10 POLLUTION

A Study the words in box a.

  1 Use your dictionary to check the meanings.

  2 What part of speech is each word?

B Read the Hadford University handout on this page.

  1 Use your dictionary or another source to check the meanings of the highlighted phrases.

  2 Which is the stressed word in each phrase?

C Look at the pictures on the opposite page.

  1 What do you think is happening in each picture?

  2 For each picture talk about the role that pollution plays. Use some of the highlighted phrases from Exercise B and words from Exercise A.

D Study the words in box b.

  1 Check the meanings, parts of speech and stress patterns.

  2 Put the words into the correct box in the table below, as in the example.

Neutral	Marked
rise, increase	rocket, soar
fall, decrease	
big, large	
good	
small	

E Read the report below by an environmentalist on attempts to reduce greenhouse gases.

  1 Use a marked word in place of each of the blue (neutral) words.

  2 Look at the red phrases. How strong or confident are they?

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a   contaminant   emission   generate   hydrocarbon   legislation   particulate   pollutant   technology   toxic   transport


HADFORD *University*

Pollution: its sources and solutions

Two key sources of pollution in industrialized societies are power stations and petrol-driven vehicles. They both emit large amounts of greenhouse gases into the atmosphere, and therefore contribute to global warming. However, new green technologies, such as end-of-pipe systems in electrical generation plants, and lean-burning engines in cars, are starting to reduce the environmental impact of fossil fuels on our natural environment. Government legislation is starting to target the big polluters and making industry more accountable for its actions.

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b   brilliant   collapse   enormous   huge   insignificant   massive   minimal   outstanding   plummet   plunge   rocket   significant   slump   soar   superb   tremendous

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It's clear that carbon dioxide emissions have risen recently, and it's generally accepted that all industrialized countries need to do more to introduce green technologies into their power generation sectors. As a result of two decades of research on end-of-pipe systems, we undoubtedly have a good opportunity to cut emission rates in half by 2050.

It's fair to say that international targets set to cut vehicle pollution have not been challenging, but perhaps we should consider any reduction as a good success. We can be confident that the UN does not want to see a further fall in air quality, and it's unlikely that they will make significant changes to their commitment to the environment.
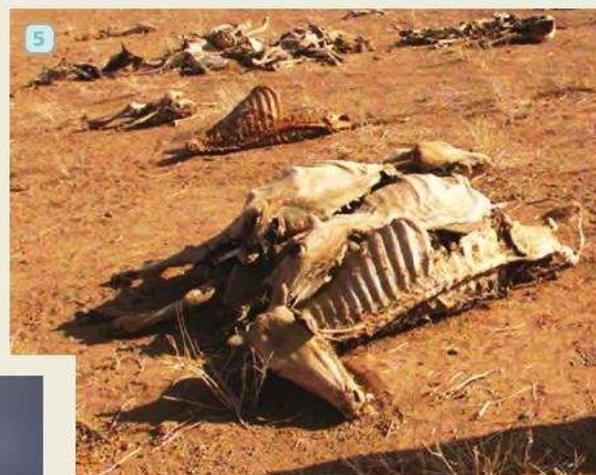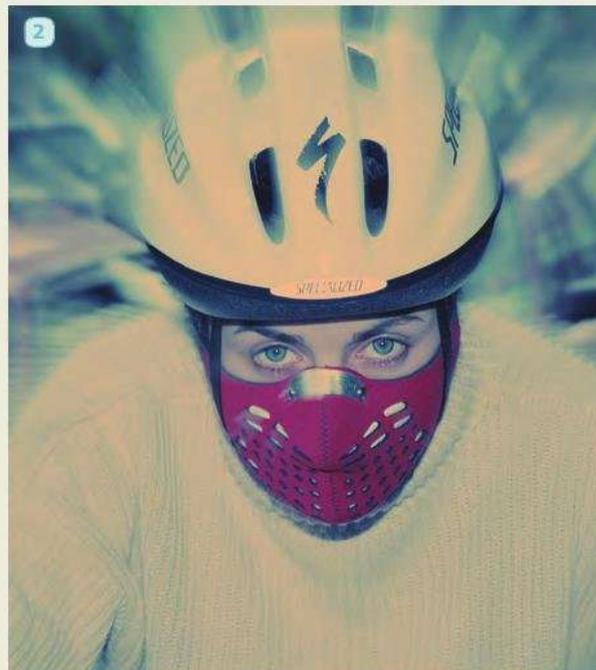
10.2 Reading

A Study the sentence on the right. Each phrase in box a could go in the space. What effect would each one have on the base meaning? Mark from *** = very confident to * = very tentative.

B Survey the text on the opposite page.
1 What will the text be about?
2 Write three research questions.

C Read the text. Does it answer your questions?

D Answer these questions.
1 What are the main ways in which pollutants are generated?
2 Are power stations mainly using coal to generate electricity?
3 Do sulphur dioxide emissions cause more than one type of respiratory illnesses?
4 What has caused the large increase in areas affected by acid rain in China?
5 How successful has the adoption of new technologies been?

E Find the phrases in box b in the text. Is the writer *confident* (C) or *tentative* (T) about the information which follows?

F Look at the writer's description of pollution caused by transportation (paragraph 3).
1 Underline the marked words.
2 What does the choice of these words tell you about the writer's opinion of the subject?
3 Find neutral words to use in their place.

G Study the example sentence on the right, and then sentences A and B.
1 Divide sentences A and B into small parts, as in the example sentence.
2 Underline any linking words (e.g., conjunctions).
3 Find the subjects, verbs, objects/complements and adverbial phrases which go together.
4 Make several short simple sentences which show the meaning.

The decrease in coal-powered stations in the UK _____ a decline in CO_2 emissions.

a
probably caused _____

may have contributed to _____

was possibly one of the factors which contributed to _____

could have been a factor which led to _____

caused _____

seems to have caused _____

b
many writers seem to agree … _____

much of the data suggests … _____

Research has shown … _____

It is obvious … _____

it appears to be the case … _____

Recent research has found … _____

Example:

Much of our current electricity supply | is generated | by power stations | that | use | traditional fossil fuels | and | they often | produce | high levels of air pollutants.

A

When nitrogen dioxide mixes with hydrocarbons it often synthesizes into tropospheric ozone which can wipe out woodlands and lead to terrible skin irritations in people.

B

Air travel emits more carbon dioxide per passenger than any other type of transportation and is therefore having a far more destructive effect on the environment than other types of transportation.

Dealing with pollution

With the continued growth of modern industrialized societies, many writers seem to agree that the amount of pollution has increased markedly in the last few decades. Pollution occurs when contaminants are introduced into an environment and cause harm to ecosystems and organisms. These contaminants are generated in a multitude of ways, but much of the data suggests that there are two sources of pollution which contribute more than most: power stations and transportation.

Much of our current electricity supply (60%) is generated by power stations that use traditional fossil fuels and they often produce high levels of air pollutants. Coal-powered stations are one of main sources of carbon dioxide emissions, which are leading to rising global temperatures. Research has shown that coal-powered stations are also responsible for adding sulphur dioxide and nitrogen dioxide into the atmosphere. These gases dissolve and produce acid rain, which has damaged large areas of forests across much of the world. We also have to consider the health implication: O'Riordan (1995) suggests that 'sulfur dioxide exacerbates respiratory illnesses such as chronic bronchitis'. (p. 288)

The other massive contributor to airborne pollution is modern transportation, principally petrol-driven vehicles. According to Byrne (2001), in the United Kingdom, it has been estimated that cars produce 36% of hydrocarbon emissions, 89% of carbon monoxide and 51% of nitrogen dioxides. All of these gases have disastrous effects on the natural environment and humans. When nitrogen dioxide mixes with hydrocarbons it often synthesizes into tropospheric ozone which can wipe out woodlands and lead to terrible skin irritations in people. The Centers for Disease Control and Prevention (CDC, n.d.) warn that hydrocarbon emissions such as benzene can cause increased cancers in human populations. Finally, carbon monoxide is an important greenhouse gas that is contributing to soaring global temperatures.

To sum up the problem, as Chiras (2006) maintains, 'pollution adversely affects human health, damages the environment and the organisms that live in it […], costing billions of dollars a year.' (p. 409)

It is obvious, therefore, that pollution is having a serious impact on our planet, but what can be done to reduce pollution from these sources? In recent decades, new technologies and legislation have been introduced and have met with some success. Allaby (2000) supports this view by stating that 'cleaner technology […] has led in some countries to a reduction in pollution' (p. 284). Unfortunately, it appears to be the case that this has not been a universal experience.

If we consider attempts to reduce emissions from power stations we see a rather mixed picture. Although many governments have introduced legislation and green technologies to reduce domestic and industrial energy use and emissions, the sheer number of new coal-powered stations being built around the world has wiped out the small gains made in the last few years. For example, in China, even though the government has introduced severe charges for polluters and invested money in pollution control, Allaby (op. cit.) asserts that 'The area affected by acid rain increased from 18 per cent of the total land area in 1985 to 40 per cent in 1998' (p. 285). Yet the situation in other countries is better. Moore (1992), in his research on Germany's sustainable approach to power generation, has highlighted the success of the German government's attempt to cut sulphur oxides by 90%, a goal achieved in a little over six years.

A more positive picture emerges when we look at efforts to reduce pollution from transportation. Recent research has found that new technologies, such as catalytic converters, have reduced the amount of nitrogen dioxide, carbon monoxide and hydrocarbon emissions. Secondly, tighter governmental emission standards have created a new generation of relatively lean-burning engines that pollute far less. However, concern has grown over the effect mass air travel is having on the atmosphere. Air travel emits more carbon dioxide per passenger than any other type of transportation and is therefore having a far more destructive effect on the environment than other types of transportation.

10.3 Extending skills
essay types • situation–problem–solution–evaluation essays

A Read the three essay questions. What types of essay are they?

B Look at text A on the opposite page. Copy and complete Table 1.

C Look at text B on the opposite page. Copy and complete Table 2.

D Look again at the solution in Exercise B (Table 1). What are its possible advantages and disadvantages?

E Read the title of essay 3 again.

   1 Make a plan for this essay.

   2 Write a topic sentence for each paragraph in the body of the essay.

   3 Write a concluding paragraph.

1   Compare the methods local governments might use to reduce harmful emissions from their public transportation systems.

2   Explain from an ecological viewpoint how some of the main forms of modern transportation are having a detrimental effect on human populations.

3   Describe, with some actual examples, the environmental problems caused by coal-powered stations and vehicles. Consider how government and businesses can best solve these difficulties.

Table 1

Situation	
Problem	
Solution	

Table 2

Solution	
Argument for	
Argument against	

10.4 Extending skills
writing complex sentences • references • quotations

A Expand these simple sentences. Add extra information. Use the ideas in Lesson 10.3.

   1 Power stations are polluting the environment.

   2 Modern transportation is polluting the environment.

   3 There are three solutions to reducing pollution.

   4 Green technologies can be successful in reducing emissions.

B Look at text C on the opposite page. Copy and complete Tables 1–3.

C Look at text D on the opposite page.

   1 Complete a further row of Table 1.

   2 How could you write this as a reference?

D What do the abbreviations in the blue box mean?

E Look back at the text on page 81 (Lesson 10.2).

   1 Find all the research sources, e.g., O'Riordan (1995).

   2 Mark any page numbers for books and journals next to the correct reference in the list (C) on the opposite page.

   3 What punctuation and formatting is used before and within each direct quote? Why?

   4 What words are used to introduce each direct quote? Why does the writer choose each word?

Table 1: *Referencing books*

Author(s)	Place	Date	Publisher

Table 2: *Referencing journals*

Name of journal	Volume	Pages

Table 3: *Referencing websites*

Retrieval date	URL

&	©	cf.	edn.	ed(s).	et al.
ibid.	n.d.	op. cit.	p.	pp.	vol.

A

Case Study 1

In the early1980s, a study was jointly commissioned by both the Swedish and Norwegian governments to study the apparent decline in timber yields in the northern coniferous woodlands of both countries. The problem appeared to be that sulphur dioxide emissions from coal-powered stations were producing acid rain that was severely damaging their forests. With the advent of new clean air technologies at the end of the 1980s, both governments decided on a programme of equipping their power stations with end-of-pipe equipment which could remove or convert harmful gases into harmless substances. The prime technology installed was the scrubber, where pollutant-laden air is passed through a fine mist of lime and water. This process traps over 90% of particulates and up to 95% of sulphur dioxide and has done much to clean up the air and reduce woodland damage

Source: Clough, 2002

B

It is clear that the use of end-of-pipe technologies in power stations will not in itself stop the trend in increased air pollution. Another area which should be considered by government and industry is the reduction of emissions from mobile sources through the increased use of catalytic converters in vehicles (Chiras, 2006). Clough (2002) argues that this technology represents an important step in reducing carbon monoxide and hydrocarbon emissions, and will therefore drastically cut urban air pollution. However, Chiras (ibid.) also points out that 'in many cities improvements in air quality brought about by catalytic converters are being negated by increasing numbers of motor vehicles.' (p. 417)

C

References

Allaby, M. (2000). *Basics of environmental science*. London: Routledge.

Byrne, K. (2001). *Environmental science*. London: Nelson Thornes.

Centers for Disease Control and Prevention. (n.d.). *Air pollution and respiratory health*. Retrieved March 7, 2008, from http://www.cdc.gov/nceh/airpollution/

Chiras, D. (2006). *Environmental science*. London: Jones and Bartlett Publishers.

Moore, C. A. (1992). Down Germany's road to a clean tomorrow. *International Wildlife*, 22, 24–28.

O'Riordan, T. (1995). *Environmental science for environmental management*. London: Longman.

D

Environmental Management of Pollution

Brian Campbell

Smith & Lindsay

Recognizing fixed phrases from environmental science (3)

Make sure you understand these phrases from environmental science.

air pollutants	energy use	power generation
acid rain	fossil fuel	respiratory illness
catalytic converter	human populations	sulphur dioxide
carbon dioxide	natural world	tropospheric ozone
carbon monoxide	nitrogen dioxide	
end-of-pipe	power station	

Recognizing fixed phrases from academic English (3)

Make sure you understand these key phrases from general academic English.

One of the …	In this sort of situation …
In some circumstances, …	It is obvious/clear that …
Even so, …	It appears to be the case that …
… , as follows: …	Research has shown …
The writers assert/maintain/conclude/ assume/state/agree/suggest that …	The evidence does not support this idea.

Recognizing levels of confidence in research or information

In an academic context, writers will usually indicate the level of confidence in information they are giving. There is a strong tendency also for writers to be tentative when stating facts.

Examples:

It appears to be the case that … / This suggests that … **(tentative)**

The evidence shows that … / It is clear that … **(definite/confident)**

When you read a 'fact' in a text, look for qualifying words before it, which show the level of confidence.

Recognizing 'marked' words

Many common words in English are 'neutral', i.e., they do not imply any view on the part of the writer or speaker. However, there are often apparent synonyms which are 'marked'. They show attitude, or stance.

Examples:

*CO_2 emissions **rose** by 10% last year.* **(neutral)**

*CO_2 emissions **soared** by 10% last year.* **(marked)**

Soared implies that the writer thinks this is a particularly big or fast increase.

When you read a sentence, think: *Is this a neutral word, or is it a marked word? If it is marked, what does this tell me about the writer's attitude to the information?*

When you write a sentence, particularly in paraphrasing, think: *Have I used neutral words or marked words? If I have used marked words, do they show my real attitude/the attitude of the original writer?*

Extend your vocabulary by learning marked words and their exact effect.

Identifying the parts of a long sentence

Long sentences contain many separate parts. You must be able to recognize these parts to understand the sentence as a whole. Mark up a long sentence as follows:

- Locate the subjects, verbs and objects/complements and underline the relevant nouns, verbs and adjectives.
- Put a dividing line at the end of a phrase which begins a sentence, before a phrase at the end of the sentence, and between clauses.
- Put brackets round extra pieces of information.

Example:

In recent years, many writers have claimed that catalytic converters are very useful in reducing greenhouse gases, but the increased use of private cars has cancelled out much of this reduction in recent decades.

In recent years, | many writers have claimed | that catalytic converters are very useful in reducing greenhouse gases, | but the increased use of private cars has cancelled out much of this reduction | (in recent decades).

Constructing a long sentence

Begin with a very simple SV(O)(C)(A) sentence and then add extra information:

	Developing countries		need	help.	
As recent studies have shown,	developing countries	in every part of the world	need	help	in many areas.

Writing a bibliography/reference list

The APA (American Psychological Association) system is common in the social sciences. Information should be given as shown in the following references for a book, Internet article and journal article. The final list should be in alphabetical order according to the family name of the writer. See the reference list on page 83 for a model.

Author	Date	Title of book	Place of publication	Publisher
Parson, E. A.	(2003).	*Protecting the ozone layer.*	New York:	Oxford University Press.

Writer or organization	Date (or 'n.d.')	Title of Internet article	Date of retrieval	Full URL
Lawrence Berkley National Laboratory	(n.d).	*Indoor and outdoor air pollution.*	Retrieved August 14, 2008, from	http://www.lbl.gov/Education/ELSI/pollution-main.html

Author	Date	Title of article	Title of journal	Volume and page numbers
Jestin, K.	(1995).	International efforts to abate the depletion of the ozone layer.	*Georgetown International Environmental Law Review,*	829, 82–87.