

# LEVEL 5 RESOURCES AND SUSTAINABILITY

## LEARNING WORKBOOK

### – ANSWERS –

#### Introduction – Resources and sustainability

#### Activity 2: Resources and sustainability (page 2)

1.	Definition	Meaning
	Biodiversity	The variation of life at all levels (genes, species and ecosystems)
	Ecosystem	A community of living organisms (plants, animals and microbes) living in their physical environment
	Extinction	Death of last of a species (there is no ability to reproduce and create a new generation)
	Conservation	Protection and management of biodiversity, energy, habitat, wildlife and marine, soil and water resources
	Renewable resource	A resource that is replaced naturally and can replenish with the passage of time
	Global warming	An increase in the average temperature of the Earth's atmosphere that causes changes to climate
	Emissions	The sending out of gases into the atmosphere or pollutants into water
	Carbon footprint	A measure of the total amount of carbon dioxide and methane emissions created by an entity
	Degradation	A change or disturbance of the environment that makes the environment worse
	Endangered	Something that is threatened and likely to become extinct
	Sustainability	To provide for basic human needs without degrading or destroying the natural environment
	Climate change	A significant change in weather patterns over a period of time
	Recycle	To take material already created but that is no longer used and change it into new products to prevent waste of useful resources
	Greenhouse gas	A gas in the atmosphere that changes the wavelength of radiation from the Sun so it is heat (infrared) energy <i>and/or</i> reflects infrared radiation from the Earth back to the Earth

2. a. *Fishing* is a very important *economic* activity for the residents of a small *coastal village* in the *Pacific Ocean*. The ocean *environment* provides work, money and food for this *Pacific society*.
- b. *Logging* is an important *economic* activity in the *Amazon jungle* but can be quite destructive to the *environment*. The *economic* activities and *society* of indigenous tribes are often disrupted.

3. Resource	Renewable or non-renewable
Soil	Renewable
Fossil fuels such as oil, gas and coal	Non-renewable
Gold and copper	Non-renewable
Water	Renewable
Fish and marine life	Renewable
Forests	Renewable
Solar energy and wind power	Renewable
Coffee	Renewable
Wool and cotton	Renewable
Iron and silver	Non-renewable

### Activity 3: Sustainability (page 4)

1. a. Environmental sustainability means preserving Earth's biodiversity and ecosystems. Natural resources must not be overexploited or consumed at a pace that is faster than the resource's ability to renew itself.
- b. Social sustainability refers to the physical and mental well-being of people. Natural resources must be distributed in such a way that each generation and ethnic and social group has a fair share.
- c. Economic sustainability means using natural resources to provide the products and services that people want and need. Resources must be used wisely so as not to deprive future generations.
- d. Sustainable development meets the needs of the present without preventing future generations from enjoying a quality of life at least as good as our own. Sustainable development maintains a balance between the human need to improve lifestyles and the preserving of natural and cultural processes or practices.

e. Definition	Meaning
equitable	Resources are shared fairly between ethnic and social groups. It is a fair society.
viable	The environment must be capable of providing for economic needs.
bearable	Society's use of the environment must be able to be endured and tolerated and not be destructive.

- f. The following points need to be considered in the paragraph.
  - Society's use of the environment must be bearable – in other words, able to be endured and tolerated and not destructive.
  - The economy must be equitable, which means resources are shared fairly between ethnic and social groups. It must be a fair society.
  - The economy's use of the environment must be viable. The environment must be capable of providing for economic needs.
  - Ideally, all three aspects – society, the economy and the environment – should be sustainable. Future generations should not be prevented from enjoying a lifestyle at least as good as our own.

2. <i>Consumption of renewable resources</i>	<i>State of the environment</i>	<i>Level of sustainability</i>
People use more resources than nature's ability to replenish and replace	Environmental degradation. Destruction of biodiversity and ecosystems.	Not sustainable with resources not keeping pace with the level of consumption.
People use resources equal to nature's ability to replenish and replace	Environmental equilibrium, with biodiversity and ecosystems preserved.	Sustainable development with resources used in balance and keeping pace with the level of consumption.
People use less resources than nature's ability to replenish and replace	Environmental renewal and restoration with development of biodiversity and ecosystems.	Sustainable development with resource renewal greater than level of consumption.

## Sustaining our native forests

### Activity 1: Deforestation and forest degradation (page 11)

- Clear-felling is a forestry/logging practice in which most or all trees in an area are cut down.
  - Negative impacts upon forests could include: an increase in erosion, the loss of habitat, soil degradation, increased run-off and flooding, the establishment of unwanted (weed) shrubs and grasses, depletion of the seed bank.
- Deforestation* is the permanent removal of forests and the removal of land from forest use. *Degradation* means negative changes in a forest; the forest is damaged by disturbances.
- The extent of deforestation and degradation is significant. Over 12 million hectares of forest are lost each year, which is an area equivalent to that of the North Island.
- Countries suffering from deforestation could include:  
Brazil, Colombia, Venezuela, Vietnam, Laos, Cambodia, Myanmar (Burma), Thailand, India.
- Causes of deforestation and degradation could include:  
Logging for selected types of timber; clearing land for new farmland, with the growing of crops or the raising of animals; government resettlement programmes, whereby subsidies are offered to people to settle within forests; the removal of non-timber forest products, for perhaps medical uses.
- Environmental (E) consequences of deforestation include:  
Loss of biodiversity; habitats of plants and animals damaged or destroyed; plants and animals become endangered, or even extinct; smoke and pollution from land clearing; a rise in greenhouse gases in the atmosphere.  
Social (S) consequences could include:  
New farmlands are created, relieving pressure for land; crops and animals are introduced to newly cleared land; unemployed people find work clearing and farming this new farmland; new settlements are created, roads and infrastructure are built through the forests; the lifestyle of indigenous people is upset, changed and damaged; internal migration to newly cleared lands.
- Soil erosion**  
Without forest cover, soil erosion occurs when the thin layer of soil is blown or washed away.

### Rivers

Rivers become clogged with silt and debris from the forest. The rivers change colour, oxygen becomes depleted and aquatic life dies.

## Deserts

Deserts emerge where there was once forest. The land becomes infertile, and vegetation growth diminishes.

## 8. Economic

Local or indigenous people lose their habitat as deforestation/degradation occurs around them. The economic consequence is that they lose their hunting and gathering area.

## Culture and traditions

Culture and traditions of indigenous people are disrupted and their lifestyle and work change as they gain greater contact with the outside world.

## Migration

Many indigenous people migrate to the cities for work and this migration means that they abandon their forest life forever.

9. Sustaining the Earth's forests is important because: Earth needs biodiversity; species must not be allowed to become endangered or extinct due to human activity; preservation of native plants and timbers is important; production of man-made carbon emissions and their release into the atmosphere must be reduced; global warming must be controlled; indigenous people must be allowed to retain their traditional lifestyle.
10. **Loggers** can selectively log rather than clear-fell forests, they can restrict themselves to certain areas, they can avoid contact with indigenous people. This probably won't be very effective, as most will just put short-term economic gain before environmental considerations.

**Local people** can be empowered to control decision making regarding forest management. Locals can determine which trees and areas to preserve. This will probably be quite successful, especially if indigenous people get to decide. They will want to preserve their habitat. Other local people (recent migrants) might just consider short-term economic gain.

**Governments** can stop giving incentives (such as subsidies) to people to clear forests and then resettle in these cleared areas. Governments can legislate to prevent forest degradation and deforestation. This would probably be very effective, as governments could use their economic, military and judicial powers to achieve their desired outcome.

**Rich countries** can sponsor or provide financial assistance to other, poorer, countries to sustain their forests and end deforestation. Aid and advice can be provided. This can be effective if the money and aid are used for what they had been allocated towards. Hard to monitor.

11. Steps *I could* take may include:

- avoid using products grown on former forested lands, such as palm oil
- join organisations that campaign against deforestation, make donations, sign petitions and tell other people
- spend time as a volunteer assisting with replanting programmes.

## Saving our oceans and seas

### Activity 1: Our oceans (page 16)

1. Pacific, Atlantic, Indian, Arctic and Southern.
2. Oceans and seas are important for recreation such as boating, swimming, snorkelling, fishing, sailing. Oceans and seas are used for navigation and transport. They are an important source of food. They provide holiday opportunities.

### Activity 2: Saving our oceans (page 18)

1. Problems facing oceans and seas include overfishing (70% of Earth's fisheries are already fully exploited, overfished or depleted); marine ecosystems damaged or destroyed; species endangered or even extinct; acidification; pollution from run-off (chemicals and fertilisers); pollution from plastic and garbage. *Student should write one sentence for each problem.*

- 2. Problem:** Overfishing – marine life is hunted and gathered from oceans and seas at rates too high for species to replace themselves or increase in numbers.

**Actions/solutions to the problem** could include the following ...

- Create marine reserves where fishing is prohibited.
- Allow governments to decide their own specific fishing quotas after they have researched the sustainability of their fishing areas.
- Put in place an international ban on certain fishing methods such as deep-sea trawling.
- Fish farming.

### Consequences

#### Marine reserves

*Positive:* An opportunity for fish stocks and ecosystems to recover.

*Negative:* Threatened fish species do not stay in marine reserves and will get caught elsewhere or the reserve may be too expensive to patrol.

#### Government quotas

*Positive:* Governments may better understand their local marine reserves and endeavour to sustain these by use of quotas.

*Negative:* A government may still decide to overfish or abuse the quota system. Government may be corrupt and allow illegal fishing outside the quota – the quota system will then break down.

#### Ban certain fishing methods

*Positive:* Some methods over-fish marine life and turn seas to deserts; banning these methods would be beneficial to sustainability.

*Negative:* Fishing may become more difficult with fish harder to catch – resulting in higher prices and maybe hunger.

#### Fish farming

*Positive:* Humans move away from destructive hunting and gathering practices and into more sustainable farming.

*Negative:* Fish farming produces considerable waste and pollution. It can lead to overfishing of other, smaller species used to feed the farmed fish.

All consequences should relate to the solution and be entirely different from one another.

Preferred solution is student's own decision but needs to be justified with a reason.

## Ross Sea marine reserve proposal

### Activity 1: Ross Sea marine reserve (page 20)

1. Ross Sea is the last complete/untouched marine ecosystem on Earth where the ecosystem is in balance.
2. A large part of the Ross Sea would be set aside as a reserve – meaning its marine life must be preserved and cannot be exploited.
3. **a.** The reserve proposal was scaled back in three ways. Firstly, size was reduced from 2.27 million square kilometres to 1.34 million. Secondly, a limited amount of Toothfish may be caught within the reserve – although unrestricted fishing would not be allowed in the proposed reserve. Thirdly, the reserve could be scrapped at some time in the future if it is found to be unworkable.
- b.** The proposal was scaled back to make it more acceptable to other countries and more likely to be agreed to.
4. Probably not – the reserve is no longer 100% 'pure' and is thus open to further abuse.
5. Human need for fish – food requirements. Some countries (Russia, Ukraine and China) objected to the reserve.
6. The ecosystem will be degraded and perhaps destroyed. Top predators could disappear or be so reduced in numbers from the food chain that the entire balance of the ecosystem would be upset.

7. Actions: Conduct research and become informed about the problem; tell other people; join organisations (become a member, become an activist, make donations, sign petitions); write to governments of countries opposed.

Explain why: *Reasons could include* show support; provide financial assistance; mobilise others; pressure governments.

8. *Leaflet should take ideas from the Unit to promote the reserve.*

## Managing e-waste

### Activity 1: E-waste (page 24)

1. E-waste is any type of electrical appliance with a battery or a cord that is no longer wanted and is therefore discarded.
2. Images could include: computer hard drives, monitors, printers, scanners, televisions, refrigerators, cell phones, microwaves, lights, alarms, medical devices and some toys.
3. Planned obsolescence – this means that appliances are not made to last long.  
Short lifespan of appliances.  
Improvements in technology making appliances redundant, and then people replace them rather than having them repaired.
4. E-waste discharges toxins into the air, water and soil. E-waste is full of chemicals, minerals and heavy metals, which can leach out.
5. Toxins from e-waste enters the air, water and soil, and gets into the food chain through plants and animals. E-waste poisons our water supplies.
6. *These answers will be based on students' own experiences, but encourage them to provide different reasons for each e-waste item disposed of.*
7. Sustain Earth's resources by recycling minerals and heavy metals found in e-waste. Some people gain an income from recycling. Recycling will reduce pollution.
8. Actions could include: repair rather than replace an appliance; take e-waste to special recycling depots; don't put e-waste into rubbish bins; don't upgrade appliances so quickly. Support recycling campaigns; sign petitions; join organisations; make donations and spread the word to other people. Become educated about e-waste and spread your knowledge.
9. *The aim of the day is to reduce e-waste by recycling and other measures such as those listed in the answer to question 8.*

## Tuvalu struggles to sustain human life

### Activity 1: Sustaining life on Tuvalu (page 29)

1. Tuvalu's geographic features include: five coral atolls and four tiny islands, scattered across 500 000 square kilometres of Pacific Ocean; no land higher than 4.6 metres above sea level; total land area only 26 square kilometres.
2. Low-lying and vulnerable to seepage of seawater and coastal erosion. A lack of resources such as drinking water, energy and fertile soil. Isolated and scattered across the ocean.
3. Coastal erosion as land falls into the sea. Destruction of fishing grounds and depleted shellfish resources.
4. An increase in the Earth's average atmospheric temperature that causes changes in climate and that may result from the greenhouse effect.
5. Rising sea levels eroding the islands; severe weather events such as droughts, cyclones and storm surges becoming more common.



6.	<i>Problem type</i>	<i>Describe the problem</i>	<i>Suggest a solution to the problem</i>
	Water supply	Water supply is dependent on rainwater and groundwater	Increase storage capacity and desalination
	Energy supply	Energy supply is dependent on solar energy and burning of biodiesel	Build more solar panels, wind turbines
	Pollution of soil	Saltwater contamination of aquifers due to tides; easily eroded by rising sea level	Remove garbage from 'borrow pits'
	Extreme weather events	Extreme weather events such as droughts and storm surges becoming more common	Build barricades, build shelters
	Coastal erosion	Coastal erosion as land falls into the sea destroying fishing grounds and shellfish resources	Sandbag coastline, plant trees, go further out to sea to fish

7.	<i>Action</i>	<i>Reason for action</i>
	I would build raised beds for growing of vegetables	Create more productive farmland
	I would sandbag and plant trees and grasses along the coastline	Reduce coastal erosion
	I would find ways to collect and store water	Improve water supply

8. Actions an individual could take to help reduce global warming could include:

- don't burn fossil fuels
- recycle plastics, tin cans, paper, etc.
- use renewable resources as much as possible (e.g. solar power, wind power).

9. *Student's own ideas, supported with evidence.*

## Activity 2: Environmental refugees? (page 32)

1. Kiribati, Tuvalu, Tokelau and Maldives.

2. Refugees are classified as people facing persecution or threats to their lives.

3. *Student's own ideas, supported with evidence.*

4. Government actions could include:

- buy land in another country using the Overseas Investment Fund and relocate their citizens overseas
- build barricades to keep back the sea
- build all new buildings on stilts to avoid flooding
- reclaim land from the sea by using waste as landfill
- either launch or join an international campaign to reduce global warming.

## Sustainable Samsø Island

### Activity 1: Samsø Island (page 34)

1. Four sources of emissions of CO<sub>2</sub> into the atmosphere from the burning of fossil fuels are: the burning of fossil fuels for energy; car exhaust fumes; aircraft exhaust fumes; ships burning diesel.
2. The rise of carbon dioxide in the atmosphere could lead to more heat being trapped within the atmosphere which in turn could raise global temperatures, melt ice caps and cause a rise in sea levels.
3. The Danish government held a competition to create a carbon-neutral community, and Samsø won the contest.
4. Samsø produces electrical energy by using windmills and solar panels.
5. Samsø produces hot water by means of solar energy and by burning straw and wood pellets.

6. Samso still burns fossil fuel to power cars, tractors and the ferry to Denmark. The island will also burn fossil fuels if windmills do not generate enough power, as they have no storage capacity.
7. The islanders have experimented with electric cars and tractors powered by bio-fuel. Many ride bicycles.
8. Samso does create some carbon emission (*carbon debit*), but not much. Samso sells *carbon credits* earned by selling clean energy to Denmark, which would otherwise have to burn fossil fuels to produce the energy. The island is thus carbon neutral because its carbon debit is offset by its carbon credit.
9. Computer, radio, television, cell phone, fridge, microwave, stove, alarms, electric blankets, clocks, kitchen appliances, hot water, washing machine, drier, lights, automatic doors, cars, buses.
10. a. *May be inaccurate, but it gives the idea of how carbon footprint is measured.*  
 b. Actions and activities could include: using the car unnecessarily; wasting power, water and gas; failing to recycle paper, plastic, cans, newspapers and glass; using plastic shopping bags rather than using your own shopping bag; failure to compost food waste; putting garden waste into rubbish bins; using unnecessary appliances; allowing extravagant wrapping of purchased items.  
 c. Shorter showers; turn off lights; turn off appliances at the wall; walk rather than ride; avoid using appliances.  
 d. Use less energy created by burning fossil fuels; help create sustainable energy to be sold to Denmark.

## New Zealand's declining water quality

### Activity 1: Improving New Zealand's water quality (page 39)

1. New Zealand's freshwater systems (rivers, streams and lakes) were until recently clean and unpolluted, but now are increasingly being filled with contaminants and choked with weeds, algal slime and algal blooms. There is an associated decline in aquatic life, birds and insects. The quality of New Zealand's water is declining.
2. Features of clean, unpolluted freshwater streams and lakes include:
  - high levels of oxygen
  - low levels of nitrogen and phosphate
  - high clarity
  - water that is free of waste and contaminants.

3. Source of contamination	Type of contamination
Erosion from hills and cliffs	Sediment falls into waterway and destroys fishing and shellfish grounds
Farms, especially dairying	Discharge nitrogen and phosphate. Cows also destroy riparian habitats and wetlands.
Urban centres, households and factories	Discharge of detergents, waste oil, litter and sewage.
Vehicles and roads	Discharge of pollutants such as zinc, copper, lead and hydrocarbons.

4. **Good water quality:**
  - There is an abundance of marine life
  - People are permitted to swim in the water
  - A wide variety of bird life and insect life

#### Can be good or bad:

- Fences protect riparian habitats
- Wetlands have been restored



**Poor quality water:**

- Shellfish are not safe to eat
- Recreational fishermen discharge waste from their boats
- The water has a murky green appearance
- Stormwater drains discharge urban waste

5. Type of land use	Likely water quality
Stream passing through an urban centre	Poor
River passing through a native forest	Excellent
River passing through a plantation forest	Average
Stream within an area of dairy farming	Poor
Lake inside a national park	Excellent*
Lake near an area of dairy farming	Poor
Stream passing through a recreational park	Average
River passing through an uninhabited mountain range	Excellent
Lake beside a major factory	Poor
Pond beside an e-waste dump site	Poor
Stream passing through a market garden	Poor
Stream beside a major highway	Poor

\* Water quality could be *Poor* in lakes in national parks influenced by geothermal activity.

- Riparian habitat refers to zone immediately adjacent to a waterway – it is characterised by plants that can tolerate wet soil conditions.
- A freshwater system's ecology is altered – this can be from increased sedimentation or a decrease in plant cover (less shade may result in increased water temperature, oxygen levels drop putting stress on certain species).
- Responsibilities/actions could include the following.
  - Central government – make national policies and laws, set national standards for water quality and provide funding to local government, provide finance for research and conservation.
  - Local government – support local initiatives to improve water quality, allocate government funding for the improvement of water quality, carry out inspections of properties within the region to ensure that they are not polluting streams and lakes.
  - Iwi – water quality is a taonga (or treasure), and it is a Treaty of Waitangi obligation to consult Māori about water issues. Iwi need to engage with central and local government regarding water-quality policies. Iwi can educate and advise local Māori about water quality issues.
  - Farmer – use more efficient effluent discharge methods, restore riparian habitats and wetlands.
- Farming is New Zealand's main source of income. Much of New Zealand's economic development and wealth are generated by dairy farming, but dairy farming is having a negative impact on our water quality. New Zealand must find a way to make intensive dairy farming sustainable.
- Household audit: What goes down the sink, hand basin, shower, washing machine, *InSinkErator*, toilet and outside drainpipes?

## Sustainable water trail at Auckland's Botanic Gardens

### Activity 1: A sustainable water trail (page 45)

- Run-off* is rainwater that is carried off an area by streams, rivers and stormwater systems.

2. Stormwater is a drainage system which transports run-off rainwater to lakes and the sea. It is usually identified by gratings and large pipes.

Type of problem	Description of the problem
Contaminants and pollution	These come from roads, concrete and buildings. Dangerous to public health, kill marine and other wildlife. If contaminants are high in nitrogen and phosphate, waterweeds flourish and choke waterways.
Fast flow	Erodes streams, causing sediment deposits downstream and these destroy marine and insect habitats. Removes stream vegetation and undermines trees along banks.
Impact on groundwater	Prevents water from soaking into soil to become groundwater. Groundwater is needed for healthy plants by maintaining adequate soil moisture levels and to supply water to streams.

4. **Catchment area:** Hunua Ranges – rainfall enters the stream high in this forested area.  
**Farmland:** Sediment, effluent and fertilisers find their way into the stream.  
**Suburbs:** Stormwater pipes discharge contaminants into the stream.  
**Botanic Gardens:** A sustainable Water Trail absorbs some water and contaminants. The stream flow slows, and water quality is improved.  
**Auckland city:** Stream continues its flow through the city, gaining more contaminants from run-off and stormwater.  
**Manukau Harbour:** Stream's water enters the harbour and may contain contaminants.
5. Three methods used by Auckland's Botanic Gardens to improve the water quality of the Puhinui Stream follow.
- Run-off flows into a swale that absorbs water and contaminants.
  - Water leaving swale flows into a rain garden made up of native plants.
  - Riparian bank planted with natives to slow water flow and reduce or absorb pollutants and sediment.
6. Rainwater could be collected by placing containers outside during rainfall.
7. A roof layered with plants.
8. Advantages of a 'living roof' include:
- the building is cooler in summer and warmer in winter
  - run-off of rainwater is reduced
  - biodiversity is improved and mini-ecosystems are created.
9. Government policies to limit the spread of dairy farms; educate farmers on how to reduce their farms' discharge into streams, rivers and lakes; clean urban discharge before it reaches freshwater systems; restore riparian habitats; use of sustainable water trails.
10. Take care what you put down the drain; use water sparingly and don't waste it; clean litter away from streams, rivers and lakes. Talk to people about water-quality issues.

## Waste disposal in landfills

### Activity 1: Waste disposal in landfills (page 49)

1. Landfills are an expensive and inefficient way to dispose of waste. Landfills are the main means of rubbish disposal in New Zealand. They are basically large holes in the ground that are then filled up with rubbish.
2. Landfills are used because they are an easy and simple option. They are readily available. Alternative means of managing waste take time and effort to set up and can be costly. People's awareness needs to be raised and education about waste management encouraged before landfills will cease to exist.
3. Garden clippings/food scraps, plastic, paper/cardboard/packaging, glass, metals and hazardous liquids/chemicals.

4. Methane gas and a liquid toxic leachate.
5. The image shows the Earth weighed down heavily with rubbish. The Earth is covered in junk which needs to be recycled or re-used. There is so much waste that the Earth may be overwhelmed and destroyed. We can also identify types of waste from this image.
6. *Answers could include:* old furniture, televisions, computers, phones, keyboards, monitors, cameras, paint, building/roofing materials, car parts, carpet, fridges, stoves, washing machines and dryers.

7. <b>Method</b>	<b>Provide a brief description of how this could be done</b>
Reduce waste	Shop wisely, avoid extravagant packaging, use your own shopping bag.
Re-use items	Use bottles and glass containers again for another purpose.
Recovery materials	Collect items for recycling from discarded rubbish.
Recycle items	Take old clothing to a recycling bin, take e-waste to special depots for disposal.

8. The best action a student could take to reduce waste going to landfills could include:
  - change your own lifestyle and be aware of waste management issues
  - educate others about the 5 Rs
  - take a lead at home or school to implement the 5 Rs.

## New Zealand's Exclusive Economic Zone

### Activity 3: Protecting New Zealand's EEZ (page 53)

1. An EEZ is an area of the sea off the coast of a country. That country has sovereignty over its EEZ up to 12 nautical miles (22 kilometres) and special rights over the exploration and use of marine resources up to 200 nautical miles (370 kilometres) offshore.
2. New Zealand has one of the world's largest EEZs. Its total area is over 4 million square kilometres.
3. The EEZ provides fishing, oil, gas, shipping routes to international markets and communication cables to the New Zealand economy.
4. *Student's own ideas, supported with evidence.*
5. *Student's own ideas, supported with evidence.*

6. <b>Positive</b>	<b>Negative</b>	<b>Interesting</b>
Oil and gas, if discovered, would be of great economic benefit to New Zealand.	A blowout of an exploratory well could send oil gushing into the sea.	New Zealand has one of the largest EEZs in the world.
New jobs would be created.	An oil spill would upset the ecosystem of the ocean.	The EEZ is already being exploited for fish, oil and gas.
Government would have more money to spend on social services.	Biodiversity could be upset.	If there is a blowout, a cap has to be flown to New Zealand.
Companies that explore for oil have the technology to cap a bore hole quickly if there is a blowout.	Whales are upset by seismic surveying and may even die as a result.	A drill has to pass through 3 km of water then 9 km of sediment and rock before reaching oil or gas.
The chance of finding oil and gas reserves is very high.	Kaikoura's whale-watching tourism industry could be adversely affected.	
	It could take more than four weeks to cap an oil leak.	

7. Students come to their own conclusion about whether exploration for oil and gas in the EEZ is good or bad, providing sound reasons to support their answer.

## Sustainable Aotearoa

### Activity 1: Resource management (page 57)

1. a. Provide practical ideas for people to follow to reduce their waste of resources and impact on the natural environment; provide skills for a healthier lifestyle; help people reduce living costs.  
b. Learning guides that provide easy no-cost actions; ideas about small investments that quickly pay for themselves; advice on how to deal with big challenges in life such as buying a car or renovating a house.

2. Area of resource mismanagement	Examples of how this waste of resources occurs in your home or neighbourhood
Energy	Burning fossil fuels for heat. Poorly insulated houses.
Electricity	Inefficient lighting and appliances, leaving appliances switched on when not in use, and examples of power wastage.
Water	Long showers, running or dripping taps, wasteful watering of lawns or gardens.
Use of cars	Use of car for short trips, car dependency. No involvement in car-pooling.
Discharge into stormwater system	Pouring detergents and harmful liquids down drains.
Food production	Buying pre-packaged foods (cans, bottles), waste of food by throwing much out, not growing food on available land.
Rubbish	Failure to recycle or re-use items. Using things once then throwing them away.

3. Area of mismanagement	Possible solution to the problem
Energy	Don't burn coal or wood to heat your home. Install a heat-pump.
Electricity	Turn off lights when a room is not in use. Turn appliances off at the wall. Avoid excessive outdoor lighting.
Water	Collect rainwater for outdoor use, repair dripping taps, use a watering can rather than a hose.
Use of cars	Walking, cycling, public transport and car-pooling.
Discharge into stormwater system	Avoid pouring hazardous liquids like oil and paint down drains.
Food production	Avoid purchasing food with extensive packaging. Store food carefully, and do not purchase too much at one time. Eat leftovers. Grow some of your own fruit and vegetables.
Rubbish	Recycle paper, glass, metal and e-waste. Compost food and garden waste.

4. Possible answers could include:

- (1) Sustainable fresh water
- (2) Recycle tag – recycle and avoid waste
- (3) Recycle water
- (4) Make careful decisions about the need to make a flight
- (5) Alternative and clean energy sources like natural gas
- (6) Use clean energy/electricity

- (7) Conserve energy and electricity
- (8) Conserve energy and electricity – avoid use if possible
- (9) Put rubbish into bins and be a 'tidy Kiwi'
- (10) Use energy-efficient light bulbs
- (11) Reduce your carbon footprint
- (12) Conserve water – water garden sparingly
- (13) Grow your own food – plant something
- (14) Support trees – plant or don't remove
- (15) Think globally and act locally
- (16) Preserve nature and insect life