

1

MATERIALI IN INGLESE RACCOLTI DALLA PROF.ssa GABRIELLA GASPERINI PER IL LAVORO IN CLASSE NELL' AMBITO DEL PROGETTO DI EDUCAZIONE AMBIENTALE . TERZA PARTE.

Laura Clyde Shannon West

GESE Grades

7-8

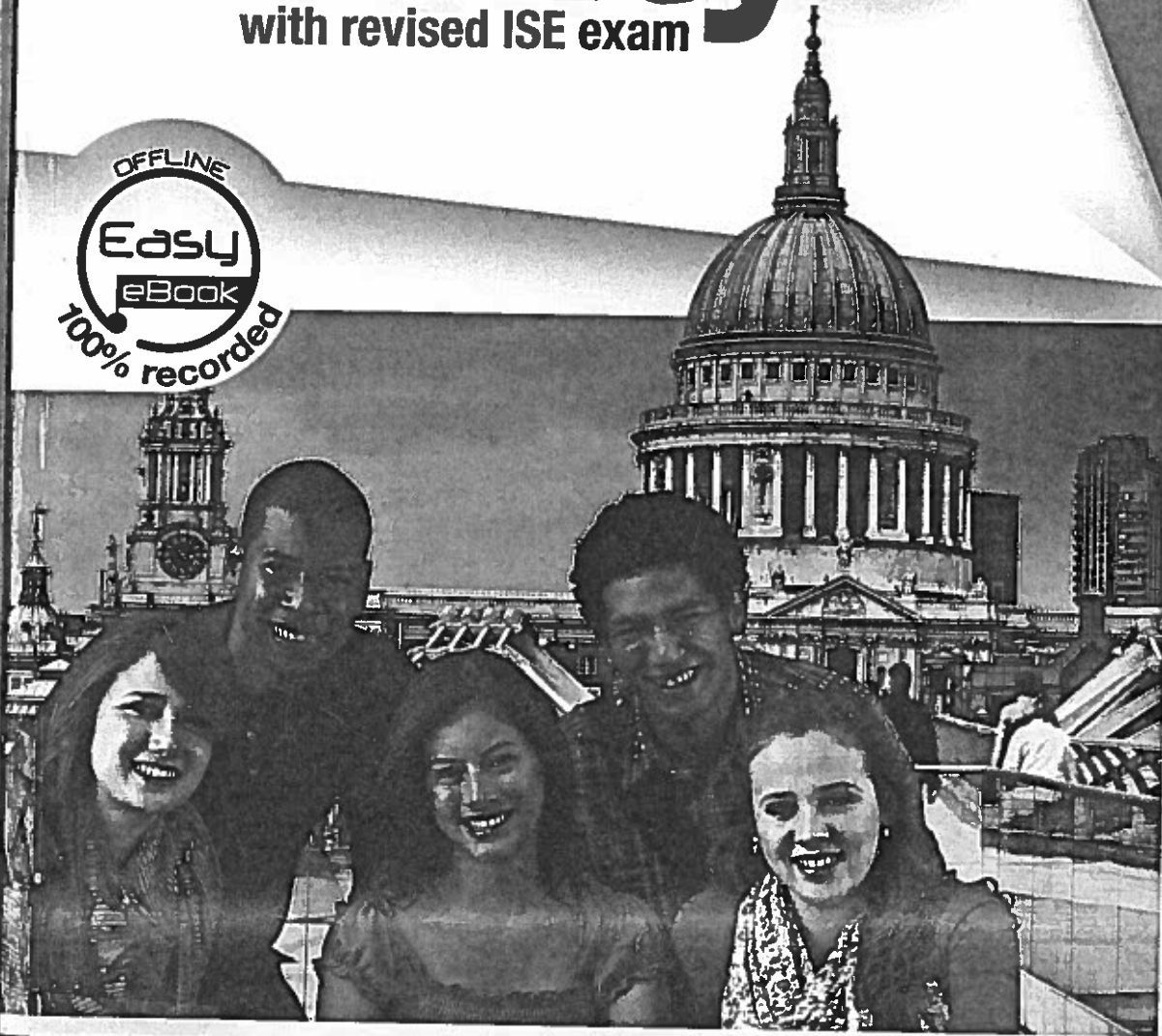
ISE II

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Conversation phase**■ Asking questions**

8a In the Conversation phase for Grade 7, the examiner chooses two subjects from the list below. Match the questions with the subjects.

- A Education
- B National customs
- C Village and city life
- D National and local produce and products
- E Early memories
- F Pollution and recycling

- 1 What are the advantages of buying food grown in your area?
- 2 Are there any laws in your city to reduce the amount of smog and car fumes in the air?
- 3 What is/was your favourite school subject?
- 4 Do you celebrate any festivals where you live?
- 5 If you moved to a big city like New York, what would you miss most?
- 6 What kinds of things do you remember from your childhood?

b In pairs, write down three questions you could ask for each of the subjects above.

c Your teacher will call out a subject. Student A (the examiner) should ask the questions s/he has for that subject. Student B (the candidate) should answer the questions, giving extra information. Keep asking questions until your teacher changes the subject. Change roles and start again.

Writing

ISE → See ISE file on pages 107-108/111-111.

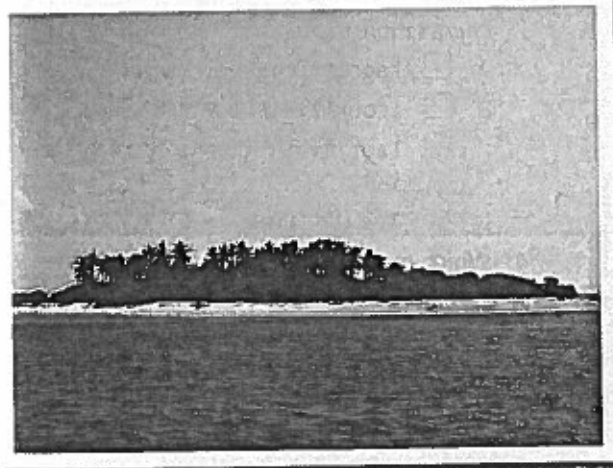
9 Choose one, or more, of these writing tasks.

A formal letter

Write a letter (150-180 words) to the editor of an international environmental publication explaining how your country's environment is being damaged by business activities. Express your feelings about the situation and emphasise the need for government action.

A report

Your area has been suffering from the effects of pollution. Write a report (150-180 words) for an environmental committee explaining how the local landscape and lives of residents have been negatively affected by pollution. Make some suggestions to improve the situation.

**Trinity
TAKEAWAY**

Examiner: Tell me about what people do with their rubbish in your country.

Candidate: Well, most plastic, paper and glass rubbish is recycled. It is collected from people's houses every week and then it is taken to a recycling plant, where it is made into new products.

Review Units 4-6

REVIEW

1 Choose the correct answer/s to the questions below.

1 Choose the correct word to complete the following sentence.

...is a place with trees, fields and very few houses around.

- A A town
- B A city
- C A village
- D The countryside

2 Which reply to the following statement is inappropriate?

I think that living in a town is better than living in the countryside.

- A I'm afraid I disagree completely.
- B I'm not sure that I agree with you.
- C I don't know about that.
- D I don't mind.

3 Which reply doesn't show full agreement with the following statement?

A city has a better atmosphere for children. There's more to do.

- A I agree completely.
- B I couldn't agree more.
- C I agree with you to a certain extent, but...
- D Yes, that's true.

4 Which modal verb cannot be used in the following sentence?

If she lived in the city, she have a better social life.

- A can
- B could
- C might
- D would

5 Choose the two possible options to complete the following sentence.

She's the woman lives on the second floor.

- A that
- B which
- C no relative pronoun
- D who

6 Which of the following phrases can be used to elicit further information from someone?

- A It would be interesting to hear what you have to say about...
- B If I were you, I would...
- C Talking about..., was there anything to do with... that you could tell me more about?
- D Tell me something about what... involves.

7 Which suggestions help people be 'greener'?

- A Use bio-degradable products.
- B Buy lots of fruit and vegetables.
- C Use renewable resources.
- D Don't buy products with unnecessary packaging.



8 Which reply to the following statement is incorrect?

I want to be more environmentally-friendly.

- A How about separating your rubbish for recycling?
- B Have you tried separate your rubbish for recycling?
- C Perhaps you could separate your rubbish for recycling?
- D What about separating your rubbish for recycling?

Task 2 – Multi-text reading (I)

1 In this section there are four short texts for you to read and some questions for you to answer.

Questions 1-5 (one mark per question)

Read questions 1-5 first and then read texts A, B, C and D below the questions. As you read each text, decide which text each questions refers to. You can use any letter more than once.

Which text

16. summarises how much food is wasted in the world?
17. suggests ideas for the general public for how to change the amount of waste?
18. describes the process we use to reduce packaging waste?
19. describes some of the advantages a family can have from wasting less food?
20. compares different areas of the world and their record on waste and recycling?

Text A

I interviewed Jasmine Chaudry, a local expert on our use of natural resources, for Planet magazine.

What should everyone know about our natural resources, Jasmine?

"People need to understand that we live in a world of diminishing resources but we continue to consume and consume as if they'll last forever. Let's take steel cans, for example used as food containers. They are 100% recyclable and you can recycle them again and again. Using recycled steel uses 75% less energy than starting from raw material. Yet, only 55% of steel cans made in Europe come from recycled steel. Much less than some other continents. This really is a waste."

Text B

Easy ways to make the most of our natural resources

Reduce

- Buy less food each week. Top up when you have run out
- Grow your own vegetables
- Drink tea and coffee from your own cup, not a disposable cup



Reuse

- Reuse carrier bags from the supermarket
- Use scrap paper for writing notes
- Buy rechargeable appliances not ones that use batteries



Recycle

- Separate your rubbish and use the recycling bins available in your town
- Compost your food scraps from the kitchen – your plants will love it




ISE file


Text C


A quarter to one third of all food produced for people to eat is lost in the production and transport process or wasted by consumers. This adds up to about one billion tons of wasted food a year. The situation is the worst in developed countries where 56% of food is lost or wasted. While in developing countries this is 44%. This lost food and calories could remove hunger gaps in the developing world.


An average person needs about 2,000 calories per day. Over 1,500 are lost in North America and Oceania. 61% of that lost is a result of waste by consumers. Other continents waste half as much as North America and Oceania but the record is still poor. For example, Europe and industrialised Asia waste over 700 calories per person, Africa over 500 calories per person and Latin America, South Asia and South East Asia waste over 400 calories per person.

Text D


 Martin: I watched a TV programme last night about food waste. I had never really thought about it before.

 Susan: Really? We are really strict in our house about recycling and using less. The whole family is involved.

 Martin: But how do we know it's making a difference?

 Susan: We're trying to reduce the amount of food we throw out. Over the last couple of months we have tried to buy less, freeze a lot more so food doesn't go off and juicing older fruit so my kids eat it when they wouldn't normally. We also buy loose fruit and vegetables if we can. I hate plastic packaging!

 Martin: Have you noticed a difference?

 Susan: Absolutely. We spend less each week on the grocery bill. About £20 less. And we have less food left in the fridge at the end of the week. I was really surprised at how much it changed.

Questions 21-25 (one mark per question)

Choose the five statements from A-H below that are true according to the information given in the texts above. Write the letters of the **TRUE** statements on the lines below in any order.

- A. Developing countries have a worse record than developed countries for food waste.
- B. Europe and industrialised Asia are similar in the amount of calories lost to food waste.
- C. More than two billion tons of food is wasted a year.
- D. Europe is not the best continent at recycling steel cans.
- E. Some families are able to save money by reducing the amount of food they throw out each week.
- F. Over 60 per cent of calories lost in North America is due to waste by transporters.
- G. Using recycled steel rather than raw steel saves three quarters of the energy.
- H. Steel cans can be continually recycled.

21.

24.

22.

25.

23.

**CAREER
PATHS**

NOT FOR SALE
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Agriculture

Neil O'Sullivan
James D. Libbin



Express Publishing

Get ready!

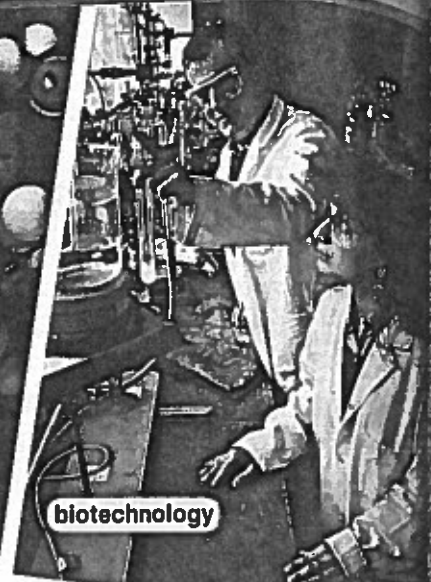
1 Before you read the passage, talk about these questions.

- 1 How can bioengineering improve animal industries?
- 2 What are some concerns about bioengineering?



prohibition

genes



biotechnology

Animal Bioengineering

National Association of Bioengineers (NAB) Westphalia University



cloning

Friday March 18

4:30 pm Registration • Parker Hall lobby

5:30 pm Keynote Address

Chapman Ballroom. Keynote speaker Dr. Mary Gilbertson will describe her research in genetic engineering.

Saturday March 19

8:30 am – 12:00 pm Presentations, Parker Hall

Group A: Room 119
Transgenic organisms. Dr. Meyers White talks about current research and newly developed transgenic organisms and their benefits.

Group B: Room 106
Biotechnology applications in agriculture. Dr. Francis Gray discusses three promising new directions for biotechnology in agriculture.

2:00 pm – 4:00 pm Poster Session
Rorschach Exhibition Area

Sunday March 18

8:30 am – 12:00 pm Presentations, Parker Hall

Group A: Room 119
Cloning bacteria and other microorganisms: engineering applications. Dr. Ursula Prsybysic and Dr. William Shawcross present on the latest engineering applications.

Group B: Room 106
Genes, gene expression, and gene enhancement: new techniques for producing favorable outcomes. Dr. Samel Perez discusses a set of techniques developed by Camber University.

2:00 pm – 3:00 pm Closing Remarks
Chapman Ballroom. Dr Whitaker will discuss societal concerns about bioengineering. How might we face greater regulation of our research and even prohibition?

Reading

2 Read the conference schedule. Then, mark the following statements as true (T) or false (F).

- 1 The keynote speaker will address biotechnology in agriculture.
- 2 On Sunday, group B attends a presentation on cloning bacteria.
- 3 The closing remarks will discuss concerns with bioengineering.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|---------------------------------------|--|
| 1 <input type="checkbox"/> cloning | 4 <input type="checkbox"/> prohibition |
| 2 <input type="checkbox"/> gene | 5 <input type="checkbox"/> expression |
| 3 <input type="checkbox"/> transgenic | 6 <input type="checkbox"/> genetic engineering |

- A the appearance of a trait
- B making a copy of an organism
- C a segment of DNA
- D banning something
- E altering genetic material
- F having artificially introduced genetic material

4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 gene enhancement / regulation
 - A _____ can create stronger animals.
 - B There is strict _____ of genetic research.
- 2 biotechnology / societal concerns
 - A There are many _____ about cloning.
 - B Robert wants to work in the _____ field.

- 5 Listen and read the conference schedule again. What is Dr. Meyers White going to talk about?

Listening

- 6 Listen to a conversation between an interviewer and a speaker. Choose the correct answers.

- What is the interview mostly about?
 - A the benefits of bioengineering in agriculture
 - B the government's support of biotechnology
 - C the health risks of bioengineered foods
 - D the impact of consumer's concerns
- What does the speaker suggest as a solution?
 - A opposing government regulations
 - B communicating better with consumers
 - C publishing the latest scientific discoveries
 - D testing transgenic products more often

- 7 Listen again and complete the conversation.

Interviewer: So, what are the challenges of agricultural bioengineering?

Speaker: Well consumers fear that genetically modified 1 _____.

Interviewer: Shouldn't people be worried about eating genetically modified food?

Speaker: Not at all. 2 _____ genetically modified food is safe to eat. We just need to do a better job of communicating this with the public.

Interviewer: What do you think will happen if you don't 3 _____ about genetically modified foods?

Speaker: 4 _____ consumers have been very vocal. Governments there have responded by 5 _____ of agriculture. In some cases, they have responded by prohibiting all genetically modified products. This is not what we want to happen.

Interviewer: 6 _____

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

What are the challenges of bioengineering ...
Consumers fear that ...
Some governments have ...

Student A: You are a reporter. Interview student B. Talk about:

- challenges
- consumer opinion
- government response

Student B: You are a speaker at a conference, answer student A's questions.

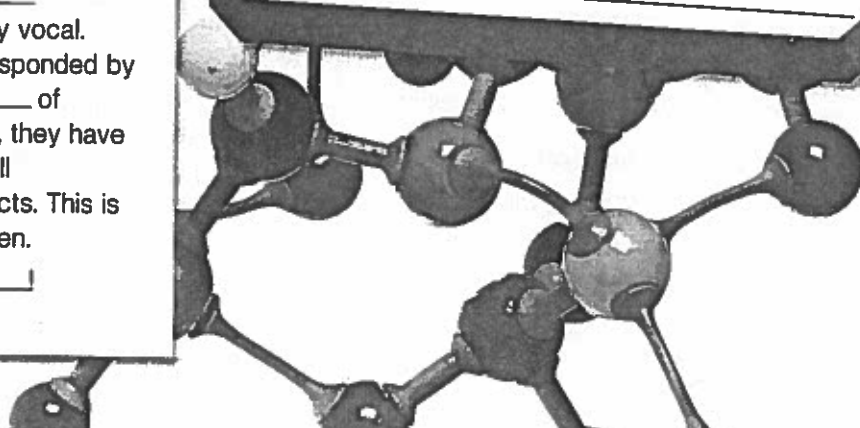
Writing

- 9 Use the conversation from Task 8 to write notes about the challenges of bioengineering. Include the challenges and consequences.

Bioengineering

Challenges: _____

Consequences: _____



12 Sustainable farming

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What sustainable farming practices are common in your country?
- 2 What challenges does sustainable farming present?

Reading

2 Read the flyer for a discussion on sustainable farming. Then, mark the following statements as true (T) or false (F).

- 1 — The focus of the event is farming basics.
- 2 — Mr. Arnold will receive an award at the event.
- 3 — JFCA speakers will address soil amendments.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------------|----------------------------|
| 1 — sustainable | 4 — off-farm impact |
| 2 — biodiversity | 5 — systems perspective |
| 3 — intercropping | 6 — non-renewable resource |

- A able to last a long time
- B the effect of farm activities on other areas
- C something that exists in a limited amount
- D a broad view of the effects of agriculture
- E the existence of a variety of organisms
- F planting multiple crops in the same field

non-renewable resource

compost

intercropping

monoculture

FARMING IN YOUR BACKYARD



Join the Johnson County Farmer's Association (JCFA) for a discussion on **sustainable farming**. Several experts will give lectures and answer questions. Come and enjoy free food from local farms and learn about agriculture in your community.

When: April 10th at 6:00 PM
Where: Johnson County Community Center
Admission: Free

- Fred Arnold, author of *Modern Farming*, will talk about reducing dependence on **non-renewable resources** like petroleum. The talk will cover the importance of expanding the whole community's **systems perspective**. Mr. Arnold won the JCFA's Excellence Award for improving local economic **sustainability** through alternative energy sources.
- Lisa Perry, Professor of Agriculture, will discuss methods for successful farming. Her lecture will focus on ways to make crops stronger and more reliable. Topics include the benefits of **intercropping** and the advantages of **biodiversity** over **monoculture**. Ms. Perry teaches a class on farming basics at Johnson University.

Members of the JCFA will give advice on limiting **negative off-farm impact**. The presentation will cover tips for producing your own **soil amendments** like **compost** and manure. The JCFA encourages audience members to ask questions and share their own farming techniques.

7

Far

Spea
Farr

Spea

Farr
Speak

4 Read the sentence pair. Choose where the words best fit the blanks.

1 compost / monoculture

A _____ is disappearing as more farmers embrace biodiversity.

B Using _____ is a great way to fertilize soil.

2 economic sustainability / soil amendments

A A farm will fail if it lacks _____.

B Most farmers add _____ to fields.

5 Listen and read the flyer for a discussion on sustainable farming again. What will Lisa Perry's lecture focus on?

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I have a question for you, if you don't mind.

Do you think I should try intercropping?

Really? How does that work?

Student A: You are a farmer. Ask Student B about:

- intercropping
- crops you grow
- avoiding pesticides

Student B: You are a sustainable farming expert. Answer Student A's questions.

Listening

6 Listen to a conversation between a farmer and a sustainable farming expert. Choose the correct answers.

1 What is the man seeking advice about?

- A preparing fields for the growing season
- B planting two kinds of vegetables together
- C using pesticides to get rid of flies
- D giving a presentation on agriculture

2 How do onions protect carrots?

- A pests will attack the onions instead
- B pests do not like how the onions smell
- C carrots' smell is masked by the onions
- D onion leaves hide the carrot tops

7 Listen again and complete the conversation.

Farmer: Professor Perry, I 1 _____, if you don't mind?

Speaker: 2 _____.

Farmer: Well, I grow onions and carrots, but I've always 3 _____ fields. Do you think I should try intercropping?

Speaker: Absolutely, Ed. Onions and carrots grow 4 _____ . Onions are perfect for protecting carrots from pests.

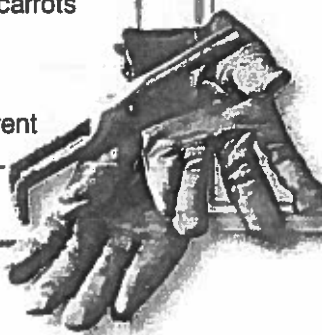
Farmer: Really? How does that work?

Speaker: Well, 5 _____ different types of crops. You've 6 _____ attacking your carrots.

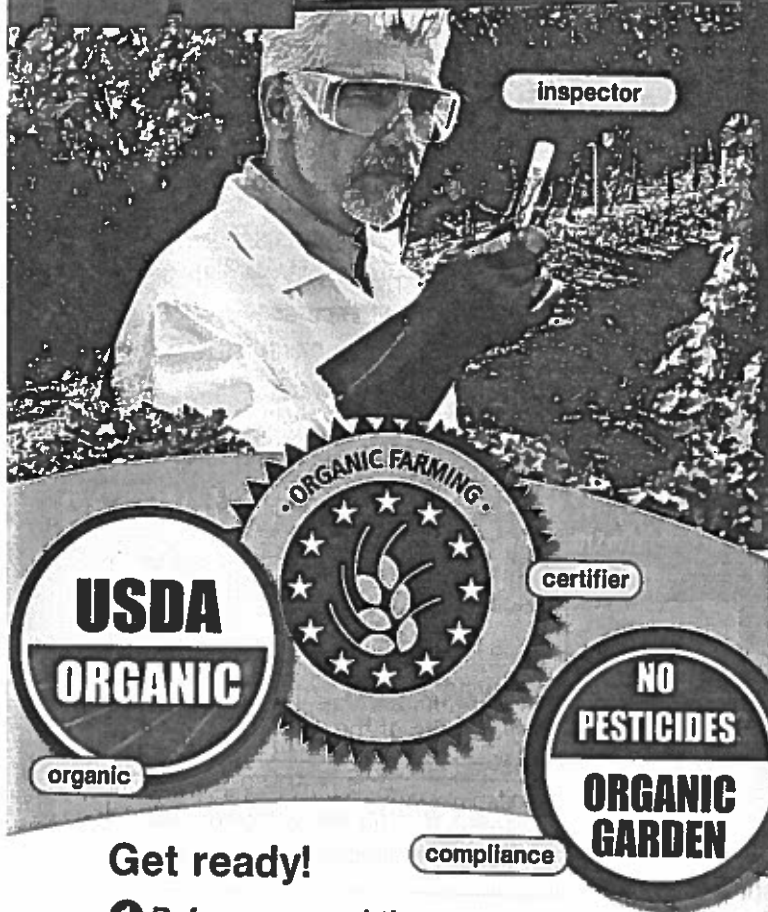
Writing

9 Use the conversation from Task 8 to write notes on a talk about sustainable farming. Include information about intercropping and its benefits.

Sustainable farming



14 Organic farming



Going Organic?

What to do to get your certification

1. Find a Certifier. To be considered **organic**, you must comply with specified eco-friendly standards. Each certifier has its own guidelines, but all certifiers stress environmental sustainability and eco-friendly production practices.

2. Apply. Submit an application and **organic system plan** to a certifier. If the certifier approves your plan, an **inspector** will schedule a visit to observe your production facility.

3. Prepare for inspection. Documentation of production must be accessible to the inspector. It is important to keep your **field activity log** up to date as the inspector will examine it.

4. Inspection. All inspections are performed onsite. There are three types of inspectors that specialize in examining different aspects of production.

- **Crop inspectors** monitor the health of the plants, soil, and water. They also observe whether there is **compliance** with pest-control regulations.
- **Livestock inspectors** judge the health of animals and their living conditions. Have vaccination reports prepared as well as a list of **material inputs**.
- **Processing inspectors** check for **organic integrity** in production facilities. These inspectors assess whether there is **contamination** or **commingling** with crops from on-site non-organic fields or materials.

5. Certification. If your facility fulfills the organic standards you will be certified. Keep **audit trail documents** on file as proof of the organic authenticity of your products.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are the challenges of organic farming?
- 2 Are organic products popular in your country?

Reading

2 Read the publication on organic farming. Then, choose the correct answers.

- 1 What is the magazine article mainly about?
A organic crop growers
B organic farmer certification
C organic pest control
D organic farming standards
- 2 Which is NOT a type of inspector?
A crop inspector
B livestock inspector
C documentation inspector
D processing inspector
- 3 What can you infer about organic facilities?
A They can also produce non-organic crops.
B They must be inspected every year.
C They must report changes in material inputs.
D They pay membership fees to certifiers.

Vocabulary

3 Fill in the blanks with the correct words from the word bank.

Word BANK

compliance commingle
contamination certifier organic

- 1 The farm maintains _____ with regulations.
- 2 The inspector is checking for _____ of organic crops with non-organic materials.
- 3 John is preparing for a visit from the _____.
- 4 The farm offers _____ produce.
- 5 Don't _____ organic and non-organic produce.

4 Match the words (1-6) with the definitions (A-F).

- 1 — organic system plan 4 — inspector
 2 — organic integrity 5 — material inputs
 3 — audit trail document 6 — field activity log

- A someone who examines facilities, crops, and animals
 B a written statement describing methods
 C adhering to certifier's rule for organic products
 D a record to prove organic authenticity
 E a record of additives and work in fields
 F supplies used in production

5 Listen and read the publication on organic farming again. What are the three types of inspectors?

Listening

6 Listen to a conversation between a farmer and an organic inspector. Mark the following statements as true (T) or false (F).

- 1 — The man hopes organic labels will attract attention to his produce.
 2 — The woman certifies the farm as organic.
 3 — The farm received a random inspection.

7 Listen again and complete the conversation.

Farmer: So, Ms. Walton, what did you think of the tour?
Inspector: It went well, Mr. Davis. You seemed prepared for our visit.
Farmer: That's good to know. We're hoping 1 _____ attention with an organic label.
Inspector: I understand. Organic goods are in high demand these days.
Farmer: Do you think we'll be certified?
Inspector: 2 _____. But your field activity logs showed your practices to be in compliance with our regulations.
Farmer: 3 _____ We've worked very hard.
Inspector: 4 _____. There didn't seem to be any contamination with non-organic produce.
Farmer: Oh, we're very careful about that. So, 5 _____ to hear if we'll be certified?
Inspector: 6 _____. The certifier needs to review the documents you supplied.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Do you think we'll be certified?

There didn't seem to be any contamination ...

The certifier needs to review the documents.

Student A: You are a farmer. Ask Student B about:

- becoming certified
- time to respond
- what to do next

Student B: You are a crop inspector. Answer Student A's questions.

Writing

9 Use the conversation from Task 8 and the publication to write a crop inspector's report. Include information about: field activity logs, compliance and organic integrity.

Report

Name: _____
 organic inspector

SMITH'S SEEDS Inc.

About Us

Smith's Seeds offers the best seeds that technology can produce. Each **biotech seed** contains favorable traits carefully selected by our genetic engineering team. Sustainability is important to us, and that's why we're producing more than a **conventional seed**.

Available Seeds

Soy #7: This variety is characterized by both **herbicide-resistance** and **insect-resistance**. If pesky insects are affecting your crop yields, this is the seed for you. These plants will withstand many conventional herbicides.

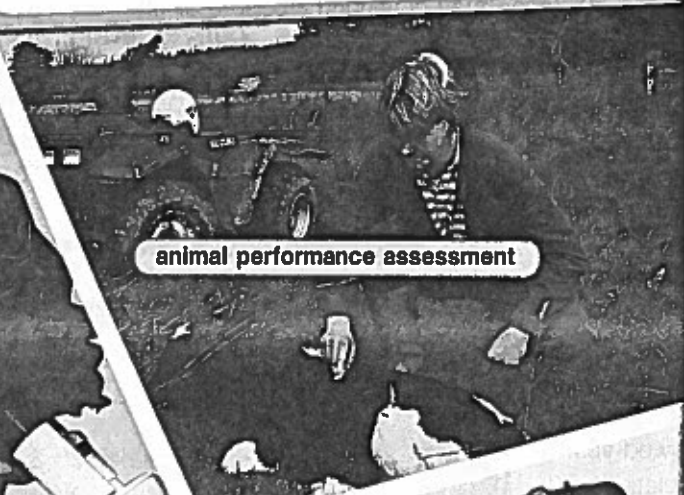
Wheat #5: This variety is characterized by its incredible output. Wheat #5 seeds can be planted more closely together than conventional wheat seeds. Because these plants occupy little space, you can expect marked **yield enhancement**.

Corn #10: This variety is characterized by its great yields that result from **nitrogen efficiency**. These seeds will grow even in compromised soil conditions. If soil quality has decreased your corn production, Corn #10 is your solution.

Sorghum #2: This variety is characterized by its **drought-resistance**. If you farm in a dry area that receives irregular rainfall, this is the perfect variety for you. Expect a hardy plant and big yields from this remarkable seed.

Safety Concerns

All of our **genetically modified organisms (GMOs)** undergo **extensive analysis** before they are sold. Our **animal performance assessments** guarantee the safety of our products.



animal performance assessment



conventional seed



analysis

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How can genetically modified organisms help farmers?
- 2 How do consumers feel about genetically modified organisms in your country?

Reading

2 Read the webpage from a seed company. Then, mark the following statements as true (T) or false (F).

- 1 Soy #7 is designed to thrive in poor soil.
- 2 Sorghum #2 grows well in dry climates.
- 3 The company tests their products on animals.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- 1 drought-tolerant
- 2 GMO
- 3 animal performance assessment
- 4 nitrogen efficiency
- 5 yield enhancement

- A increasing the size of a harvest
- B able to withstand dryness
- C the ability to use minimal nitrogen
- D organism produced by genetic engineering
- E a test of the effects of a product

4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **biotech seed / analysis**
 - A This _____ can resist herbicides.
 - B _____ suggests that the product is safe.
- 2 **herbicide tolerant / insect-resistant**
 - A _____ seeds counter pest populations.
 - B _____ seeds let farmers kill weeds.
- 3 **conventional seeds / traits**
 - A Scientists are enhancing desirable _____.
 - B Some farmers prefer _____ to GMOs.

- 5 Listen and read the webpage from a seed company again. Which variety will grow in compromised soil?

Listening

- 6 Listen to a conversation between a seed developer and a salesman. Choose the correct answers.

- 1 What is the main benefit of the seed?
- A nitrogen efficiency
 - B drought-resistance
 - C insect-resistance
 - D herbicide-resistance
- 2 Why does the woman believe the seed will benefit the environment?
- A Less land will be used per season.
 - B More farmers will plant in dry regions.
 - C Animals will have healthier feed.
 - D Less irrigation will be needed.

- 7 Listen again and complete the conversation.

Salesman: Carol, please come in. 1 _____ your new seed is almost ready for marketing.

Developer: It is. After the animal performance assessments, it will be 2 _____.

Salesman: Wonderful. 3 _____. I want to know the best way to advertise it.

Developer: Well, the main benefit is that it's extremely 4 _____.

Salesman: Okay. So we'll 5 _____ it to farmers in dry regions.

Developer: Yes. We'll 6 _____ where rainfalls are unpredictable.

Salesman: Okay. What else?

Developer: We should emphasize the dependability of our seed. Tests showed that the yields produced during rainy seasons and those produced during droughts varied very little and they're better for the environment than conventional seeds.

Salesman: How?

Developer: With fewer crops failing during drought seasons, there'll be greater yields. That means 7 _____ per season.

Salesman: Excellent, Carol.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I want to know the best way to advertise it.

We should emphasize ...

Excellent point.

Student A: You are a salesman. Ask Student B about:

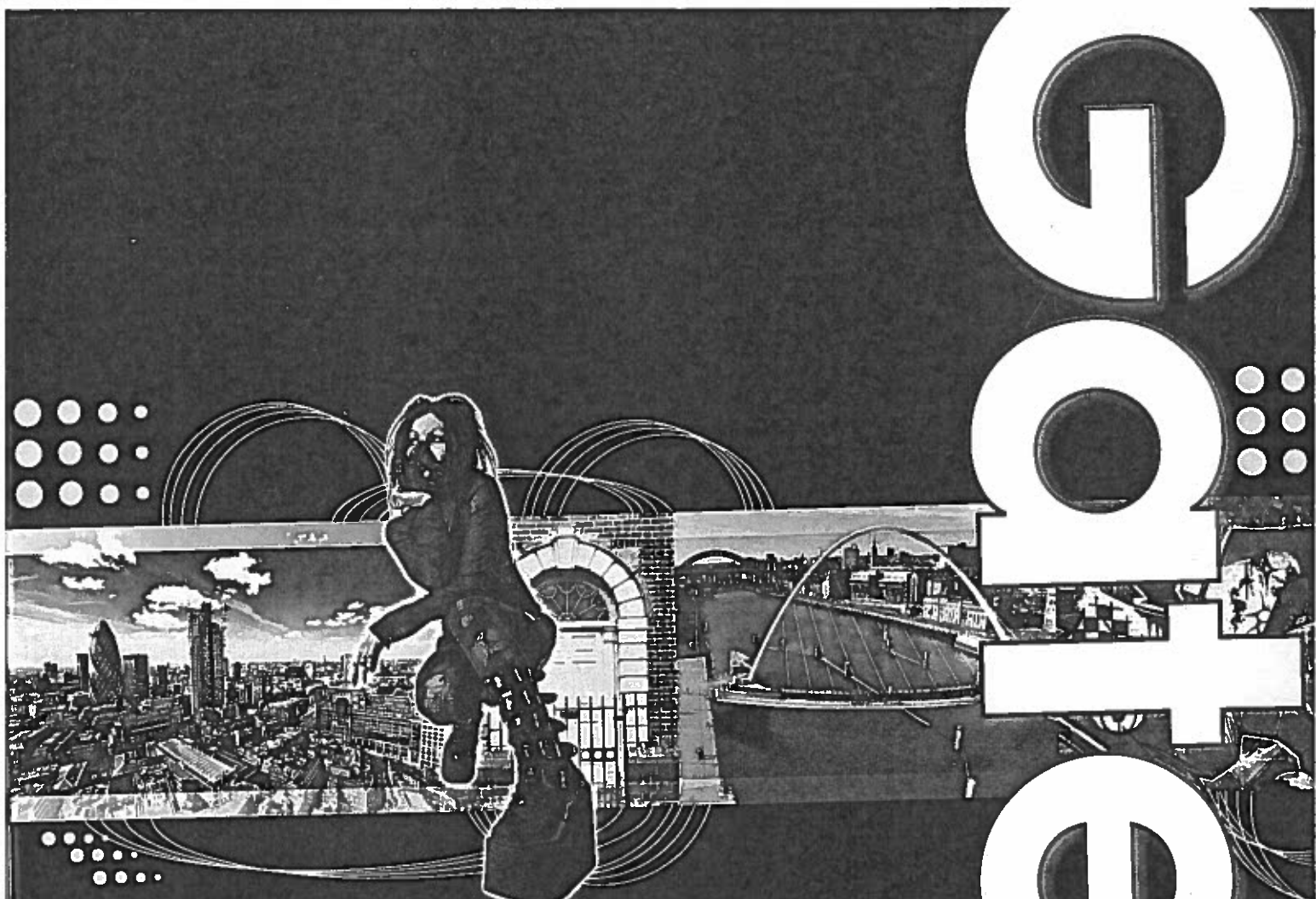
- a new seed
- seed benefits and traits

Student B: You a seed developer. Answer Student A's questions.

Writing

- 9 Use the conversation from Task 8 and the web page to write product descriptions of two new seeds. Include the crop types, seed traits, and benefits.

| | |
|------------|-------------------------|
| Crop Type: | _____ |
| Traits: | _____ _____ |
| Benefits: | _____ _____ _____ |
| Crop Type: | _____ |
| Traits: | _____ _____ |
| Benefits: | _____ _____ _____ |



GET STARTED NOW

B1

Student's Book and Workbook

David Spencer

- life-long learning skills
- build up your competences
- motivating contents
- multimedia rich material



MACMILLAN

Living Planet

VOCABULARY

Geographical features

1a Match the photos to these words.

beach • desert • forest • ice cap • mountain range • rainforest and jungle

1b 2.02 Listen and repeat.



The environment

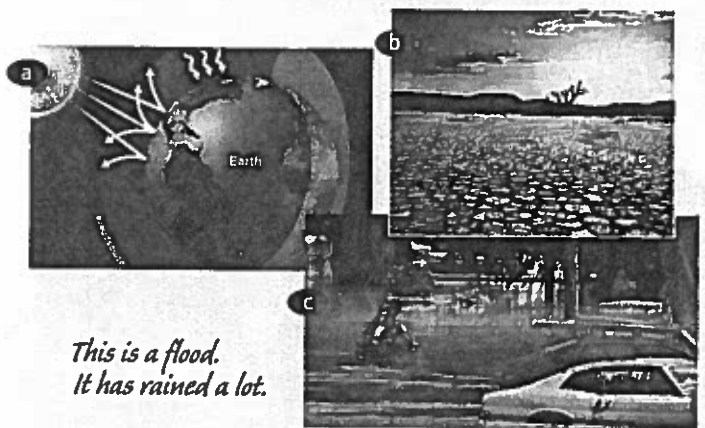
2 Match the words with the definitions.

drought • environment • flood • global warming • greenhouse effect • nuclear disaster • oil spill • ozone layer • pollution • recycle • save • waste

when heat cannot escape from the atmosphere and the temperature on earth goes up *greenhouse effect*.

- 1 to use something again, or change something so that you can use it again
- 2 the natural world around us
- 3 to stop using something (for example water, money, electricity) or to use it less
- 4 a long period of time when there is no rain
- 5 the part of the earth's atmosphere which protects the earth from the sun
- 6 the process of making the air, water or land worse, with chemicals, for example
- 7 a large quantity of water that suddenly covers an area
- 8 the increase in the temperature on earth
- 9 to use something more than necessary, or in an incorrect way
- 10 an accident with nuclear power, usually causing radioactivity
- 11 an accident when oil comes out of its container, for example at sea

3 Use words from 2 to talk about the photos.



This is a flood. It has rained a lot.

4 **LISTENING** 2.03 Listen to three descriptions of environmental problems. Match each description to a photo in 3.

- 1
- 2
- 3

5 **SPEAKING** Work in pairs. Ask and answer the questions.

- 1 How is global warming affecting your country?
- 2 What do you do to protect the environment?
- 3 What do you do to save water or electricity?

READING

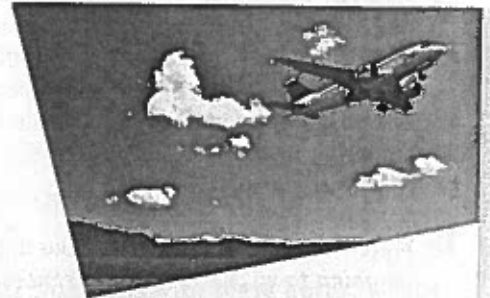
1 You are going to read a text about things we can do to protect the environment. You have three minutes to read the four paragraphs and match them to these titles.

- | | | | |
|-------------------|--------------------------------------|-------------------|--|
| 1 Paragraph | a Young people can make a difference | 3 Paragraph | c What is a carbon footprint? |
| 2 Paragraph | b Predictions for the future | 4 Paragraph | d Your lifestyle and your carbon footprint |



1 It's difficult to know exactly how our climate will change. Scientists think that the global temperature may go up by between 1.4°C and 5.8°C in the next fifty years. This global warming will definitely make a big change to life on earth. Most areas will become warmer. Some parts of the world might have terrible floods, but some may have droughts. This will probably be bad for plants and animals in all parts of the world. In the Arctic we can already see that the changing weather is going to make life very difficult for polar bears.

2 So what can we do about this? One thing we can do is to think about our carbon footprint. A carbon footprint is a way of working out the difference that each person makes to the environment. It shows the pollution that we, as individuals, are responsible for. For example, when you go to school by car every day your carbon footprint gets bigger because you are adding to the pollution. When you walk to school or go by bike, your footprint is much smaller.



3 Your decisions in life make a difference to your carbon footprint. Do you fly when you go on holiday? Planes are much worse for the environment than trains. They leave a bigger carbon footprint. When you buy products that have a lot of plastic packaging, you are also making your carbon footprint bigger.

4 You are a teenager. Perhaps you think that you are not responsible for your own carbon footprint because your parents and your school are responsible. But you can help your family and others to change their habits. And you can watch less TV and turn off the light when you leave a room. Each small action will make your carbon footprint smaller. And that will help to slow down global warming and its dangerous consequences.

2 Choose the correct alternative. Write the number of the paragraph where you found the answer.

- A carbon footprint works out the difference that each human being/type of transport makes to the environment.
Paragraph
- The text suggests that teenagers can take decisions for their parents/influence their parents' decisions.
Paragraph
- Rail travel/Flying is relatively good for the environment.
Paragraph
- The effects of climate change will probably/will probably not affect nature all over the planet.
Paragraph
- Everyday activities make/don't make a big difference to your carbon footprint.
Paragraph
- Scientists are/are not sure what will happen in the next fifty years.
Paragraph
- Scientists predict that the changes will/won't be the same in different places.
Paragraph

3 Match the underlined words in the text with their definitions.

cause (v) are responsible for.

- the plastic that covers things you buy
- deciding, calculating
- results
- routines
- the mark that your foot leaves on the ground
- making something bigger or worse

4 **SPEAKING** What about you?

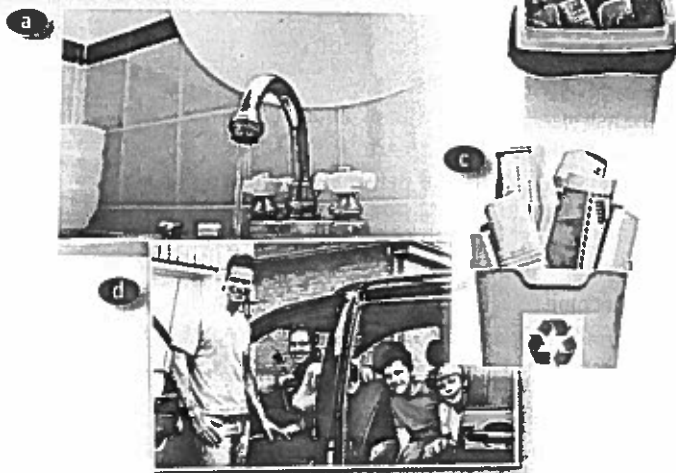
- How important do you think global warming is? Why?
- Do you think your carbon footprint is big or small? Why?

I think global warming is the most important problem in the world right now.

I don't agree. There are other big problems too.

LISTENING AND READING

- 1 **SPEAKING** Work in pairs. What can you see in each photo? Is the situation good for the environment or not? Why?



- 2 **LISTENING** 2.05 Listen to part of a meeting at a school, then answer the questions.

- 1 What is the meeting about?
- 2 How many ideas do they write down?
- 3 Which student wants to save water in the school canteen?

Listening FAQ

What is the main objective the first time I listen to a listening text?

Study Skills → page 130

- 3 Listen again. Are these sentences true (T) or false (F)? Correct the false sentences.

- 1 The first student, William, wants to separate paper into three different boxes. T/F
- 2 The school has never told students to switch lights off. T/F
- 3 Isabelle's idea is to help people remember to switch the lights off. T/F

- 4 2.06 Read and listen to an extract from the conversation. Choose the verb form that you hear.

WILLIAM: If we reuse/'ll reuse and recycle all the paper in the school, it helps/'ll help to save trees.

MARIE: Just one question. When the box is/will be full, who takes/'ll take the paper for recycling? That's a big job.

WILLIAM: If we all help/will help, it isn't/won't be so bad. Why don't we use the class list and go in alphabetical order?

GRAMMAR IN CONTEXT

Zero conditional

- 1a Look at the sentences in the zero conditional. Then choose the correct alternative.

- 1 If you don't turn the tap off, you waste a lot of water.
 - 2 You die if you don't drink.
- We use the zero conditional to talk about *specific situations/things that are generally true*.

- 1b Look again at the sentences in 1a.

- a What tenses do we use in the zero conditional? If + _____
- b Does the half of the sentence with if always come first?
- c When do we use a comma in conditional sentences?

Workbook → page 195

- 2 Complete these sentences by putting the verb in the correct form.

- 1 If it's sunny, people often _____ (go) to the beach.
- 2 If it _____ (not rain) for months, the result is usually a drought.
- 3 If it rains a lot for months, there _____ (be) often floods.
- 4 If you don't water plants, they _____ (die).
- 5 If it _____ (be) very sunny, it's bad for your eyes.
- 6 If the sun _____ (shine) all day, the temperature goes up.

- 3 Write sentences to make general statements using the zero conditional.

If I'm late for school, *my teacher gets angry with me.*

- 1 If you sit too close to the TV, _____
- 2 If you go to bed late, _____
- 3 I feel sad if _____
- 4 I enjoy English classes if _____
- 5 My parents are happy if _____

- 4 **SPEAKING** Work in pairs. Compare your sentences from 3. Are any sentences the same?

I feel sad if I watch a sad story on the news.

Me too. But I wrote that I feel sad if I argue with my friends.

First conditional and time clauses

5a Look at these sentences in the first conditional. Then choose the correct alternative.

- 1 If we recycle all the paper, it'll help to save trees.
- 2 It won't be so bad if we all help.

We use the first conditional to talk about *possible/impossible* situations and their consequences.

5b Look at these time clauses. Then choose the correct alternative.

- 1 When the box is full, who'll take the paper for recycling?
- 2 After we put posters up, people won't forget to do it.

We use a time clause to talk about a *sequence/the cause* of future events.

5c Look at the sentences again and choose the correct alternative.

- a In the part of the sentence with if or a time word (*when, after, before, until, as soon as*) we use the *present simple/will or won't*.
- b In the other part of the sentence we use the *present simple/will or won't*.

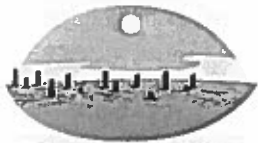
Workbook → page 195

6 Choose the correct alternatives.

- 1 If we *don't/won't* recycle paper, we *need/will need* to cut down more trees.



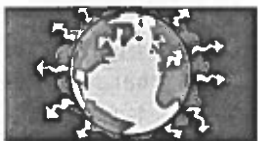
- 2 If we *cut/will cut* down more trees, the forests *disappear/will disappear*.



- 3 There *are/will be* more deserts if the forests *disappear/will disappear*.



- 4 If there *are/will be* more deserts, the planet *becomes/will become* hotter.



- 5 Many plants and animals *die/will die* if the planet *becomes/will become* hotter.



7 Put the verbs in the correct tenses using the first conditional.

'If we (a) (not do) something soon, electronic products (b) (create) serious problems for the environment. We use more and more energy because we buy more and more electronic gadgets. If this situation (c) (continue), each house (d) (need) an incredible quantity of energy. The popularity of computers and games consoles has created an enormous need for more power. In the 1970s homes contained, on average, just 17 electronic products. But now some people think that they (e) (not be) able to brush their teeth if they (f) (not have) an electric toothbrush. And if we (g) (forget) to switch off all these electronic gadgets we (h) (use) up all of our electricity for nothing.'

8 Complete the sentences with the correct form of the verb given.

- 1 After the students (discuss) their ideas, they'll write them down.
- 2 When Jack (see) the poster, he won't forget to turn the tap off.
- 3 Mum (start) making dinner as soon as she gets home.
- 4 We'll have to wait here until the rain (stop).
- 5 I'll do my homework before I (go) out with my friends.
- 6 Who (wash) the dishes when we finish eating?

9a **SPEAKING** Work in pairs. Take it in turns to ask and answer questions about what you will do:

- when you get home
- before you go to bed tonight
- after the summer holidays start
- as soon as you are eighteen

When I get home, I'll turn the TV on and I'll have lunch

9b Tell your sentences to the class. Who will do the most unusual things?

DEVELOPING WRITING – A formal letter

- 1 Read this newspaper article about recycling. What does the writer think about recycling? What reasons does he give?



RECYCLING IS A WASTE OF TIME Harry Macdonald's Viewpoint

Everybody is always telling us to recycle. In some countries it is a crime *not* to recycle! This just shows how stupid modern society has become. The fact is that it's more expensive to recycle paper and glass than to make them from new materials. Why don't we just burn our rubbish? If we burn it, we'll produce lots of energy. And another thing, recycling only really works if we separate plastic, paper, aluminium etc. Let's be honest, how many people really do that? Recycling? It's just a waste ... of our time.



- 2 Here is a letter to the editor of the newspaper. Does the reader agree or disagree with Harry Macdonald?

LETTERS TO THE EDITOR

Dear Editor,

I am writing in response to Harry Macdonald's article 'Recycling is a waste of time' which appeared in your newspaper last week. Personally I agree with many of the things that Mr Macdonald says.

Firstly, recycling is more expensive than we think. **Furthermore**, it is difficult or impossible to recycle some materials.

Next, some people say that burning rubbish is bad for the environment because of the fumes. **Nevertheless**, burning rubbish is a very efficient way to generate electricity.

Finally, many people say they recycle their rubbish. **However**, not many people take the time to separate glass, paper and plastics. **What's more**, I totally disagree with the idea of making people recycle.

I will be interested in hearing other readers' opinions on this question.

Yours faithfully,

Helen Horton, Manchester

Writing FAQ

Why is it important to divide texts into paragraphs when I write?

Study Skills → page 130

- 3 The words in bold in the letter are all linkers. Put them in the correct place in the Writing Bank below.

Writing Bank

Linkers of sequence, addition and contrast

- Sequence: **Firstly**, _____, _____
- Addition: **Furthermore**, _____
- Contrast: **However** _____

- 4 Complete the sentences with linkers from the Writing Bank.

- 1 I think recycling is easy. _____, it is cheap.
- 2 Let me explain what I think. _____, I want to explain my opinions about recycling paper. Next, I want to tell you what I think about recycling glass. _____, I want to talk about plastic.
- 3 In general, I agree with the article. _____, there are some things in it that I don't agree with.

Practice makes perfect

- 5a Look at this topic and make notes.

A newspaper journalist writes:

'Humans aren't responsible for climate change. It's just a natural process.'

Write a letter to the newspaper editor expressing your own opinion on this topic.

- Begin by explaining why you are writing.
- Express your opinion and explain your main reason for it.
- Give additional reasons for your opinion.
- End your letter.

- 5b Write your letter using the model in 2, your notes and the Writing Bank to help you.

Exam Success

When you are writing in exam conditions, if you don't know a word, think of a more general or basic word. If you aren't sure how to use a grammatical structure, change what you are going to say.

Writing Tips → page 78

Build up your competences

Project

Section

C

Use what you have learnt in this section with a project that makes you:

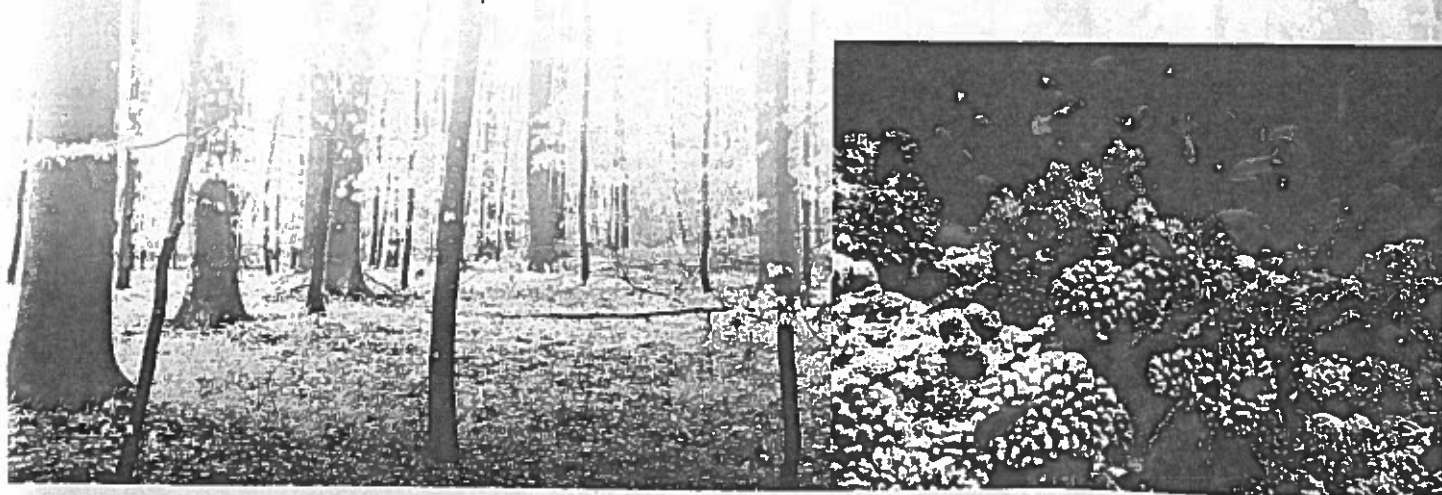
- ▶ plan your work
- ▶ communicate ideas and opinions creatively
- ▶ identify links and relationships between different subjects.

GREEN RAP



Work in groups of four or five. You're going to write a rap song that has an environmental message.

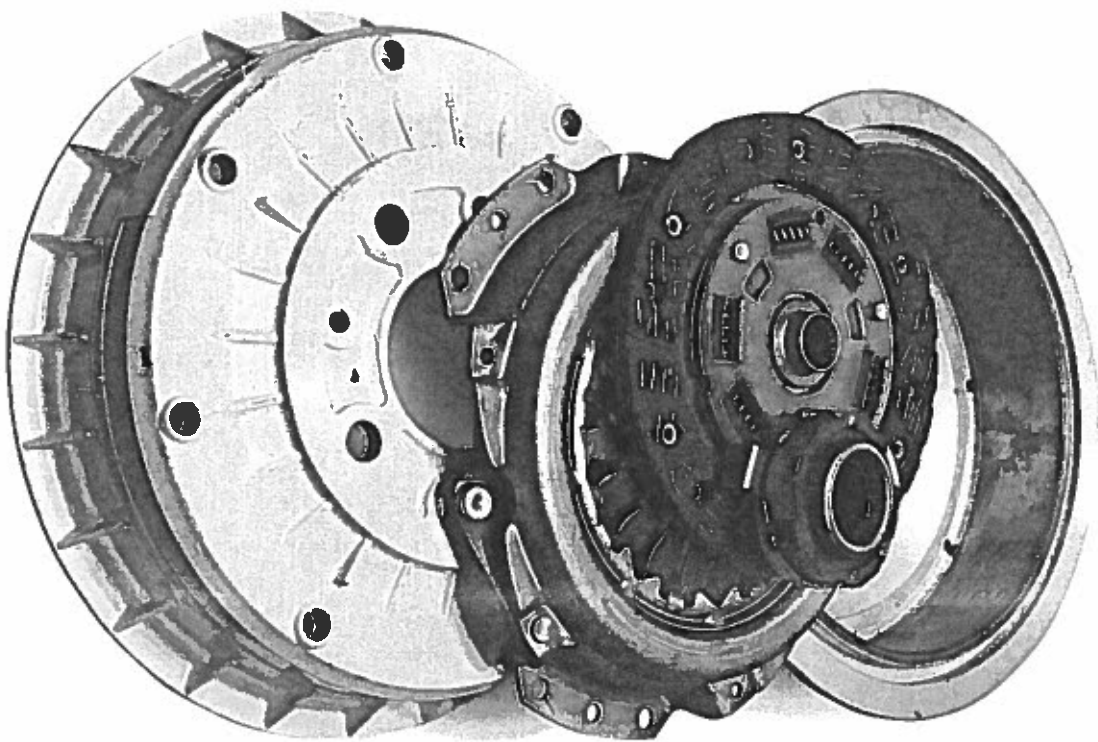
- 1 In your group, think about environmental problems in your country. What are the causes? What are the consequences? What can people do about them? Write a list of your ideas.
- 2 Write a chorus or refrain. It should contain the main idea for your song.
- 3 Write the lyrics. Go through each of the points from your list and express them in rhyme (for example, green/clean, pollution/solution).
- 4 Choose a beat that expresses the emotion you want to put in your song. You can download free beats from the Internet.
- 5 Arrange your lyrics into verses.
- 6 Structure your song. A popular structure is verse – chorus – verse – chorus.
- 7 Practise rapping your song. Cut out words that are not necessary. Add some pauses.
- 8 Memorise your song and perform it in class.



B. Franchi Martelli - H. Creek

ENGLISH TOOLS

for Mechanics



4LL

for Lifelong Learning



MINERVA SCUOLA

Energy

Energy and Environment



- 1 **Brainstorming** Split into three groups, each group chooses one of the following topics.
- a Source
 - b Fossil fuels
 - c Alternative energy

Write a list of as many words as you can think of that are connected to your topic. Then, put your lists together. Which words appear in all lists? Two lists? One list? Write your results on the blackboard.

- 2 Read the text below, then see whether you can add any useful key-words to your lists.

TEXT 1

Sources of energy

Sources of energy can be broadly divided into two groups: non-renewable and renewable. The first are consumed and, at some stage, run out, while the second are naturally replenished. Traditionally, most electricity has been generated using fossil fuels.

NON-RENEWABLE SOURCES

1 Fossil fuels

Huge amounts of energy are needed for heating, generating electricity and for transport. In the early years of the Industrial Revolution **coal**, formed from organic matter buried beneath the Earth's surface, was the leading source of energy. It is still important as a raw material, despite the fact that, when burnt, it gives off sulphur and other air pollutants as well as **carbon dioxide**, a major **greenhouse gas**.

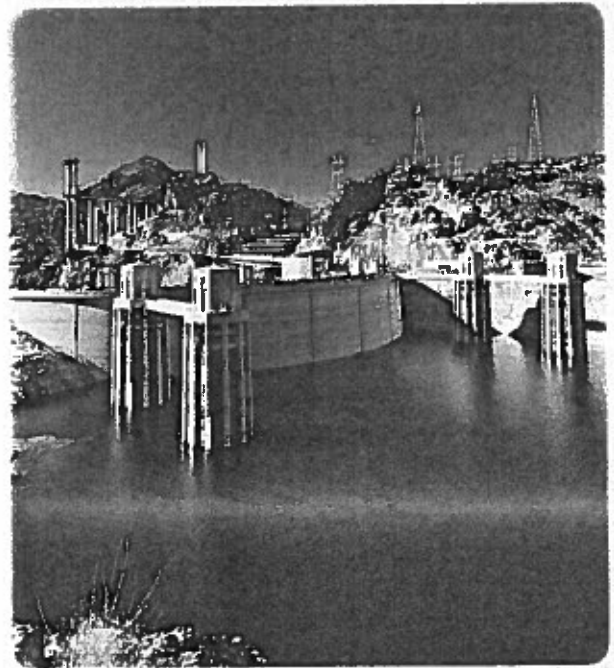
However, **oil** and **natural gas**, which came into wide use in the 20th century, are cheaper to produce and easier to handle than coal, and, kilogram for kilogram, they give out more heat.

Oil is especially important for transportation, supplying about 97% of the fuel consumed.

In 1995, proven **reserves** of oil were sufficient to supply the world, at current rates² of production, for 43 years, while supplies of natural gas stood at about 66 years. Coal reserves are more abundant and known reserves would last 200 years at present rates of use. Although these figures³ must be regarded with caution, because they do not allow for future discoveries, it is clear that fossil fuel reserves will run out⁴ one day.

2 Nuclear power

Nuclear energy uses radioactive material, that, when is put in a "**nuclear pile**", heats up; this heat is used to turn water to **steam**, used to power turbines. Nuclear power stations can produce energy at a low cost, but building a plant is very expensive. It is without greenhouse emissions, but it creates radioactive nuclear waste and can cause enormous damage to health and environment. So great attention must be paid to safety.



Hoover dam.

RENEWABLE SOURCES

Other sources of energy are therefore required. At present, besides *nuclear energy*, the main alternative to fossil fuels is *water power*. The costs of building dams and hydroelectric power stations is high, though hydroelectric production is comparatively cheap and it does not cause pollution, it can cause environmental damage. But the creation of reservoirs uproots people and, in tropical rainforests, it destroys natural habitats. Hydroelectricity is also suitable only in areas with plenty of rivers and steep slopes, such as Norway, or the Alps and Wales and Scotland, while it is unsuitable in flat areas, such as the Netherlands.

In Brazil, *alcohol made from sugar* has been used to fuel cars. Initially, this government-backed policy⁵ met with great success, but it has proved to be extremely expensive.

Other forms of energy, which are both renewable and cleaner than fossil fuels, are: wind, sea wave, the rise and fall of tides, and geothermal power. These forms of energy are already used to some extent. However, their contribution in global terms seems likely to remain small in the immediate future (see *Alternative Sources of Energy* on page 138).



Rainforest.

¹ give off: emit

² rate: speed, percentage

³ figures: numbers

⁴ run out: finish

⁵ government-backed policy: a policy supported and financed by the government

TECHNICAL ENGLISH

| | | | | | |
|----------------|----------------------|--------------|-------------------------------------|-------------|---------------------------------|
| carbon dioxide | anidride carbonica | coal | carbone | fossil fuel | combustibile fossile |
| greenhouse gas | gas ad effetto serra | nuclear pile | pila (mucchio) di sostanze nucleari | replenished | riempito, rifornito, riprodotto |
| oil | petrolio | renewable | rinnovabile | replenished | riempito, rifornito, riprodotto |
| reserve | riserva | source | fonte | steam | vapore |
| | | | | waste | rifiuti |

3 Now go back to the text again and scan it to look for the missing data concerning the items in the chart below.

| Source of energy | Weak points | Strong points |
|------------------|---|--|
| coal | when burnt it gives off sulphur and other air pollutants | |
| gas | | cheaper, easier to handle, it gives out more heat |
| hydro | cost for dams is high, destroys natural habitats | |
| nuclear | building the plant is expensive, radioactive waste | energy at low cost, no greenhouse emissions |
| oil | | important for transportation, it gives out more heat |
| other | expensive and their contribution seems likely to remain small in the immediate future | |

- 4 **Brainstorming** A Groups: match each of the terms below with its definition and list any information you have about these things. Put your notes together with those of the rest of the class.

CFC chlorofluorocarbon

CO₂ carbon dioxideCH₄ methane

greenhouse effect

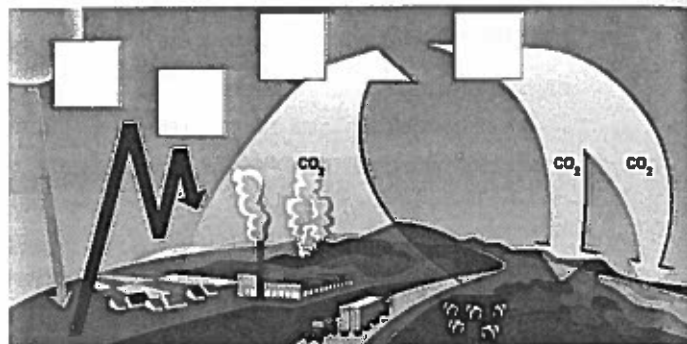
GHG greenhouse gas

global warming

- a is a process by which thermal radiation from a planetary surface is absorbed by atmospheric greenhouse gases, and is re-radiated in all directions including back towards Earth's surface, so the temperature there is higher than it would have been if direct heating by solar radiation were the only source of warmth.
- b is a class of organic chemical compounds that has been widely used as refrigerants, propellants (in aerosols), and solvents. It is being phased out now because of the damage it does to the ozone layer.
- c is the recent increase in the world's temperature that is believed to be caused by the increase of certain gases in the atmosphere.
- d is the principal component of natural gas. It is a relatively potent greenhouse gas: when burnt in the presence of oxygen produces carbon dioxide and water.
- e is any gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. The main ones in the Earth's atmosphere are: water vapour, carbon dioxide, methane, nitrous oxide, and ozone.
- f is the most important greenhouse gas because it has a strong impact on climate and human activities generate more than 6 billion tons of CO₂ each year and rising.

B Decide which caption goes in which box in the diagram and prepare a brief description of the cycle it shows in your own words.

- a Sun radiation, solar radiation.
- b CO₂ freely allows radiation from the sun, but traps heat radiated back from the Earth's surface.
- c Vegetation subtracts CO₂ from the atmosphere, reducing damage due to greenhouse gases.
- d Heat.



- 5 Read Text 2 and list the main sources of greenhouse gases and their polluting gases.

TEXT 2

Climate is changing... why?

Fossil fuels emit many substances into the air which can cause climate change.

All economic activity that requires energy consumption contributes to these emissions producing these so-called 'greenhouse gases'. These gases are dangerous to our environment.

Greenhouse gases are mainly produced by:

The energy sector: the largest source of CO₂ emissions from fossil fuel combustion is for the production of electricity.

Transport: contributes to CO₂ emissions as a result of fuel combustion.

Agriculture: the largest producer of CH₄.

Industry: mainly contributes to greenhouse gas emissions through energy use, including direct consumption of fossil fuels and use of electricity, but many also produce CO₂ during their normal manufacturing cycles (e.g. CO₂ is a by-product of cement manufacture). Industry also produces some CFCs although they, along with five other substances that were attacking the ozone layer, were banned by the Montreal protocol in 1989.

TECHNICAL ENGLISH

banned vietato (messo al bando)

combustion combustione

consumption consumo

environment ambiente

greenhouse gases gas ad effetto serra

6 Read the following passage and answer these questions.

- Which gas is the major cause of global warming?
- What do scientists think we should do to slow down global warming?
- In what ways could global warming change future weather patterns?

TEXT 3

The greenhouse effect

Why are the greenhouse gases dangerous for our environment?

Greenhouse gases are dangerous because their heating effect is analogous to the manner in which the glass of a greenhouse traps the sun's radiation to warm the air inside the greenhouse.

With the greenhouse effect, warmth from the Sun heats the surface of the Earth, which then radiates energy back out into space. Some of this outgoing radiation, which is nearly all in the **infrared region of the spectrum**, is trapped¹ in the atmosphere by so-called greenhouse gases. For instance, **water vapour** strongly absorbs radiation with wavelengths between 4 and 7 micrometers, and carbon dioxide absorbs radiation with wavelengths between 13 and 19 micrometers. The trapped radiation warms the lower part of the Earth's atmosphere, the troposphere. This warmed air radiates energy – again, largely in the infrared region of the spectrum – in all directions. Some of the radiation works its way up and out of the atmosphere, but some finds its way back down to the Earth's surface, keeping it hotter than it would otherwise be.

Our planet is getting warmer and warmer. Burning fuels are releasing **polluting** gases into the air continuously. These gases then act like the glass in a greenhouse and

keep the heat in – this effect leads to **global warming**. Carbon dioxide gas is the most important greenhouse gas, and millions of tons of it are produced by the petrol, gas and coal we burn every day.

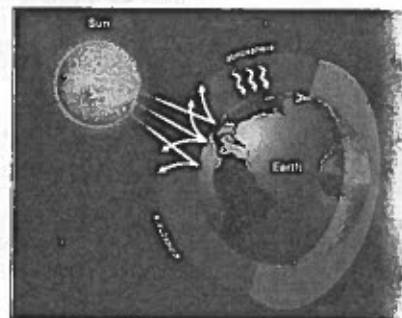
What might happen in a warmer World? Scientists have predicted what the weather will be like in the future: destructive **droughts** could strike² more often and places that grow crops at the moment could turn into semi-deserts; forests could decline and change and wildlife would have to find new habitats.

As ice on Greenland and in Antarctica **melts**, the seas could creep higher onto the land and large areas of lower land could be submerged.

Some scientists think that we should act immediately to slow down the global warming.

The future may lie in finding alternative ways of obtaining energy that do not involve using fossil fuels. For example solar and wind energy.

(Adapted from *Polo Liceale* website)



¹ *trapped*: held tightly so that it cannot move

² *strike*: to happen suddenly and have a harmful or damaging effect on something

TECHNICAL ENGLISH

| | | | | | |
|---------------------------------|--|--|----------------|-----------------------|--|
| drought | siccità | | global warming | riscaldamento globale | |
| infrared region of the spectrum | regione dei raggi infrarossi dello spettro | | (to) melt | sciogliersi | |
| polluting | inquinante | | water vapour | vapore acqueo | |

7 Read Text 4 and explain why some people are sceptical about global warming.

TEXT 4

How will global warming affect Britain's weather?

Sceptics have seized on last winter's snow and record low temperatures as proof that global warming is nonsense. But as Britain makes up just 0.05 per cent of the world's surface, what happens in one tiny part of the planet can hardly be regarded as representative. In fact, on a global scale, last year was one of the warmest ever. That suggests it would be dangerous to dismiss the predictions of global warming for future weather. The trouble is, the predictions themselves are pretty broad-brush. Put simply, they suggest that while **average temperature** will creep upward there are also likely to be more extremes, with severe winters mixed in with **sweltering** summers.

(Winter 2010-2011: from *Focus* – April 2011).

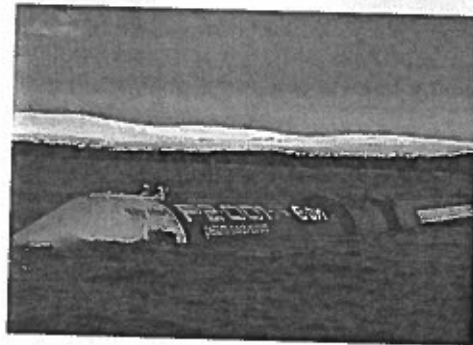
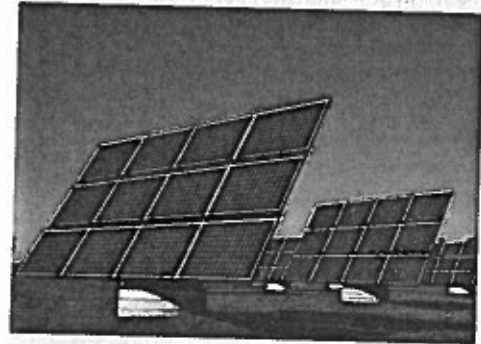
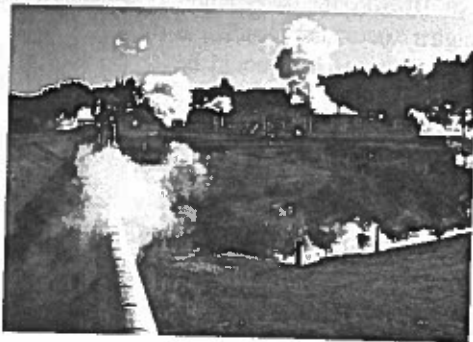
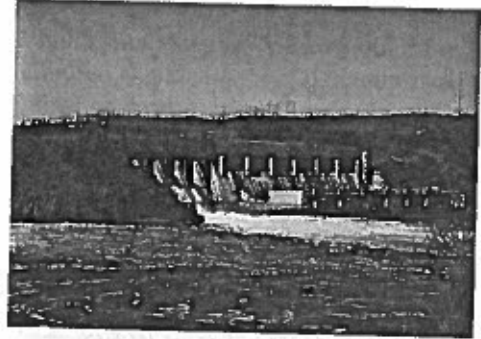
TECHNICAL ENGLISH

| | | | | |
|---------------------|-------------------|--|------------|----------------------|
| average temperature | temperatura media | | sweltering | molto caldo ed afoso |
|---------------------|-------------------|--|------------|----------------------|

Alternative Sources of Energy



- 8 **Brainstorming** Work in groups and try to list the alternative sources of energy that you know and where they are used. What do you recognise in these pictures? Describe what you see (sources, places, components, etc.).



- 9 Read all the excerpts below and prepare a poster with the pros and cons of the various alternative sources.

TEXT 5

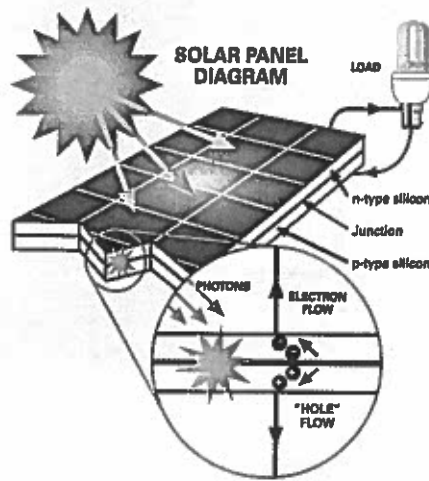
Solar energy

The Sun is an extremely powerful energy source, and solar radiation is by far the largest source of energy that reaches Earth, but when it hits the Earth's surface this energy is quite low intensity. This is partly because the Earth's atmosphere and the clouds absorb nearly 54% of all incoming sunlight.

In the 20th century, solar energy became increasingly attractive as an energy source because, unlike fossil fuels such as coal, oil and natural gas, reserves are virtually inexhaustible and it does not pollute. The sunlight that reaches the ground is made up of nearly 50% visible light, 45% infrared radiation, and small amounts of ultraviolet light and other forms of

electromagnetic radiation. This radiation can be converted into either thermal or electrical energy.

It is easier to convert solar energy into heat (thermal energy) using **flat-plate collectors**. The most widely used flat-plate collectors consist of a blackened¹ metal plate, covered with one or two sheets² of glass, that are heated by the sunlight that falls on the plate. Solar Panels are mainly used for hot-water heating and **house heating**.



are connected together, as in modern solar batteries, more than one kilowatt of electric power can be generated but these larger units are very expensive as they require huge and costly assemblies of these cells and so far, they have been used only to provide power for weather and communication satellites. So, the potential for solar energy is enormous; unfortunately the current high cost of **collecting, converting and storing** it have made it less attractive as an exploitable energy source. However,

Solar radiation on the other hand can be converted directly into electricity using **photovoltaic cells**. In these cells, a small electrical voltage is generated when light strikes the junction between a metal and a semiconductor (such as silicon). The voltage generated by a single photovoltaic cell is very low which is why, so far, they have mainly been used for low-power applications, for example calculators and watches. However, if large numbers of individual cells

recent government grants in the UK have led to an increase in the use of photovoltaic (PV) cells for industrial and domestic use.

(Adapted excerpt from the website of *Encyclopædia Britannica*.)

¹ *blackened*: dimmed, darkened

² *sheets*: layers

TECHNICAL ENGLISH

| | | | |
|----------------------|-----------------------------------|---------------|--------------------------------|
| (to) collect | raccogliere | (to) convert | convertire |
| flat-plate collector | collettore (solare termico) piano | house heating | riscaldamento in un'abitazione |
| photovoltaic cells | celle fotovoltaiche | (to) store | immagazzinare |

10 A Find out about solar energy production in your country.

- How much is produced; where, and what it is used for.
- Government policy on solar energy.

B Prepare an oral report on the current situation in your country and decide what you think should be done regarding solar energy in the future.

11 Read the following passages from the website of Hydro, the company supplying energy to Norway, and:

- make notes in order to describe Hydro's project in Havøygavlen
- make a record (chart) of the results so far
- list the pros and cons of using wind power
- discuss its possible future uses.

TEXT 6

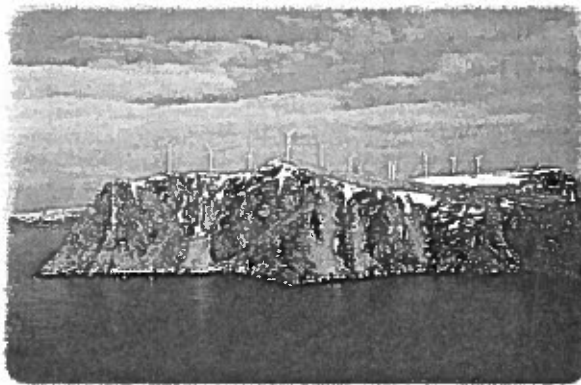
Wind power

The 16 turbines in the Havøygavlen Wind Park in northern Norway guard the fishing hamlet¹ of Havøysund on the Barents Sea like friendly giants. Havøygavlen is the first **wind power** project carried out by Hydro – the National Company for Energy – though several others are under consideration. The project provides light and warmth for 5,000 to 6,000 homes (estimated on the basis of an annual consumption averaging 20,000 kW/h per household), or five times the number of inhabitants in Havøysund itself.

How a wind turbine works

A wind **turbine** operates automatically:

- it self-starts when the wind reaches an average speed of 3–5 m/s;
- it adjusts the pitch of its rotor blades to maintain an effective operating speed regardless of the strength of the wind, and to protect itself from strong winds;
- output increases with wind speed until it reaches 13–14 m/s. If the average wind speed exceeds the operational limit of 25 m/s, the turbine stops;
- when the wind drops back below restart speed, the safety systems will reset automatically.



Havøygavlen, the world's most northerly wind park.

Rapidly growing market

Surplus power from the project is transmitted through the **power grid** to other locations that need it. Wind power represents the most rapidly growing electricity market in Europe. Driving this growth are the European Commission's directives (issued in 2003, 2007 and in 2009) on renewable energy. In order to achieve just half of the EU target, 1,600 wind parks the same size as Havøygavlen's will have to be built. In Norway, Hydro has already secured other locations suitable for development, so Norway will also be a major energy supplier to Europe in the future. Norway offers the combination of optimal wind conditions and low population density, making it easier to develop major wind parks. It is important to have geographical diversity and a wide range of energy sources, so Hydro is therefore also looking to the UK, which also has good wind conditions.

A changing industry

Wind park development involves both technical and political challenges. When developing wind parks, consideration needs to be given to their visual impact, to flora and fauna as well as to local commercial and leisure interests. Moreover, an infrastructure needs to be available to establish the wind park, while the power grid in the area has to be capable of transporting the power to the market.

N.B. Don't forget that wind power depends on there being wind! Therefore traditional sources of power (power stations) have to be maintained (see the Utsira project later on page 145 in this Unit).

¹ *hamlet*: villaggio

TECHNICAL ENGLISH

power grid rete di distribuzione dell'energia

turbine turbina

wind power energia eolica

12 Read Text 7 and make notes so as to answer these questions.

- What is tidal energy?
- How is it produced?
- Describe some projects in progress and future implementations.

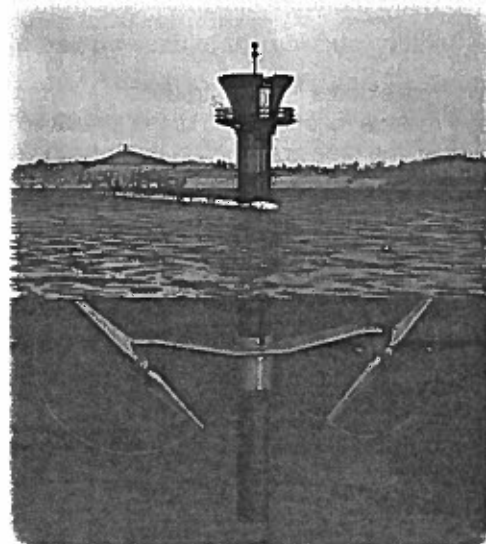
TEXT 7

Tidal power generator.

Tidal energy

Tidal energy is a renewable source of energy driven by the **gravitational pull** of the sun and moon, and with no carbon dioxide emissions. It's a sustainable energy resource where the daily production is entirely predictable.

Hammerfest Strøm AS, a Norwegian company was formed to develop **commercially-viable power technology** using the **kinetic energy** of the tide and is currently developing technology to exploit¹ tidal currents.



A fully operational 300 kW prototype tidal turbine has been running in Norway since 2003 and has achieved good results. It's the world's first tidal turbine to supply electricity directly to the onshore grid.

Thanks to its successful trial, the tidal turbine is front runner for commercial projects being planned off the coasts of Scotland and Ireland.

In the autumn of 2008, Hammerfest Strøm signed

an intention agreement with Scottish Power to further develop tidal technology in the UK.

A 1 MW turbine is currently under development.

(Adapted from the, now extinct, *UK Sustainable Development Commission* website. The SDC was closed down in March 2011)

¹ *exploit*: use something in order to gain as much from it as possible

TECHNICAL ENGLISH

| | |
|---|--|
| commercially-viable power technology | tecnologia legata alla produzione di energia commercialmente sostenibile |
| gravitational pull | attrazione gravitazionale |
| kinetic energy | energia cinetica |
| tidal | marea |

13 Read Text 8 in detail and answer the following questions.

- Where is geothermal energy released from?
- How is heat generated?
- Where can geothermal energy be used?
- What are the advantages of geothermal energy?

TEXT 8

Geothermal energy

Geothermal energy is a technology in which energy from the core of the Earth can be utilised for electricity and heat production in almost any location.

Geothermal energy is heat naturally present everywhere. This energy is released from the core of the Earth, and heat is continuously generated by the decay of radioactive isotopes in the crust and in the mantle, a highly viscous layer directly under the crust.

Geothermal energy is renewable and environmental friendly and offers many advantages: a high degree of availability, low emissions and insignificant dependence on weather conditions. Next generation technologies may provide a game-changing energy option for electricity production.

Geothermal energy has been used in Iceland for many decades to provide heating for houses from the many hot springs there.

(Adapted from Statoil website)



Geothermal power station.

TECHNICAL ENGLISH

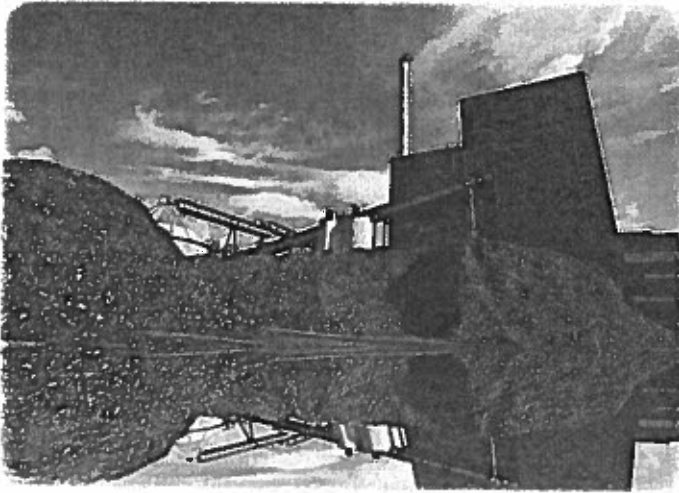
| | | | | | |
|--------------------------|--------------------|--------------|------------------|---------------|----------------|
| core | centro | crust | crosta terrestre | decay | decomposizione |
| geothermal energy | energia geotermica | layer | strato | mantle | mantello |

- 14 Read the essay below, divide it into paragraphs and highlight the main information in each paragraph. Then prepare a three minute speech in which you explain what bio-energy is and support, or oppose developing it.

TEXT 9

Bio-energy

The European Industrial Initiative on **bio-energy** addresses the technical and economic barriers to the further development and accelerated commercial deployment of bio-energy technologies for widespread sustainable exploitation of biomass¹ resources, aiming to ensure at least 14% bio-energy in the EU energy mix by 2020, and at the same time to guarantee greenhouse gas (GHG) emission savings of 60% for bio-fuels and bio-liquids under the sustainability criteria of the new RES Directive².



Bio-fuel power plant.

Bio-energy encompasses a chain of technologies from the production of biomass in a sustainable manner, meaning cultivation, **harvesting**, transportation, storage and eventual pre-treatment before use in a conversion process to produce the final energy, **bio-fuel** or chemical feedstock. While many technologies in use are quite mature, there is still considerable work to do to ensure that a minimum sustainability threshold is exceeded. Combined production of heat and electricity (CHP) is moving to wide commercial exploitation in **co-firing** systems with fossil fuels, particularly coal, while efficiency and scale of operation in purely biomass fired systems still needs some development before optimum efficiencies may be achieved. Production of bio-fuels from ligno-cellulosic biomass is only at the pilot scale, although demonstration projects will be on-line by 2010. Bio-refineries are some way behind ligno-cellulosic bio-fuel production

and are unlikely to be fully demonstrated by 2015. Cost of investment is steadily being reduced for all bio-energy systems. Only approximate figures for ligno-cellulosic bio-fuel production can be given in the absence of large-scale demonstration performance data. With the exception of biomass co-firing in fossil power plants and bio-gas production from agricultural residues, all other technologies still require considerable research and development.

The EU proposes to carry out an ambitious demonstration programme of different bio-energy pathways at a scale appropriate to the level of their maturity – pilot plants, pre-commercial demonstration or full industrial scale. Up to about 30 such plants will be built and operated across Europe to take full account of differing geographical and climate conditions and logistical constraints. A longer term research programme will support the bio-energy industry development beyond 2020. The cost of such a European programme is estimated at €9 billion over the next ten years.

(Source: SETIS website)

¹ *biomass*: as a renewable energy source, is biological material from living, or recently living organisms. As an energy source, biomass can either be used directly, or converted into other energy products such as biofuel

² *RES Directive*: the Renewable Energy Sources (RES) EU Directive came into force in 2009. It seeks to promote renewable energy and the EU has adopted a binding target of 20% final energy consumption from renewable energy by 2020. If properly transposed into national law, the RES Directive will become the most ambitious piece of legislation on renewable energy in the world

TECHNICAL ENGLISH

| | | | | | | |
|------------------|---|------------|--|-------------------|------------------------|--|
| | bio-energy | bioenergia | | bio-fuel | combustibile biologico | |
| co-firing | co-combustione (combustione contemporanea di due materiali diversi) | | | harvesting | raccolta | |