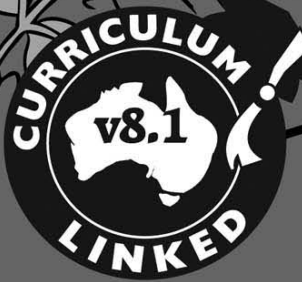


Sustainability

For Years 5-6



By
Fiona Back

Contents

Teachers' Notes	4	Section Four: World Views	30
Curriculum Links	5	Transport Around The Globe	31
Section One: Biosphere	6	Sustainable Transport 1	32
Sustainability And The Earth's Biosphere	7	Sustainable Transport 2	33
The Biosphere Sustains Life 1	8	Sustainable Role Models	34
The Biosphere Sustains Life 2	9	Fly Carbon Neutral	35
The Atmosphere – Invisible Gases	10	A Global Change Of Heart	36
The Super Atmosphere 1	11	Global Sustainability	37
The Super Atmosphere 2	12	Section Five: Future	38
Hydrosphere And Lithosphere	13	Sustainable Buildings	39
Looking At The Hydrosphere And Lithosphere	14	Recycling: Sustainable Futures 1	40
Section Two: Ecosystems	15	Recycling: Sustainable Futures 2	41
What Is An Ecosystem?	16	Mobile Phones - Recycling Policies	42
Understanding Ecosystems 1	17	Waste - Everyone's Responsibility	43
Understanding Ecosystems 2	18	Shopping Bags – The Shocking Facts	44
Thinking About Ecosystems	19	Shopping Bag Initiatives	45
How Do People Affect Ecosystems?	20	Sustainable Communities For The Future	46
Affecting Ecosystems 1	21	A Community Project	47
Affecting Ecosystems 2	22	Answers	48-50
Section Three: Sustainable Patterns Of Living	23		
Fishing For The Future 1	24		
Fishing For The Future 2	25		
Let's Go Crabbing 1	26		
Let's Go Crabbing 2	27		
Ecotourism	28		
Sustainable Tourism	29		

Teachers' Notes

Sustainability is the ongoing capacity of Earth to maintain all life. Sustainable patterns of living meet the needs of the present without compromising the ability of future generations to meet their needs. Actions to improve sustainability are both individual and collective endeavours shared across local and global communities. They necessitate a renewed and balanced approach to the way humans interact with each other and interact with the environment.

Education of sustainability develops the knowledge, skills, values and world views necessary for people to act in ways that contribute to more sustainable patterns of living. Being educated about sustainability enables individuals and communities to reflect on ways of interpreting and engaging with the world. Sustainability is future-orientated, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence.

Sustainability has been identified in the Australian curriculum as one of three important cross-curriculum priorities. This means that teachers and educators are required to give students the opportunity to demonstrate their understanding of sustainability across all learning areas.

For each cross-curriculum priority, a set of organising ideas is provided. These organising ideas reflect the essential knowledge, understandings and skills for the priority. The organising ideas are referenced at the bottom of each page throughout the book.

Sustainability For Years 5 - 6 comprises student information and activity pages. As students work their way through this resource, they will demonstrate their understanding of the organising ideas in a variety of ways. Answers to the tasks are provided at the back of the book.

Curriculum Links

Organising Ideas

SYSTEMS

OI.1

The biosphere is a dynamic system providing conditions that sustain life on Earth.

OI.2

All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.

OI.3

Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.

WORLD VIEWS

OI.4

World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability.

OI.5

World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.

FUTURES

OI.6

The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.

OI.7

Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

OI.8

Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgments based on projected future economic, social and environmental impacts.

OI.9

Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.



It is important that the people who live on Earth today make sure that the Earth's environment is kept healthy for future generations.

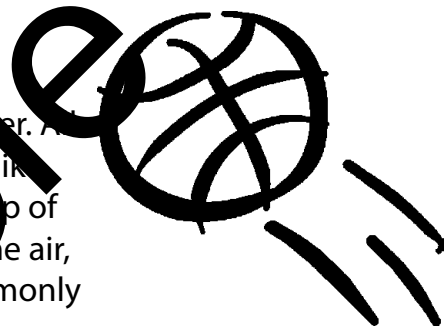
World leaders such as Prime Ministers and Presidents are responsible for making important decisions about how the world is kept healthy. These decisions are a part of a global strategy for *sustainable development*.

Even though it is world leaders who make the big decisions about the environment, it is the actions of every day people that makes a real difference.

It is time now for you to think about the world, the environment and the future. What part will you play?

What is the biosphere?

Biosphere is a word that describes the living world. The biosphere is also all of the ecosystems operating together. All life on Earth is within the biosphere. Imagine the world like a basketball spinning in the air. The biosphere is made up of different parts. Imagine throwing a basketball up into the air, this is called the atmosphere. Insects and birds are commonly found in the atmosphere. Now imagine bouncing the basketball onto the ground, this is the lithosphere. Now imagine that the basketball rolls into the ocean and sinks to the bottom, this is a part of the hydrosphere. The biosphere is any place where life exists.



The biosphere is made up of different parts.

atmosphere – the air;
lithosphere – solid structures of the earth;
hydrosphere – oceans, seas and lakes.



The biosphere is important in sustaining life on Earth. There are many factors that affect the biosphere's ability to keep living organisms alive.

BIG FACTORS

- The **distance** between the Earth and Sun needs to remain **constant** or the planet will be too hot or too cold to sustain life.
- The **tilt** of the Earth creates the seasons, six months of warmer weather and six months of cooler weather.

SMALL FACTORS

- The Earth is affected by the **daily weather**, **climate** and **erosion** (the wasting away of land).
- Humans and all life forms need to adapt daily to the Earth's conditions.



Read the information on page 7, then complete this activity sheet.

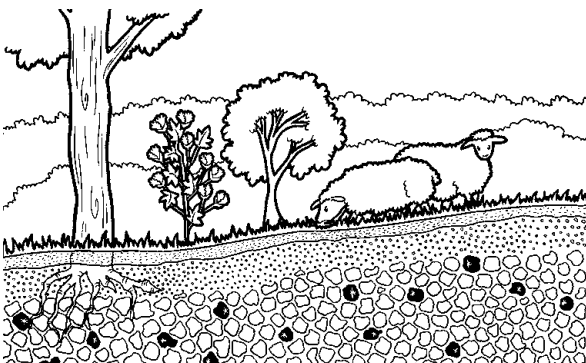
The biosphere is made up of different parts. Label the diagram.

Draw an animal living in each part of the biosphere.

a _____

l _____

h _____



Look at the picture and tick the correct answer/s.

1. Are the sheep living in the biosphere's ☐atmosphere or ☐hydrosphere?
2. Are the tree roots in the ☐atmosphere, ☐hydrosphere or ☐lithosphere?
3. What organisms are in the picture?
☐sheep ☐soil ☐trees ☐rocks

Extra!

Literacy: Pair up and test each other on the spellings: biosphere, lithosphere, hydrosphere, and sustainability.



There are many ways that people affect different ecosystems and sometimes this can have a negative impact. Read about four ways below that humans can have a negative impact on ecosystems.



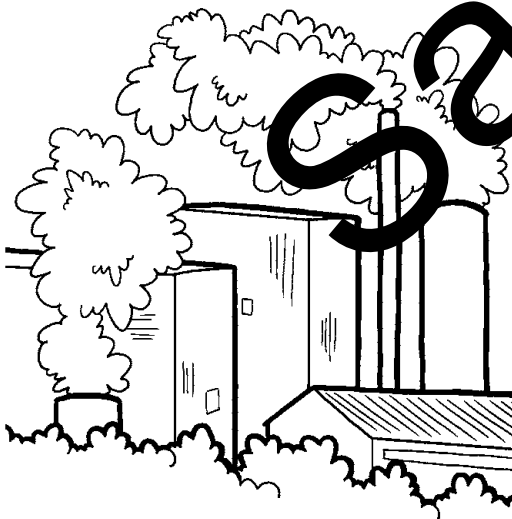
Urban Development

Urban development is the **clearing of land** to build cities, industrial areas and housing. When trees, bush and scrub are cleared, nutrients in the soil are destroyed and animals lose their homes and plants lose their food sources. Human construction continues today at a rapid rate all over the world.



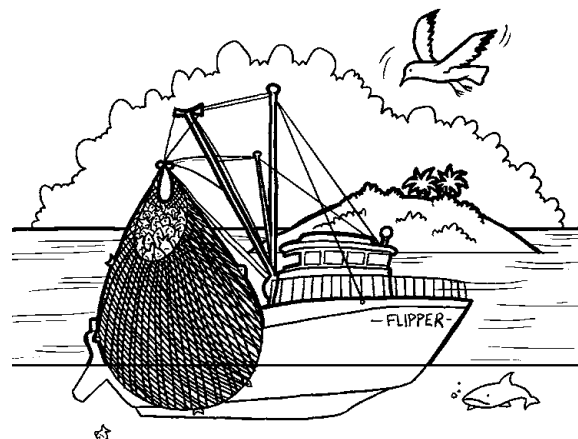
Deforestation

Deforestation is the **cutting down of trees** for human use. Seventy eight million acres of the world's **rainforests** are **destroyed** each year by humans. Trees are needed as a **natural air filter** as they take in the dangerous carbon dioxide that humans breathe out. Trees also help to prevent flooding and provide homes for animals.



Pollution

Human-made cars, trucks, boats and planes all emit **toxic gases** into the air creating **air pollution**. People also use **pesticides** to stop their food crops from being eaten by bugs. These pesticides seep into groundwater, rivers and lakes, poisoning ecosystems.



Overfishing

Overfishing is unregulated and irresponsible fishing. It happens when too many fish are caught in one area. If too many adult fish are caught and are not left to reproduce, fish supplies can deplete and food chains are affected.



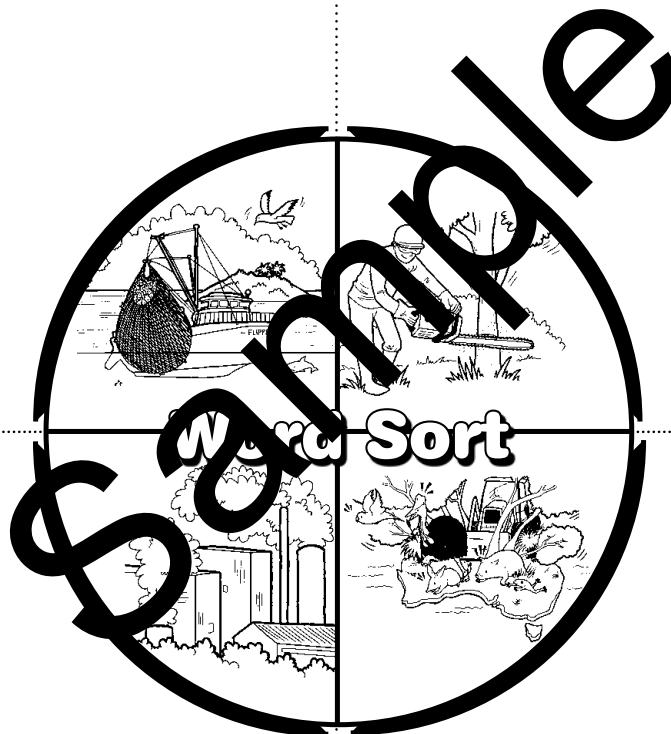
Read the information on page 20, then complete this activity sheet.

- A. Place the bolded word/phrases under the correct headings to show how humans damage ecosystems. Add some of your own.

build mass produce factories high intensity fishing
affect the food chain prevent breeding of fish emit toxic gases
clearing trees endanger animal homes clearing of lands
destroy animals' food sources take away bush medicines
loss of soil nutrients increase in carbon dioxide levels
destroy natural beauty contaminate natural water sources

Overfishing

Deforestation



Pollution

Urban Development

- B. How Can People Have a Positive Impact on Ecosystems?

Luckily, we have scientists and geologists who spend their time trying to reverse the damage that we've done to the ecosystem.

On the back of this sheet, in the form of one paragraph, explain how humans have had a positive impact on the ecosystem.



Department of Fisheries – managing fish stocks

Stock assessment (how many there are of one species) and data analysis (interpreting information) is one of the Department of Fisheries important jobs. Researchers and fisheries' managers record information from the general public in order to help collect data. Important information about the growth, movement and breeding habits of some species will all help scientists to manage fish stocks sustainably and make sure that there will be enough fish for the future.

Tagged marine life

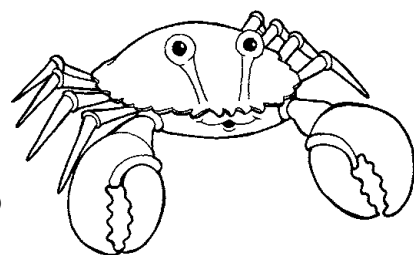
Many research projects take between three and ten years to complete all of their data collection and research. One way of providing information to the Fisheries Department is by reporting the details of any tagged marine life that you come across. The blue swimmer crab is one type of crab which the Fisheries Department research.

Have you ever been crabbing? Even if your answer is no, imagine going out on a boat and pulling a large crab net up out of the water onto the boat. Hopefully there are some crabs in the net! If you ever do catch some crabs, the first thing to do is check if they are 'size'. This means that you need to measure them and check they are not too small to keep. If they are too small you need to throw them back into the water before they die and leave them to grow more in size. If you pull up any other marine life, such as starfish, then make sure that you also return them to the water before they die, they are a vital part of the ecosystem.

Your role

If you ever find a crab with a glue-on tag you have a very important job to do. Phone the number of the Fisheries Department on the tag and leave the following information for the researcher.

- Tag number
- Crab size
- Crab gender – male / female
- If female – is she carrying eggs and if so, what colour are they?
- The exact GPS location that you caught the crab
- Depth of water in metres at which you caught the crab
- If it is 'size' then report if you kept it
- If it is undersize then report that you returned it to the water



Downloading the FishTagWA app makes it easier for fishers to report information directly to the Department using their iPhone.

Some of the types of tagged species you may find are: rock lobsters, blue swimmer crabs, deep-sea crabs, cobbler, pink snapper, tailor and Australian herring.

For participating in the research, you will receive a lottery scratch card as a reward from the Department of Fisheries and may even receive a small prize.



Read *Fishing For The Future 1* and *Fishing For The Future 2* on pages 24 and 25 to help you to complete this activity sheet.

A Day Out Crabbing

Carla and Tom were excited about the day ahead. They were heading out on their Dad's boat to go crabbing. They hadn't been crabbing before so they would need to learn about it. First of all they learnt how to drop the crab nets deep down in the water. Now all they had to do was to wait long enough for a crab to swim into the nets. After some time had passed they pulled up the first net. Tom pulled the rope as fast as he could, just like his Dad had shown him. Inside the first net there were two small crabs. They measured the crabs but they were undersize. Carla pulled up the second net. There was a large starfish in the net but no crabs. In the third net there was one small crab and one large crab. They measured both, one was the right size but the other was too small. In the last net they discovered an undersized crab that had a tag on it. They asked their Dad what they should do with it.

Explain what Carla and Tom should do with what they caught in:



Crab Net 1



Crab Net 2



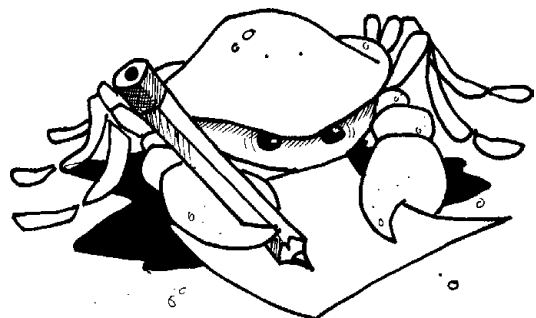
Crab Net 3



Crab Net 4

Think Tank

Think about the sustainable fishing methods shown by Carla and Tom. Brainstorm how else you could make sure that people are engaging in social fishing responsibly.





Look at the tagged crab below that Carla and Tom caught in Crab Net 4. Carla and Tom live in Western Australia. In this state, a crab can be legally kept if the width of its carapace (shell covering) is 127mm. Carla and Tom look at their father's boat's GPS as soon as they find the crab. On it they read the following information: Depth: 9.6012m. Coordinates: 114° 39' 54.8"E 22° 36' 17.1"N .

After considering the above information and studying the crab below, complete the table at the bottom of this page.



Tag number:	
Crab size (you will need a ruler):	
Gender (male / female):	
Carrying eggs:	
GPS location:	
Depth of water:	
Kept the crab?:	