular ⇒ <b>climate</b> and landscape. There are a number of major environments on Earth, e.g., ⇒ <b>desert</b> , the ⇒ <b>tropics</b> .
<i>extant</i>	An animal or plant which is still alive and ⇒ <b>reproducing</b> . All species currently alive on earth are extant (opposite: ⇒ <b>extinct</b> ).
<i>extinct</i>	An animal or plant which is no longer living on Earth (opposite: ⇒ <b>extant</b> ). Species often become extinct because of changes in the ⇒ <b>ecosystem</b> .
<i>flow-through system</i>	A system with an input and an output of ⇒ <b>energy</b> . For example, a ⇒ <b>food chain</b> is a flow-through system with some of the energy consumed by the animal at every stage.
<i>food chain</i>	This is the way in which ⇒ <b>energy</b> is transferred from one living thing to another. At the top of every food chain, there is an animal which eats other animals. At the bottom of every food chain, there is a plant which can convert the Sun's ⇒ <b>energy</b> into food. If we remove one part of a food chain, there will be a reaction in another part of the chain.
<i>food value</i>	The relative amount of ⇒ <b>nutrition</b> which is obtained from a particular food.
<i>food web</i>	This is a connection of two or more ⇒ <b>food chains</b> . It shows relationships between the animals and plants in a certain ⇒ <b>ecosystem</b> . Most animals and plants are part of a food web with 10, 20 or 30 other living things. This means it is very difficult in real life to predict the effect of a change in one part of the web.
<i>Gaia</i>	This is an idea which was put forward by ⇒ <b>James Lovelock</b> . It suggests that all living things are part of one mass which can change its ⇒ <b>environment</b> to ensure its survival. This is not necessarily good news for human beings. Gaia might change the Earth in a way that makes it unfit for humans.

### 4.13 Learning new reading skills

### Doing research with encyclopedias

#### A Reviewing vocabulary

Which preposition do you expect to follow each verb phrase or noun phrase below?

1. depend On .....
2. be involved .....
3. come .....
4. convert .....
5. transfer .....
6. be part .....
7. learn .....
8. the relationship .....
9. the connection .....
10. the effect .....

#### B Identifying a new skill

Read the **Skills Check**. Then decide if each statement is true (T) or false (F).

1.  Some useful encyclopedias are on the Internet.
2.  Research questions give you a purpose for reading.
3.  You need to read a complete entry in an encyclopedia to understand it properly.
4.  Links in an online encyclopedia are usually in red type.
5.  It is easy to lose your way in an encyclopedia.
6.  The Back button does not work with an online encyclopedia.

#### C Practising a new skill

Look again at the text on page 121.

Study each research question below. Then make a list of the linked entries in each case.

research questions	links
1. What is a flow-through system?	energy, food chain
2. What is food value?	
3. What is an endangered animal or plant?	
4. What is Gaia?	
5. What is emigration in ecology?	

#### D Understanding a text

Answer the research questions in Exercise C above. Only follow relevant links.

### Skills Check

#### Using encyclopedias

Encyclopedias are a very good source for research. They can be **printed books** or on the **Internet**. But you can waste a lot of time reading information in encyclopedias which is not useful to you.

1. Always read an encyclopedia entry **for a purpose**. Write research questions before you look at the encyclopedia, e.g., *What is ecology?*  
*What is a food chain?*
2. **Do not read** the whole of a long entry. Stop when you have answers to your research questions.
3. Make a note of links to extra information, e.g., ⇒ **ecosystem** or *ecosystem*.
4. Follow useful links. But be careful! Some links may not be useful. Think: *Will the link help me answer the research question(s)?*
5. Put a **marker** in each page of a printed encyclopedia before you go to another entry. If you don't do this, it may take you a long time to find the important entries again.
6. Click the **Back** button to return to the original page after reading each entry in an Internet encyclopedia. If you don't do this, you may lose your way in all the links.

#### 4.14 Grammar for reading

#### Adding information with *which / that*

Writers often give more information about a complement with *which* or *that*.

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S	V	C		V	extra information
Energy	is	the power	which / that	enables	us to do work.
Ecosystems	are	areas		have	a particular climate.
Gaia	is	an idea		was put forward	by James Lovelock.

*which / that* replaces the subject of the second verb.

S	V	C	S	V	extra information
Energy	is	the power.	The power	enables	us to do work.
Ecosystems	are	areas.	The areas	have	a particular climate.
Gaia	is	an idea.	The idea	was put forward	by James Lovelock.

Make sure you understand the general noun in the complement before you read the *which / that* section of the sentence.

#### A Understanding the general noun

Choose a general noun from the box to match the subject of each sentence.

a chemical   an animal   an area   ~~a theory~~   a plant   a process   a subject   a machine  
a vehicle   a gas

- Learning by doing is a theory which was proposed by Aristotle.
- Condensation is \_\_\_\_\_ which converts water vapour into water.
- A jungle is \_\_\_\_\_ which has a large number of tropical trees.
- Carbon dioxide is \_\_\_\_\_ which prevents heat energy from escaping into Space.
- A tram is \_\_\_\_\_ which runs along grooves in the road.
- A mammal is \_\_\_\_\_ which gives birth to live young.
- A decomposer is \_\_\_\_\_ which breaks down dead animals or plants into chemicals.
- Media Studies is \_\_\_\_\_ which looks at the mass media, like television and the Internet.
- A nitrate is \_\_\_\_\_ which helps plants to grow.
- A generator is \_\_\_\_\_ which makes electricity.

#### B Predicting extra information after *which*

What information do you expect to read after each *which*?

- An extinct plant is a plant which does not exist on Earth any more.
- An endangered animal is an animal which \_\_\_\_\_
- A food web is a number of food chains which \_\_\_\_\_
- A desert is an area which \_\_\_\_\_
- Short-term memory is the part of your brain which \_\_\_\_\_
- A prompt in a test is something which \_\_\_\_\_
- Transactional Analysis is an idea which \_\_\_\_\_
- I'm OK, You're OK* is a book which \_\_\_\_\_
- Evaporation is a process which \_\_\_\_\_
- The Great Man-made River is a project which \_\_\_\_\_

#### C Identifying *which* in context

Look again at the text in Lesson 4.12. Circle all the *which* words. What subject does each word give extra information about?

4.15 Applying new reading skills

Producers and consumers

**A** Reviewing vocabulary

Which word or phrase from this section does each phrase define?

- |                            |   |
|----------------------------|---|
| 1. <u>food chain</u> ..... | the way in which energy is transferred from one living thing to another |
| 2. ....                    | the amount of nutrition which is obtained from a particular food        |
| 3. ....                    | an animal or plant which no longer exists on the Earth                  |
| 4. ....                    | the place which a group of animals and plants live in                   |
| 5. ....                    | a system which contains a number of food chains                         |
| 6. ....                    | an animal or plant which still lives on the Earth                       |
| 7. ....                    | an animal or plant which is becoming extinct                            |
| 8. ....                    | an area which has a particular climate                                  |

**B** Activating ideas

Study Figure 1 on the right and read the text below.

In the diagram, we can see part of an ecosystem. At the top of the diagram, we have a snake. This snake must eat five frogs a day. Each frog must eat three grasshoppers. The grasshoppers get energy from eating huge amounts of grass.

- Write the names of the living things in the correct place.
- Write the total number of each animal involved.

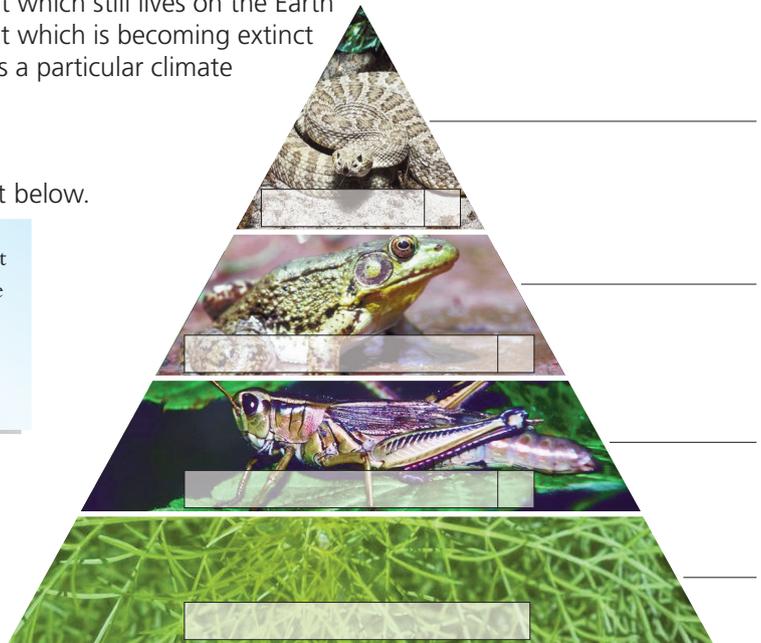


Figure 1: \_\_\_\_\_

**C** Preparing to read

Read the lecture notice from the School of Biological Sciences. Write your research questions.

School of Biological Sciences  
**Lecture 4: Ecosystems**

In this lecture, we look at ways of classifying the animals and plants in an ecosystem.

Research the following terms before the lecture:

- *producers*
- *consumers*

**D** Understanding a text

- Do research using the extracts from a website opposite. Make notes on the specialist terms.
- Write a caption for Figure 1 on the right.
- Name each level in Figure 1.

**E** Remembering key words

Define each of these words from your research. Use a sentence with *which*.

a consumer   a producer   a carnivore   a herbivore  
an omnivore   a food pyramid   photosynthesis

**Example:** A consumer is an animal which eats a producer or another animal.

**F** Developing critical thinking

... only ten per cent of the energy is transferred from one level to the next.

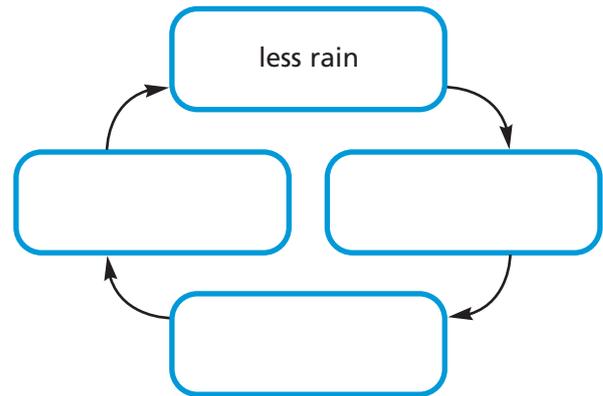
What is the connection between this statement from the web encyclopedia and vegetarianism?

File Edit View Favorites Tools Help	
adaptation	Animals and plants show adaptation to their <a href="#">habitat</a> , e.g., fish in deep water have eyes that see better in blue light because there is only blue light deep in the oceans.
biomass	This is the name which is given to stored <a href="#">solar energy</a> . The stored energy can be converted to electricity or fuel.
biome	A major <a href="#">environment</a> which covers a large area of the Earth, e.g., <a href="#">desert</a> .
carnivore	An animal which eats other animals, e.g., a lion. Carnivores do not have the correct <a href="#">digestive system</a> to eat plants.
climate	The normal weather in a particular area. Climate is mainly a combination of location, temperature and rainfall. There are eight main types of climate, including <a href="#">desert</a> , <a href="#">polar</a> and <a href="#">tropical</a> . The climate in a particular area supports particular kinds of animals and plants.
consumer	A consumer can be a primary (or first-level) consumer, a secondary (or second-level) consumer or a tertiary (third-level) consumer. A primary consumer is normally a <a href="#">herbivore</a> . Primary consumers are animals which eat <a href="#">producer</a> plants. A secondary consumer is usually a <a href="#">carnivore</a> . It eats primary consumers. A tertiary consumer is also usually a carnivore. It eats secondary consumers. Secondary and tertiary consumers can also be <a href="#">omnivores</a> .
desert	In <a href="#">climate</a> terms, an area with less than 25 cm of rain a year. Desert climates have hot days and cold nights.
food chain	This is the way that energy is transferred from one living thing to another. At the top of every food chain, there is a <a href="#">consumer</a> . This animal eats another animal. At the bottom of every food chain there is a <a href="#">producer</a> . Producers are plants which can convert <a href="#">solar energy</a> into food.  If we remove one part of a food chain, there will be a reaction in another part of the chain. The numerical relationship between living things in a food chain is shown in a <a href="#">food pyramid</a> . Energy is lost at every level of a food chain. In fact, on average, only ten per cent of the energy is transferred from one level to the next.
food pyramid	A food pyramid is a diagram which shows the energy needed to keep a particular animal alive. At each level of a <a href="#">food chain</a> , there are fewer living things.
habitat	The place which a particular animal or plant can survive in.
herbivore	An animal which eats plants, e.g., a giraffe. Herbivores do not have the correct <a href="#">digestive system</a> to eat animals.
niche	This is the position of a living thing in an <a href="#">ecosystem</a> . It includes the habitat, food and behaviour of the animal or plant.
omnivore	An animal which eats both animals and plants, e.g., human beings. Omnivores have the correct <a href="#">digestive system</a> to eat both animals and plants.
photosynthesis	The process which converts the <a href="#">solar energy</a> into <a href="#">sugar</a> , <a href="#">oxygen</a> and <a href="#">carbon dioxide</a> . It is conducted by green plants and is the basis of all <a href="#">food chains</a> .
polar	In <a href="#">climate</a> terms, an area near the North Pole or the South Pole with a maximum temperature of 10°C.
producer	A green plant, e.g., grass, which uses <a href="#">photosynthesis</a> to produce food in the form of chemical energy.
solar energy	This is heat energy which is received from <a href="#">the Sun</a> . All energy on <a href="#">the Earth</a> comes from the Sun in the first place.
the Earth	This is the <a href="#">planet</a> which we all live on. It is the third planet from <a href="#">the Sun</a> in our Solar System. It is approximately 150 million kilometres from <a href="#">the Sun</a> .
the Sun	This is the <a href="#">star</a> at the centre of our <a href="#">Solar System</a> . It is approximately 150 million kilometres from <a href="#">the Earth</a> .
tropical	In <a href="#">climate</a> terms, an area between <a href="#">latitude</a> 10 degrees north of the Equator and 10 degrees south of the Equator. Tropical climates have an average temperature around 25°C and at least 150 cm of rain a year.

**Knowledge quiz** Natural cycles and processes

**A** Desertification

1. Complete the diagram to show the vicious circle of desertification.
2. Describe the process in the diagram on the right.
3. Draw a diagram to show the process of greening the desert.
4. Describe the process of greening.



**B** Greening projects

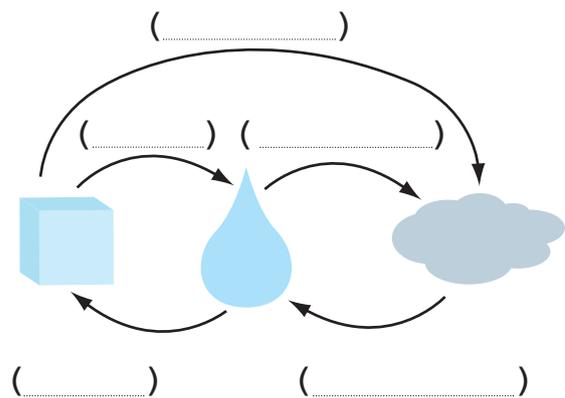
1. Match each fact below to one of the projects.
2. Describe each project briefly.

		Great Man-made River	Gobi Desert Tree	UAE Greening
a. area of tree planting	18 k <sup>2</sup>		✓	
b. evaporation of surface water p.a.	3,200 mm			
c. extra farmland produced	1.5 k <sup>2</sup>			
d. length of pipelines	3,500 k			
e. number of city parks	39			
f. speed of desertification p.a.	1,000 k <sup>2</sup>			
g. temperature fall	2°C			
h. volume of water per day	6.5 m. m <sup>3</sup>			

**C** States of water

1. Label the diagram with words from the box to show the states of water and the changing states.

- condensation
  - evaporation
  - freezing
  - ice
  - liquid
  - melting
  - solid
  - sublimation



2. Describe the possible changes of state.

**D** Food chains

1. Draw a food chain for plants and animals in your own country.
2. Describe the chain.
3. Explain the effect of a change in the middle of the food chain.