МЕТОДИЧНІ РЕКОМЕНДАЦІЇ
до практичних занять
з дисципліни «Іноземна мова професійного спрямування»

для здобувачів освітнього ступеня «магістр»
спеціальності 101 «Екологія»
денної та заочної форм навчання

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Методичні рекомендації до практичних занять з навчальної М 54 дисципліни «Іноземна мова професійного спрямування» для здобувачів освітнього ступеня «магістр» спеціальності 101 «Екологія» денної та заочної форм навчання [Електронний ресурс] / [упоряд. Д. М. Колесник, І. А. Рябцева, Л. М. Усик] ; М-во освіти і науки України, Черкас. держ. технол. ун-т. – Черкаси : ЧДТУ, 2021. – 25 с. – Назва з титульного екрана.

Методичні рекомендації містять автентичні тексти з фаху та вправи до них для розвитку навичок читання, поповнення активного словникового запасу фаховою лексикою, формування умінь та навичок реферування текстів за спеціальністю та ведення дискусій на професійні теми для здобувачів освітнього ступеня магістра спеціальності «Екологія» денної та заочної форм навчання.

Виробничо-практичне
електронне видання комбінованого використовування

Колесник Дарина Михайлівна
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Усик Людмила Миколаївна

МЕТОДИЧНІ РЕКОМЕНДАЦІЇ
до практичних занять з навчальної дисципліни
«Іноземна мова професійного спрямування»
для здобувачів освітнього ступеня «магістр»
спеціальності 101 «Екологія» денної та заочної форм навчання

В авторській редакції

ЗМІСТ

ВСТУП

Навчально-методичне видання з дисципліни «Іноземна мова професійного спрямування» призначені для здобувачів освітнього рівня «магістр» спеціальності 101 «Екологія». Запропоновані методичні вказівки також будуть корисними для організації самостійної роботи здобувачів.

Посібник складається з десяти розділів, кожний із яких є самостійним, тому порядок виконання можливо змінювати чи проходити розділи вибірково. На початку кожного розділу містяться вправи (Task 1), виконання яких допомагає спрогнозувати зміст тексту, призначеного для опрацювання, тим самим налаштовуючи студента на сприйняття навчального матеріалу. Самі тексти було вибрано із автентичного джерела, що готує здобувачів до опрацювання інформаційних та наукових джерел під час майбутнього працевлаштування або написання кваліфікаційної чи наукової роботи. Наступне завдання (Task 2) містить вправи, що формують навички видобувати повну інформацію з тексту, аналізувати викладені в ньому факти, порівнювати отримані дані, узагальнювати та формувати власні висновки. Завдання 3 (Task 3) має на меті поповнення активного лексичного запасу здобувачів. Наступне завдання (Task 4) вдосконалює вміння здобувача здійснювати швидкий пошук основної тематичної лінії тексту, сформулювати його основну ідею, знаходити і розуміти основну інформацію, розрізняти основну думку та другорядну інформацію. Остання група вправ призначена для самостійного опрацювання і дозволяє як остаточно сформувати у здобувача різноманітні техніки читання, так і використати отриману інформацію і нову лексику в продуктивних видах мовленнєвої діяльності (говоріння та письмо). В цілому система вправ направлена на формування умінь та навичок реферування текстів за спеціальністю та ведення дискусій на професійні теми.

Під час підготовки запропонованого видання було враховано вимоги чинних нормативно-правових документів Міністерства освіти і науки України, законодавчих актів України про видавничу діяльність, державних стандартів України та нормативних документів ЧДТУ.

Методичні рекомендації сформовано відповідно до «Положення про порядок планування, підготовки та затвердження навчально-методичного забезпечення», затвердженого Вченою радою ЧДТУ 19 жовтня 2016 р. (Протокол №4), «Положення про навчально-методичний комплекс навчальної дисципліни», затвердженого Вченою радою ЧДТУ 15 грудня 2016 р. (Протокол № 6).

Unit 1. RENEWABLE RESOURCES

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

From a human standpoint, a resource is anything obtained from the environment to meet our needs and wants. Conservation is the management of natural resources with the goal of minimizing resource waste and sustaining resource supplies for current and future generations.

Some resources, such as solar energy, fresh air, wind, fresh surface water, fertile soil, and wild edible plants, are directly available for use. Other resources such as petroleum, iron, water found underground, and cultivated crops, are not directly available. They become useful to us only with some effort and technological ingenuity. For example, petroleum was a mysterious fluid until we learned how to find, extract, and convert (refine) it into gasoline, heating oil, and other products that could be sold.

Solar energy is called a perpetual resource because it is renewed continuously and is expected to last at least 6 billion years as the sun completes its life cycle.

On a human time scale, a renewable resource can be replenished fairly quickly (from hours to hundreds of years) through natural processes as long as it is not used up faster than it is renewed. Examples include forests, grasslands, fisheries, freshwater, fresh air, and fertile soil.

The highest rate at which a renewable resource can be used indefinitely without reducing its available supply is called its sustainable yield. When we exceed a renewable resource's natural replacement rate, the available supply begins to shrink, a process known as environmental degradation.

There are three types of property or resource rights. One is private property where individuals or firms own the rights to land, minerals, or other resources. Another is common property where the rights to certain resources are held by large groups of individuals. A third category consists of open access renewable resources, owned by no one and available for use by anyone at little or no charge. Examples of such shared renewable resources include clean air, underground water supplies, and the open ocean and its fish.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 12-13)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.

Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.

Exercise 3. Define which part of speech the new words belong to.

Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.

Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.

Exercise 2. Write one sentence stating your interest in the article.

Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?

Exercise 4. Try to work out why you had difficulty. What was the main reason? Tick (√) and explain:
   ☐ lack of previous knowledge on the topic
   ☐ grammatical problems
   ☐ inefficient reading strategies
   ☐ vocabulary
   ☐ difficulty in recognising and understanding the main points
   ☐ other things – explain

Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.

Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.

Exercise 2. Reading: Read these articles from the library or internet.

Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.

Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.

Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 2. NON-RENEWABLE RESOURCES

Task 1. Before reading.

Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.

Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.

Exercise 1. Is the author trying to *persuade* or *inform* you?

Exercise 2. Define any new words and make a list.

Exercise 3. Write down the main idea of each paragraph.

Nonrenewable resources exist in a fixed quantity, or *stock,* in the earth's crust. On a time scale of millions to billions of years, geological processes can renew such resources. But on the much shorter human time scale of hundreds to thousands of years, these resources can be depleted much faster than they are formed. Such exhaustible resources include *energy resources* (such as coal and oil), *metallic mineral resources* (such as copper and aluminum), and *nonmetallic mineral resources* (such as salt and sand).

As such resources are depleted, human ingenuity can often find substitutes. For example, during this century, a mix of renewable energy resources such as wind, the sun, flowing water, and the heat in the earth's interior could reduce our dependence on nonrenewable fossil fuels such as oil and coal. Also, various types of plastics and composite materials can replace certain metals. But sometimes there is no acceptable or affordable substitute. Some nonrenewable resources, such as copper and aluminum, can be recycled or reused to extend supplies.

Reuse is using a resource over and over in the same form. For example, glass bottles can be collected, washed, and refilled many times. Recycling involves collecting waste materials and processing them into new materials. For example, discarded aluminum cans can be crushed and melted to make new aluminum cans or other aluminum products. But energy resources such as oil and coal cannot be recycled. Once burned, their energy is no longer available to us.

Recycling nonrenewable metallic resources takes much less energy, water, and other resources and produces much less pollution and environmental degradation than exploiting virgin metallic resources. Reusing such resources takes even less energy and other resources and produces less pollution and environmental degradation than recycling does.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 13-14)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
Exercise 2. Write one sentence stating your interest in the article.
Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?

Exercise 4. Try to work out why you had difficulty. What was the main reason? Tick (√) and explain:
- ☐ lack of previous knowledge on the topic
- ☐ grammatical problems
- ☐ inefficient reading strategies
- ☐ vocabulary
- ☐ difficulty in recognising and understanding the main points
- ☐ other things – explain

Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.
Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.
Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.
Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 3. ENVIRONMENTALLY SUSTAINABLE SOCIETIES

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

The ultimate goal is an environmentally sustainable society – one that meets the current and future basic resource needs of its people in a just and equitable manner without compromising the ability of future generations to meet their basic needs. Imagine you win $1 million in a lottery. If you invest this money and earn 10% interest per year, you will have a sustainable income of $100,000 a year that you can live off indefinitely, while allowing interest to accumulate on what is left after each withdrawal, without depleting your capital. Do you believe that the society you live in is on an unsustainable path?

$200,000 per year, even while allowing interest to accumulate, your capital of $1 million will be gone early in the seventh year. Even if you spend only $110,000 per year and still allow the interest to accumulate, you will be bankrupt early in the

eighteenth year. The lesson here is an old one: *Protect your capital and live off the income it provides.* Deplete or waste your capital, and you will move from a sustainable to an unsustainable lifestyle.

The same lesson applies to our use of the earth's natural capital—the global trust fund that nature provides for us. *Living sustainably* means living off natural income, the renewable resources such as plants, animals, and soil provided by natural capital. This means preserving the earth's natural capital, which supplies this income, while providing the human population with adequate and equitable access to this natural income for the foreseeable future.

The bad news is that, according to a growing body of scientific evidence, we are living unsustainably by wasting, depleting, and degrading the earth's natural capital at an exponentially accelerating rate. In its summary statement, the report warned that "human activity is putting such a strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted." The good news is that the report suggests we have the knowledge and tools to conserve the planet's natural capital, and it describes commonsense strategies for doing this.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 9-10)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
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Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?
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  ☐ inefficient reading strategies
  ☐ vocabulary
  ☐ difficulty in recognising and understanding the main points
  ☐ other things – explain
Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.
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Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.
Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 4. ECOLOGICAL FOOTPRINTS

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

Many people in developing countries struggle to survive. Their individual use of resources and the resulting environmental impact is low and is devoted mostly to meeting their basic needs. By contrast, many individuals in more affluent nations consume large amounts of resources way beyond their basic needs. Supplying people with resources and dealing with the resulting wastes and pollution can have a large environmental impact.

We can think of it as an ecological footprint—the amount of biologically productive land and water needed to supply the people in a particular country or area with resources and to absorb and recycle the wastes and pollution produced by such resource use. The per capita ecological footprint is the average ecological footprint of an individual in a given country or area. If a country's, or the world's, total ecological footprintis larger than its *biological capacity* to replenish its renewable resources and absorb the resulting waste products and pollution, it is said to have an *ecological deficit.*

The World Wildlife Fund (WWF) and the Global Footprint Network estimated that in 2003 (the latest data available) humanity's global ecological footprint exceeded the earth's *biological capacity* by about 25%. That figure was about 88% in theworld's high-income countries, with the United States having the world's largest total ecological footprint. If the current exponential growth in the use of renewable resources continues, the Global Footprint Network estimates that by 2050

humanity will be trying to use twice as many renewable resources as the planet can supply. The per capita ecological footprint is an estimate of how much of the earth's renewable resources an individual consumes.

After the oil-rich United Arab Emirates, the United States has the world's second largest per capita ecological footprint. In 2003 (the latest data available), its per capita ecological footprint was about 4.5 times the average global footprint per person, 6 times larger than China's per capita footprint, and 12 times the average per capita footprint in the world's low-income countries. According to William Rees and Mathis Wackernagel, the developers of the ecological footprint concept, it would take the land area of about *five more planet earths* for the rest of the world to reach current U.S. levels of consumption with existing technology.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, p.14).

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
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Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
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☐ vocabulary
☐ difficulty in recognising and understanding the main points
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Compare the ideas with your partner or in groups.
Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.

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Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.

Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 5. SOURCES OF POLLUTION

Task 1. Before reading.

Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.

Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.

Exercise 1. Is the author trying to *persuade* or *inform* you?

Exercise 2. Define any new words and make a list.

Exercise 3. Write down the main idea of each paragraph.

Pollution Comes from a number of sources. Pollution is any in the environment that is harmful to the health, survival, or activities of humans or other organisms. Pollutants can enter the environment naturally, such as from volcanic eruptions, or through human activities, such as burning coal and gasoline and discharging chemicals into rivers and the ocean.

The pollutants we produce come from two types of sources. Point sources are single, identifiable sources. Examples are the smokestack of a coal-burning power or industrial plant, the drainpipe of a factory, and the exhaust pipe of an auto mobile. Nonpoint sources are dispersed and often difficult to identify. Examples are pesticides blown from the land into the air and the runoff of fertilizers and pesticides from farmlands, lawns, gardens, and golf courses into streams and lakes. It is much easier and cheaper to identify and control or prevent pollution from point sources than from widely dispersed nonpoint sources.

There are two main types of pollutants. Biodegradable pollutants are harmful materials that can be broken down by natural processes. Examples are human sewage and newspapers. Nondegradable pollutants are harmful materials that natural processes cannot break down. Examples are toxic chemical elements such as lead, mercury, and arsenic. Pollutants can have three types of unwanted effects. *First,* they can disrupt or degrade life-support systems for humans and other species. *Second,* they can damage wildlife, human health, and property. *Third,* they can create nuisances such as noise and unpleasant smells, tastes, and sights.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 16-17)

Task 3. After reading. Vocabulary exercises.

Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.

Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.

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Task 4. After reading. Comprehension exercises.

Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.

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- ☐ inefficient reading strategies
- ☐ vocabulary
- ☐ difficulty in recognizing and understanding the main points
- ☐ other things – explain

Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.

Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.

Exercise 2. Reading: Read these articles from the library or internet.

Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.

Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.

Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 6. PREVENTING AND CLEANING UP POLLUTION

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

We can clean up pollution or prevent it. Consider the smoke produced by a steel mill. We can try to deal with this problem by asking two entirely different questions. One question is "how can we clean up the smoke?" The other is "how can we avoid producing the smoke in the first place?" The answers to these questions involve two different ways of dealing with pollution. One is pollution cleanup, or output pollution control, which involves cleaning up or diluting pollutants after they have been produced. The other is pollution prevention, or input pollution control, which reduces or eliminates the production of pollutants. Environmental scientists have identified three problems with relying primarily on pollution cleanup.

First, it is only a temporary bandage as long as population and consumption levels grow without corresponding improvements in pollution control technology. For example, adding catalytic converters to car exhaust systems has reduced some forms of air pollution. At the same time, increases in the number of cars and the total distance each car travels have reduced the effectiveness of this cleanup approach.

Second, cleanup often removes a pollutant from one part of the environment only to cause pollution in another. For example, we can collect garbage, but the garbage is then *burned* (perhaps causing air pollution and leaving toxic ash that must be put somewhere), *dumped* on the land (perhaps causing water pollution through runoff or seepage into groundwater), or *buried* (perhapscausing soil and groundwater pollution).

Third, once pollutants become dispersed into the environment at harmful levels, it usually costs too much or is impossible to reduce them to acceptable levels.

Pollution prevention (front-of-the-pipe) and pollution cleanup (end-of-the-pipe) solutions are both needed. But environmental scientists, some economists, and some major companies urge us to put more emphasis on prevention because it works better and in the long run is cheaper than cleanup.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, p.17).

Task 3. After reading. Vocabulary exercises.

Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use a dictionary.

Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.

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Task 4. After reading. Comprehension exercises.

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  □ lack of previous knowledge on the topic
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  □ inefficient reading strategies
  □ vocabulary
  □ difficulty in recognising and understanding the main points
  □ other things – explain

Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.

Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.

Exercise 2. Reading: Read these articles from the library or internet.

Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.

Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.

Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 7. POVERTY HAS HARMFUL ENVIRONMENTAL AND HEALTH EFFECTS

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to persuade or inform you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

Poverty occurs when people are unable to meet their basic needs for adequate food, water, shelter, health, and education. Poverty has a number of harmful environmental and health effects. The daily lives of half of the world's people, who are trying to live on the equivalent of less than $2 a day, are focused on getting enough food, water, and cooking and heating fuel to survive. Desperate for short-term survival, some of these people deplete and degrade forests, soil, grasslands, fisheries, and wildlife, at an ever-increasing rate. They do not have the luxury of worrying about long-term environmental quality or sustainability.

Poverty affects population growth. To many poor people, having more children is a matter of survival. Their children help them gather fuel (mostly wood and animal dung), haul drinking water, and tend crops and livestock. Their children also help to care for them in their old age (which is their 40s or 50s in the poorest countries) because they do not have social security, health care, and retirement funds.

While poverty can increase some types of environmental degradation, the reverse is also true. Pollution and environmental degradation have a severe impact on the poor and can increase poverty. Consequently, many of the world's desperately poor people die prematurely from several preventable health problems.

One such problem is malnutrition from a lack of protein and other nutrients needed for good health. The resulting weakened condition can increase the chances of death from normally nonfatal illnesses, such as diarrhea and measles. A second problem is limited access to adequate sanitation facilities and clean drinking water. More than 2.6 billion people (38% of the world's population) have no decent bathroom facilities. They are forced to use fields, backyards, ditches, and streams. As a result, more than 1 billion people – one of every seven – get water for drinking, washing, and cooking from sources polluted by human and animal feces. A third problem is severe respiratory disease and premature death from inhaling indoor air pollutants produced by burning wood or coal in open fires or in poorly vented stoves for heat and cooking.

According to the World Health Organization, these factors cause premature death for at least 7 million people each year. This amounts to about 19,200 premature deaths per day. Two-thirds of those dying are children younger than age 5. The news media rarely cover this ongoing human tragedy.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 18)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use the vocabulary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
Exercise 2. Write one sentence stating your interest in the article.
Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?
Exercise 4. Try to work out why you had difficulty. What was the main reason? Tick (√) and explain:
  ☐ lack of previous knowledge on the topic
  ☐ grammatical problems
  ☐ inefficient reading strategies
  ☐ vocabulary
  ☐ difficulty in recognising and understanding the main points
  ☐ other things – explain
Compare the ideas with your partner or in groups.
Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.
Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.
Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.
Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 8. CARRYING OUT a CONTROLLED SCIENTIFIC EXPERIMENT.

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

One way in which scientists learn about how nature works is to conduct a controlled experiment. To begin, scientists isolate variables, or factors that can change within a system or situation being studied. An experiment involving single-variable analysis is designed to isolate and study the effects of one variable at a time.

To do such an experiment, scientists set up two groups. One is the experimental group in which a chosen variable is changed in a known way, and the other is the control group in which the chosen variable is not changed. If the experiment is designed and run properly, differences between the two groups should result from the variable that was changed in the experimental group.

In 1963, botanist F. Herbert Bormann, forest ecologist Gene Likens, and their colleagues began carrying out a classic controlled experiment. The goal was to compare the loss of water and nutrients from an uncut forest ecosystem (the control site) with one that was stripped of its trees (the experimental site).

They built V-shaped concrete dams across the creeks at the bottoms of several forested valleys in the Hubbard Brook Experimental Forest in New Hampshire (Figure 2-1). The dams were anchored on impenetrable bedrock, so that all surface water leaving each forested valley had to flow across a dam where scientists could measure its volume and dissolved nutrient content.

In the first experiment, the investigators measured the amounts of water and dissolved plant nutrients that entered and left an undisturbed forested area (the control site) (Figure 2-1, left). These measurements showed that an undisturbed mature forest is very efficient at storing water and retaining chemical nutrients in its soils.

The next experiment involved setting up an experimental forested area. One winter, the investigators cut down all trees and shrubs in one valley (the experimental site), left them where they fell, and sprayed the area with herbicides to prevent the regrowth of vegetation. Then they compared the inflow and outflow of water and nutrients in this experimental site (Figure 2-1, right) with those in the control site (Figure 2-1, left) for 3 years.

With no plants to help absorb and retain water, the amount of water flowing out of the deforested valley increased by 30–40%. As this excess water ran rapidly

over the ground, it eroded soil and carried dissolved nutrients out of the deforested site. Overall, the loss of key nutrients from the experimental forest was six to eight times that in the nearby control forest.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 28)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use the vocabulary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
Exercise 2. Write one sentence stating your interest in the article.
Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?
Exercise 4. Try to work out why you had difficulty. What was the main reason? Tick (√) and explain:
- lack of previous knowledge on the topic
- grammatical problems
- inefficient reading strategies
- vocabulary
- difficulty in recognising and understanding the main points
- other things – explain

Compare the ideas with your partner or in groups.
Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.
Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.
Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.
Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 9. THE SCIENTIFIC CONSENSUS OVER GLOBAL WARMING

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

Based on measurements and models, it is clear that carbon dioxide and other gases in the atmosphere play a major role in determining the temperature of the atmosphere through a natural warming process called the *natural greenhouse effect.* Without the presence of these *greenhouse gases* in the atmosphere, the earth would be too cold for most life as we know it to exist, and you would not be reading these words. The earth's natural greenhouse effect is one of the most widely accepted theories in the atmospheric sciences and is an example of *reliable science.*

Since 1980, many climate scientists have been focusing their studies on three major questions:

- How much has the earth's atmosphere warmed during the past 50 years?
- How much of the warming is the result of human activities such as burning oil, gas, and coal and clearing forests, which add carbon dioxide and other greenhouse gases to the atmosphere?
- How much is the atmosphere likely to warm in the future and how might this affect the climate of different parts of the world?

To help clarify these issues, in 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (IPCC) to study how the climate system works, document past climate changes, and project future climate changes. The IPCC network includes more than 2,500 climate experts from 70 nations.

Since 1990, the IPCC has published four major reports summarizing the scientific consensus among these climate experts. In its 2007 report, the IPCC came to three major conclusions:

- It is *very likely* (a 90–99% probability) that the lower atmosphere is getting warmer and has warmed by about 0.74 C° (1.3 F°) between 1906 and 2005.
- Based on analysis of past climate data and use of 19 climate models, it is *very likely* (a 90–99% probability) that human activities, led by emissions of carbon dioxide from burning fossil fuels, have been the main cause of the observed atmospheric warming during the past 50 years.
- It is *very likely* that the earth's mean surface temperature will increase by about 3 C° (5.4 F°) between 2005 and 2100, unless we make drastic cuts in greenhouse gas emissions from power plants, factories, and cars that burn fossil fuels.

This scientific consensus among most of the world's climate experts is currently considered the most *reliable science* we have on this subject.

As always, there are individual scientists who disagree with the scientific consensus view. Typically, they question the reliability of certain data, say we don't have enough data to come to reliable conclusions, or question some of the hypotheses or models involved. However, in the case of global warming, they are in a distinct and declining minority.

Media reports are sometimes confusing or misleading because they present reliable science along with a quote from a scientist in the field who disagrees with the consensus view, or from someone who is not an expert in the field. This can cause public distrust of well-established reliable science, such as that reported by the IPCC, and may sometimes lead to a belief in ideas that are not widely accepted by the scientific com- munity.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 33)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use the vocabulary.

Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.

Exercise 3. Define which part of speech the new words belong to.

Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.

Exercise 2. Write one sentence stating your interest in the article.

Exercise 3. Were there any paragraphs you had difficulty in understanding? Which ones?

Exercise 4. Try to work out why you had difficulty. What was the main reason? Tick (√) and explain:
- lack of previous knowledge on the topic
- grammatical problems
- inefficient reading strategies
- vocabulary
- difficulty in recognising and understanding the main points
- other things – explain

Compare the ideas with your partner or in groups.

Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
Exercise 2. Reading: Read these articles from the library or internet.
Exercise 3. Speaking: Explain one of these articles to your class, explaining how it develops the article we have looked at.
Exercise 4. Speaking & listening: Discuss the relevance and application of the article(s) to your studies.
Exercise 5. Writing: Write a review of this topic based on the articles and your discussion. Work in pairs.

Unit 10. STATISTICS AND PROBABILITY

Task 1. Before reading.
Exercise 1. Read only the title. Predict 5 vocabulary items the article will contain.
Exercise 2. Skim the article. Write down what the main theme of the text is.

Task 2. While-reading.
Exercise 1. Is the author trying to *persuade* or *inform* you?
Exercise 2. Define any new words and make a list.
Exercise 3. Write down the main idea of each paragraph.

Statistics consists of mathematical tools used to collect, organize, and inter-pret numerical data. For example, suppose we weigh each individual in a population of 15 rabbits. We can use statistics to calculate the average weight of the population. To do this, we add up the weights of the 15 rabbits and divide the total by 15. Similarly, Bormann and Likens (Core Case Study) made many measurements of nitrate levels in the water flowing from their undisturbed and cut patches of forests (Figure 2-1) and then averaged the results to get the most reliable value.

Scientists also use the statistical concept of probability to evaluate their results. Probability is the chance that something will happen. For example, if you toss a nickel, what is the probability or chance that it will come up heads? If your answer is 50%, you are correct. The chance of the nickel coming up heads is ½, which can also be expressed as 50% or 0.5. Probability is often expressed as a number between 0 and 1 written as a decimal (such as 0.5). Now suppose you toss the coin 10 times and it comes up heads 6 times. Does this mean that the probability of it coming up heads is 0.6 or 60%? The answer is no because the sample size - the number of objects or events studied - was too small to yield a statistically accurate result. If you in- crease your sample size to 1,000 by tossing the coin 1,000 times, you are almost certain to get heads 50% of the time and tails 50% of the time.

It is important when doing scientific re- search to take samples in different places, in order to get a comprehensive evaluation of the variable being studied. It is

also critical to have a large enough sample size to give an accurate estimate of the overall probability of an event happening.

For example, if you wanted to study the effects of a certain air pollutant on the needles of pine trees, you would need to locate different stands of the same type of pine tree that are all exposed to the pollutant over a certain period of time. At each location, you would need to measure the levels of the pollutant in the atmosphere at different times and average the results. You would also need to make measurements of the damage (such as needle loss) to a large enough sample of trees in each location over a certain time period. Then you would average the results in each location and compare the results from all locations.

If the average results were consistent in different locations, you could then say that there is a certain probability, say 60% (or 0.6), that this type of pine tree suffered a certain percentage loss of its needles when exposed to a specified average level of the pollutant over a given time. You would also need to run other experiments to determine that natural needle loss, ex-treme temperatures, insects, plant diseases, drought, or other factors did not cause the needle losses you observed. As you can see, getting reliable scientific results is not a simple process.

(Tyler Miller G. Jr., Scott E. Spoolman. Essentials of Ecology, pp. 34)

Task 3. After reading. Vocabulary exercises.
Exercise 1. Work in pairs. Compare and discuss your list of the new vocabulary with your partner's. Work out the meaning of the new words together. If necessary, use the vocabulary.
Exercise 2. Divide the vocabulary into special vocabulary (terms) and general vocabulary.
Exercise 3. Define which part of speech the new words belong to.
Exercise 4. Use the new vocabulary in sentences of your own or find examples of their use.

Task 4. After reading. Comprehension exercises.
Exercise 1. Write one sentence stating what you learned from this article. Discuss your ideas in groups.
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 □ inefficient reading strategies
 □ vocabulary
 □ difficulty in recognising and understanding the main points
 □ other things – explain

Compare the ideas with your partner or in groups.
Exercise 5. Estimate your comprehension of the article: ___%

Task 5. Follow up exercises.
Exercise 1. Reference skills: Find other articles or texts on this topic from the library or internet.
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