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**ENGLISH FOR ECOLOGISTS**  
**(part 2)**

Методичні вказівки до практичних занять та самостійної роботи для здобувачів першого (бакалаврського) рівня вищої освіти освітньої програми «Екологія» галузі знань Е Природничі науки, математика та статистика, спеціальності Е2 Екологія денної та заочної форм навчання

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Видання містить теоретичний матеріал та практичні завдання, спрямовані на оволодіння здобувачами англійською мовою як засобом комунікації на професійному рівні, ознайомлення студентів із специфікою професійного мовлення та вироблення в них практичних навичок використання мови в спеціальності. Призначене для здобувачів освіти ОП «Екологія» підготовки бакалавра спеціальності Е2 Екологія денної та заочної форм навчання.

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## Unit 1

### Agricultural chemicals and organic farming

#### Reading

#### Pesticides, Herbicides, Fungicides

Chemical plant protection products have been widely used in agriculture for decades. **Pesticides, herbicides, and fungicides** each play a different role in protecting crops, but they also create serious environmental concerns. Pesticides are designed to kill insects that feed on leaves, roots, or fruits. Herbicides target weeds that compete with crops for nutrients, sunlight, and water. Fungicides are used to control fungal diseases, such as mildew or rust, which can spread quickly under warm and humid conditions.

Farmers use these chemicals because they help secure large harvests and prevent financial losses. For example, some insects can destroy up to 70% of a crop if left uncontrolled. Weeds grow faster than many cultivated plants, and fungal infections can ruin entire fields within days. In this sense, pesticides and other chemicals provide stability in food production and help ensure that markets remain supplied. However, chemical protection also has significant disadvantages. **Overuse** of pesticides can kill beneficial insects such as bees, butterflies, and ladybugs. These insects are essential for pollination, which means that without them many crops would not develop fruit at all. Herbicides reduce plant diversity, leaving fields vulnerable to erosion and loss of soil nutrients. Fungicides often remain in soil and water long after they have been applied, affecting microorganisms that are essential for healthy soil structure.

Another problem is **resistance**. If pests are exposed to the same chemical for many years, they may evolve resistance, meaning the pesticide becomes ineffective. As a result, farmers start using higher doses or stronger chemicals, creating a dangerous cycle of increasing toxicity.

There are also human health concerns. Chemical residues sometimes remain on fruits and vegetables, and although they are usually below legal limits, long-term exposure

may still be harmful. People working on farms are at the highest risk, especially if they do not use protective equipment.

Today, many countries encourage farmers to use pesticides more responsibly. This includes better training, modern spraying equipment, and regular monitoring of pest levels. Many farmers now combine chemicals with natural solutions, such as biological control, crop rotation, or pheromone traps. While chemical pesticides are unlikely to disappear completely, the trend is moving toward safer, more sustainable agriculture.

### Vocabulary Point

**pesticide** — a chemical used to kill insects that damage crops

**herbicide** — a substance used to destroy unwanted plants (weeds)

**fungicide** — a chemical that prevents or kills fungal diseases

**beneficial insects** — insects that help agriculture, for example by pollination

**pollination** — the process by which plants reproduce with the help of insects

**chemical residues** — small amounts of chemicals left on food or in the environment

**resistance** — the ability of pests to survive chemicals after repeated exposure

**crop yield** — the amount of agricultural production

**overuse** — excessive or unnecessary use

**environmental impact** — the effect something has on nature

### Vocabulary Practice

#### A. Complete the sentences

(pesticides / fungicides / residues / herbicides / resistance)

1. Farmers apply \_\_\_\_\_ to protect crops from insects that feed on leaves and roots.
2. \_\_\_\_\_ are often sprayed to prevent weeds from competing with crops for water.
3. In wet climates, \_\_\_\_\_ are necessary to stop fungal diseases from spreading.
4. Chemical \_\_\_\_\_ may remain on fruit even after washing.
5. Over time, insects can develop \_\_\_\_\_ to the same pesticide.

6. If chemicals are overused, pests may become harder to control due to \_\_\_\_\_.
7. \_\_\_\_\_ should be applied carefully to avoid harming beneficial insects.
8. Fungicides are used when fungal infections threaten the \_\_\_\_\_ of crops.

## B. Word formation in context

1. Excessive chemical use causes serious environmental \_\_\_\_\_. (damage)
2. Pesticides must be applied \_\_\_\_\_ to protect ecosystems. (care)
3. Some insects are naturally \_\_\_\_\_ to certain chemicals. (resist)
4. Chemical farming practices are often \_\_\_\_\_ to soil biodiversity. (harm)
5. Farmers are becoming more \_\_\_\_\_ of pesticide risks. (awareness)

## Grammar — Conditionals

Conditionals describe the result of a certain condition. The *if* clause tells you the condition (*If I hadn't been ill*) and the main clause tells you the result (*I would have gone to the party*). The order of the clauses does not change the meaning.

The third conditional is used to imagine a different past. We imagine a change in a past situation and the different result of that change. In third conditional sentences, the structure is usually: *If* + past perfect >> *would have* + past participle.

Mixed conditionals are a combination of two types of conditional patterns, usually the second and third conditionals. We can have a third conditional in the **if**-clause and a second conditional in the main clause, or a second conditional in the **if**-clause and a third conditional in the main clause. We can use mixed conditionals when we imagine a past change with a result in the present or a present change with a result in the past.

## Grammar Tasks

### A. Complete the sentences (Type 1, 2, 3, Mixed).

1. If farmers **use** too many pesticides, beneficial insects \_\_\_\_\_ (disappear).
2. If herbicides were banned completely, many farmers \_\_\_\_\_ (struggle) to control weeds.
3. If the weather had been more humid, the fungal disease \_\_\_\_\_ (spread) more quickly.
4. Crops would grow better if farmers \_\_\_\_\_ (combine) chemicals with natural methods.
5. If a worker doesn't wear protective equipment, he \_\_\_\_\_ (risk) health problems.
6. If insects hadn't developed resistance, farmers \_\_\_\_\_ (not increase) chemical doses.
7. If more countries supported organic farming, chemical pollution \_\_\_\_\_ (decrease).
8. Plants would have died last year if fungicides \_\_\_\_\_ (not be) applied in time.

9. If farmers reduced fertilizer use, rivers \_\_\_\_\_ (become) cleaner.
10. If industries had followed safety rules, the river \_\_\_\_\_ (not be) polluted.
11. Contamination would decrease if wastewater plants \_\_\_\_\_ (upgrade).
12. If heavy metals didn't stay in soil for centuries, they \_\_\_\_\_ (be) less dangerous.
13. If the storm had not occurred, chemicals \_\_\_\_\_ (not enter) the lake.

### **B. Transform into Conditionals.**

1. Pesticides harm bees. → *Imagine the opposite.*
2. Farmers increased chemical use. → *Create a Third Conditional sentence.*

### **C. Make your own conditional sentences using these prompts:**

- a) groundwater / pesticides
- b) sewage treatment / modern technology

## **Speaking and Writing**

### **Speaking**

1. Explain the difference between pesticides, herbicides, and fungicides using examples.
2. Do you think chemical pesticides are necessary in modern agriculture? Why / why not?
3. Imagine you are a farmer. How would you decide when to use chemicals?

### **Writing**

1. Write a short paragraph (120–150 words) explaining one environmental risk of pesticide overuse.
2. Write a short opinion text: "*Chemical crop protection does more harm than good.*" Do you agree?

## **Text 2**

### **Soil and Water Contamination**

Soil and water contamination is one of the most urgent environmental challenges in the modern world. It occurs when harmful substances enter the ground or waterways and change their natural composition. These substances include pesticides, fertilizers, oil, plastic particles, industrial chemicals, heavy metals, and untreated wastewater.

Once contamination happens, it can take decades or even centuries for nature to recover on its own.

A major source of contamination is **agricultural run-off**. When it rains, chemicals used on fields — especially nitrogen and phosphorus fertilizers — are washed into rivers, lakes, and groundwater. This leads to a process called **eutrophication**, where algae grow excessively, blocking sunlight and reducing oxygen in the water. As a result, fish and other aquatic organisms may die, creating “dead zones” with almost no biodiversity.

Soil contamination is equally dangerous. Chemicals accumulated in soil can destroy microorganisms and reduce fertility. Heavy metals such as lead, cadmium, and mercury can remain in the soil for centuries and enter the food chain through plants. Once these metals accumulate in the human body, they can cause serious illnesses.

Another major pollution source is **industry**. Factories often produce large amounts of waste that must be properly managed. When regulations are weak or ignored, harmful substances leak into nearby rivers or farmland. Illegal dumping, especially of electronic waste, is an increasing problem in many developing countries.

Contamination also comes from cities. Household detergents, pharmaceuticals, microplastics, and chemicals from car tires all end up in sewage. Many wastewater treatment plants cannot fully remove these substances, which means they eventually flow into aquatic ecosystems.

Climate change further complicates the situation. Stronger storms cause more run-off, floods spread pollutants over large areas, and droughts reduce the natural ability of water bodies to dilute contaminants.

Protecting soil and water requires strong environmental policies, sustainable agriculture, public awareness, and modern waste treatment technologies. Countries that have introduced strict regulations have already seen improved water quality and healthier ecosystems. However, global cooperation is essential because water pollution does not stop at borders.

## Vocabulary

**contamination** — the presence of harmful substances in soil or water

**pollutants** — substances that cause pollution

**agricultural run-off** — water carrying chemicals from fields into rivers or lakes

**eutrophication** — excessive plant growth in water caused by nutrients

**groundwater** — water stored under the ground

**heavy metals** — toxic metals such as mercury or lead

**wastewater** — used water from homes or industry

**industrial waste** — unwanted materials produced by factories

**ecosystem** — a community of living organisms and their environment

**environmental regulations** — laws that protect nature

### A. Complete the sentences

(eutrophication / contamination / contaminate / groundwater / run-off / heavy metals / wastewater)

1. Agricultural \_\_\_\_\_ carries fertilizers into rivers after heavy rain.
2. Excess nutrients in lakes can cause \_\_\_\_\_, leading to fish deaths.
3. Polluted \_\_\_\_\_ is unsafe for drinking and irrigation.
4. Industrial \_\_\_\_\_ is often released into rivers without proper treatment.
5. Soil \_\_\_\_\_ reduces fertility and harms microorganisms.
6. Plastic waste contributes to long-term \_\_\_\_\_ of ecosystems.
7. \_\_\_\_\_ from farms is one of the main sources of water pollution.
8. Clean \_\_\_\_\_ is essential for public health.
9. Fertilizers can \_\_\_\_\_ rivers and lakes.
10. \_\_\_\_\_ such as mercury remain in soil for centuries.

### B. Choose the correct word

1. Heavy metals can \_\_\_\_\_ in soil for centuries. (remain / disappear)
2. Polluted water is dangerous to both humans and \_\_\_\_\_. (machines / wildlife)

3. Fertilizers improve yields but increase environmental \_\_\_\_\_. (risk / safety)
4. Strong environmental \_\_\_\_\_ help reduce pollution. (regulations / accidents)

### **A. Match the collocations**

1. agricultural —
  2. industrial —
  3. water —
  4. soil —
  5. environmental —
- a) contamination
  - b) pollution
  - c) run-off
  - d) regulations
  - e) waste

### **Speaking and writing**

#### **Speaking**

1. Describe how agricultural run-off affects rivers and lakes.
2. Which source of water contamination do you consider the most dangerous?
3. How can governments reduce soil and water pollution?

#### **Writing**

1. Write a cause–effect paragraph explaining how soil contamination impacts food safety.
2. Write a short report (150–180 words) suggesting solutions to reduce water contamination in agriculture.

### **Additional Texts for Unit 1**

#### **Text 1.**

#### **Integrated Pest Management (IPM)**

Integrated Pest Management (IPM) is a modern, eco-friendly approach to controlling pests that aims to reduce the use of chemical pesticides. Instead of relying on a single method, IPM combines biological, physical, cultural, and chemical strategies to manage pests in the most efficient and sustainable way. The main idea behind IPM is simple: chemical pesticides should only be used when absolutely necessary, and only after other methods have been tried.

A key principle of IPM is **monitoring**. Farmers regularly inspect their fields to check pest populations and evaluate the condition of the crops. If the number of pests remains below the economic threshold — the level at which they begin to cause financial damage — then chemical spraying is unnecessary. Monitoring helps avoid overuse of chemicals and reduces production costs.

Another important IPM technique is **biological control**. This involves using natural predators, parasites, or pathogens to suppress pest populations. For example, ladybugs feed on aphids, while certain parasitic wasps attack caterpillars. When these beneficial organisms are introduced into a field, they help regulate pest populations naturally. Unlike pesticides, biological control does not leave harmful residues and does not cause resistance.

IPM also focuses on **cultural practices**, such as crop rotation, proper irrigation, planting resistant varieties, and removing infected plant material. By creating conditions that are unfavorable for pests, farmers reduce the likelihood of infestations. Physical methods, such as traps, barriers, and manual removal, can also be efficient, especially for small-scale farmers.

However, chemical pesticides are still used in IPM — but only as a last resort. When all other methods fail or when pest levels rise above economic thresholds, carefully selected pesticides are applied in precise doses. This helps protect crops without causing long-term environmental damage.

IPM offers many advantages. It reduces chemical pollution in soil and water, protects beneficial insects, and lowers production costs. It also supports biodiversity and helps prevent pesticide resistance. Farmers who use IPM often report better crop quality, healthier soils, and increased sustainability.

Despite these benefits, IPM requires knowledge, training, and time. Farmers must learn how to identify pests, monitor fields effectively, and choose the best combination of methods. In regions where education and resources are limited, adopting IPM can be challenging. Nevertheless, international organizations increasingly support IPM programs, recognizing their importance for global food security.

If more farmers adopted IPM earlier, many ecosystems would have suffered far less from chemical pollution. If governments invested more in agricultural education, farmers would have switched to sustainable practices sooner. IPM clearly demonstrates that agriculture can be both productive and environmentally responsible.

## Vocabulary

**Integrated Pest Management (IPM)** — an eco-friendly system of pest control

**monitoring** — regular observation and checking

**economic threshold** — pest level at which damage becomes costly

**biological control** — using natural enemies to control pests

**natural predators** — animals or insects that eat pests

**cultural practices** — farming techniques like crop rotation or irrigation

**physical control** — mechanical methods such as traps or barriers

**last resort** — something used only when all other options fail

**chemical residues** — leftover chemicals in soil or plants

**sustainable agriculture** — farming that protects the environment long-term

## A. Choose the correct option

1. IPM focuses on reducing \_\_\_\_\_
  - a) biodiversity
  - b) chemical use
  - c) crop yields
2. Economic threshold means the level at which pests
  - a) disappear
  - b) cause financial damage
  - c) become useful

3. Biological control uses
  - a) machines
  - b) natural predators
  - c) fertilizers
4. IPM reduces environmental impact by
  - a) increasing spraying
  - b) combining different control methods
5. Monitoring pests helps farmers
  - a) save chemicals
  - b) ignore infestations

## B. Complete using words from the text

(monitoring / sustainable / residues / threshold / predators / last resort)

1. A \_\_\_\_\_ approach balances productivity and environmental protection.
2. Regular \_\_\_\_\_ helps farmers avoid unnecessary spraying.
3. Pesticides are used as a \_\_\_\_\_ in IPM.
4. Natural \_\_\_\_\_ help control pest populations.
5. Chemical \_\_\_\_\_ harm soil and water.
6. Pesticides are applied only when pest levels exceed the economic \_\_\_\_\_.
7. Without proper \_\_\_\_\_, farmers may spray chemicals unnecessarily.

## Grammar Tasks — Conditionals

### Complete the sentences.

1. If farmers **monitored** their fields more carefully, they \_\_\_\_\_ (reduce) pesticide use.
2. If beneficial insects had not been released, pest numbers \_\_\_\_\_ (increase).
3. IPM would work even better if farmers \_\_\_\_\_ (receive) more training.
4. If pesticides are used as a last resort, ecosystems \_\_\_\_\_ (recover) faster.
5. If the government had funded IPM research, resistance \_\_\_\_\_ (decrease).
6. If farmers didn't remove infected plants, diseases \_\_\_\_\_ (spread).
7. More farmers would adopt IPM if equipment \_\_\_\_\_ (be) cheaper.
8. If biological control had failed, farmers \_\_\_\_\_ (apply) chemicals.

## Speaking and writing

### Speaking

1. Explain IPM to someone who has never heard of it.
2. Which IPM method do you find the most effective and why?
3. Would IPM work in all countries? Discuss advantages and challenges.

### Writing

1. Write a comparison paragraph: *Traditional pest control vs. IPM*.
2. Imagine IPM had been introduced earlier in your country. Write what would have changed (use conditionals)

## **Text 2.**

### **Organic Alternatives**

Organic alternatives to chemical pesticides have gained popularity as more consumers demand healthier food and more sustainable farming. Organic farming avoids synthetic chemicals and relies on natural solutions to protect plants from pests, diseases, and weeds. These alternatives are not only environmentally friendly but also help restore soil health, support biodiversity, and reduce pollution in water systems.

One common organic alternative is **botanical pesticides**. These are made from plant extracts, such as neem oil, pyrethrum, or garlic. They break down quickly in the environment, leaving no long-term residues. While they may not be as strong as synthetic chemicals, they are safer for beneficial insects and pollinators. Farmers often use botanical pesticides as part of integrated strategies that protect crops while maintaining ecological balance.

Another group of organic alternatives includes **microbial pesticides**, which contain naturally occurring bacteria or fungi that target specific pests. For example, *Bacillus thuringiensis* (Bt) is widely used to control caterpillars. When insects ingest the bacteria, it produces toxins that affect only the targeted species, leaving other organisms unharmed. This high level of specificity makes microbial pesticides an excellent tool for sustainable agriculture.

Organic farmers also rely on **biological control**, using beneficial insects, nematodes, or mites to regulate pest populations. These natural predators can be introduced into greenhouses or outdoor fields. Because they reproduce, they create a long-lasting and self-sustaining defense system against pests.

Cultural practices play an important role as well. Techniques such as mulching, hand weeding, intercropping, and planting resistant varieties help prevent weed and pest infestations without the need for chemicals. Healthy soil is essential for organic farming, so farmers use compost, manure, and cover crops to improve soil structure and fertility.

Organic alternatives offer many environmental benefits. They reduce contamination of soil and water, protect pollinators, and improve biodiversity. They are also safer for farm workers and consumers. However, organic farming can be more labor-intensive and may result in lower yields, especially in regions with unpredictable weather or severe pest pressure. Despite these challenges, organic agriculture continues to grow as consumers become more environmentally conscious.

If farmers used organic alternatives more widely, chemical pollution would decrease dramatically. If governments subsidized organic methods, more producers would convert to sustainable farming. Although organic solutions may not completely replace synthetic chemicals, they provide an essential foundation for environmentally responsible agriculture.

## Vocabulary

**organic farming** — agriculture without synthetic chemicals

**synthetic chemicals** — man-made chemical substances

**botanical pesticides** — pest control products made from plants

**microbial pesticides** — pesticides based on bacteria or fungi

**beneficial organisms** — living beings that support plant health

**compost** — decomposed organic material used as fertilizer

**pollinators** — insects that help plants reproduce

**biodiversity** — variety of plant and animal life

**labor-intensive** — requiring a lot of human work

**consumer demand** — what buyers want to purchase

## A. Complete the sentences

(neem oil / synthetic / labor-intensive/ biodiversity / compost / consumers)

1. Organic farming avoids \_\_\_\_\_ chemicals.
2. \_\_\_\_\_ are increasingly concerned about food safety.
3. Healthy soil and \_\_\_\_\_ go hand in hand.
4. \_\_\_\_\_ improves soil structure and nutrient content.
5. \_\_\_\_\_ is often used as a natural insect repellent.
6. Organic farming supports greater \_\_\_\_\_ than conventional farming.
7. Many \_\_\_\_\_ prefer food grown without pesticides.
8. Using \_\_\_\_\_ reduces dependence on chemical fertilizers.

9. Organic farming is often more \_\_\_\_\_.

### B. Match the words

1. botanical pesticide —
2. microbial pesticide —
3. compost —
4. pollinator —
5. residue —

- a) remains of chemicals
- b) bacteria-based pest control
- c) decomposed organic matter
- d) plant-based protection
- e) insect that helps plants reproduce

### Speaking and writing

#### Speaking

1. Why are organic alternatives becoming more popular?
2. What are the main disadvantages of organic farming?
3. Would you personally choose organic food? Why / why not?

#### Writing

1. Write a short argumentative text (150 words): *Organic farming should replace conventional farming.*
2. Write a paragraph explaining one organic alternative and how it works

#### Text 3.

#### Soil Health and Soil Fertility

Soil health and fertility are essential for productive agriculture and healthy ecosystems. Healthy soil contains a balanced mixture of minerals, organic matter, microorganisms, air, and water. When these components work together, soil becomes a living system that supports plant growth, stores carbon, and filters water.

One of the most important components of soil health is **organic matter**, which includes decomposed plant and animal remains. Organic matter improves soil structure, increases water retention, and provides nutrients for plants.

Microorganisms such as bacteria, fungi, and earthworms play a vital role in breaking down organic material and recycling nutrients.

Soil fertility depends on the availability of nitrogen, phosphorus, potassium, and other micronutrients. These nutrients can come from natural sources or fertilizers. However, overuse of chemical fertilizers can damage soil health by killing microorganisms and disrupting natural nutrient cycles.

Erosion is another major threat to soil health. Wind and water can remove fertile topsoil, leaving land barren and less productive. Poor farming practices, deforestation, and climate change all accelerate erosion. To prevent it, farmers use cover crops, contour plowing, and terracing.

Soil health also affects water quality. Healthy soil acts like a sponge, absorbing water and filtering pollutants. Degraded soil, on the other hand, cannot absorb water properly, leading to run-off, floods, and contamination of rivers and groundwater.

Improving soil health requires long-term commitment. Farmers can add compost, rotate crops, minimize tillage, and plant deep-rooted species. These practices rebuild organic matter, protect soil from erosion, and restore biodiversity.

If soil had been managed sustainably in the past, many regions would not be facing land degradation today. If farmers invest in soil regeneration now, future generations will benefit from healthier ecosystems and more stable food production.

## Vocabulary

**soil health** — the ability of soil to function as a living ecosystem

**soil fertility** — the soil's ability to provide nutrients for plants

**organic matter** — decomposed plant and animal material

**microorganisms** — very small living organisms in soil

**nutrient cycle** — movement of nutrients through soil and plants

**erosion** — loss of topsoil due to wind or water

**water retention** — ability of soil to hold water

**topsoil** — the most fertile upper layer of soil

**land degradation** — decline in land quality

**regenerative practices** — methods that restore soil health

### A. Choose the correct word

1. Organic matter improves soil \_\_\_\_\_ (structure / pollution).

2. Soil erosion removes fertile \_\_\_\_\_ (topsoil / minerals).
3. Microorganisms help \_\_\_\_\_ nutrients (destroy / recycle).
4. Healthy soil can \_\_\_\_\_ water (absorb / reject).

## B. Word partnerships

Match the words:

1. soil —
2. nutrient —
3. water —
4. climate —
5. farming —

- a) retention
- b) change
- c) fertility
- d) cycle
- e) practices

## C. Complete the sentences

(organic matter / fertility / microorganisms / erosion / retention)

1. \_\_\_\_\_ improves soil structure and water storage.
2. Soil \_\_\_\_\_ refers to the ability of soil to support plant growth.
3. Wind and water \_\_\_\_\_ remove fertile topsoil.
4. \_\_\_\_\_ break down organic material and recycle nutrients.
5. Healthy soil increases water \_\_\_\_\_ during rainfall.
6. Loss of \_\_\_\_\_ leads to reduced crop yields.
7. \_\_\_\_\_ are essential for long-term soil productivity.
8. Poor farming practices accelerate soil \_\_\_\_\_

## Grammar Task

### A. Complete the Conditionals.

1. If farmers protected topsoil, erosion \_\_\_\_\_ (decrease).
2. Soil would retain more water if organic matter \_\_\_\_\_ (increase).
3. If chemical fertilizers hadn't been overused, soil biodiversity \_\_\_\_\_ (remain).
4. If farmers use deep-rooted plants, soil structure \_\_\_\_\_ (improve).
5. If erosion had continued, farmland \_\_\_\_\_ (become) unproductive.

## Speaking and writing

### Speaking

1. Why is soil considered a living system?

2. How does soil health affect climate change?
3. What farming practices help maintain soil fertility?

## **Writing**

1. Write a problem–solution paragraph about soil degradation.
2. Write a short explanation (120–150 words) of why soil health is important for future generations

## **Text 4.**

### **Crop Rotation and Permaculture**

Crop rotation and permaculture are both sustainable farming methods that help maintain soil health, reduce pests, and support biodiversity. Crop rotation involves planting different types of crops in the same field across several seasons. By changing crops regularly, farmers interrupt pest life cycles, improve soil fertility, and reduce the need for chemical inputs.

For example, legumes such as beans or peas add nitrogen to the soil, benefiting the next crop planted in the rotation. Root crops loosen soil, improving structure, while cereal crops cover the ground and prevent erosion. This diversity creates a balanced system where nutrients are recycled naturally.

Permaculture takes sustainability even further. It is a holistic design system that imitates natural ecosystems. Instead of monocultures, permaculture promotes polycultures — growing many types of plants together. Trees, shrubs, vegetables, herbs, and flowers are arranged in a way that maximizes efficiency and minimizes waste.

Products of permaculture systems require fewer external inputs. Water is conserved through rainwater harvesting, soil is protected with mulch, and biodiversity supports natural pest control. Chickens, bees, and other animals can also be integrated into the system.

Both crop rotation and permaculture focus on long-term sustainability rather than short-term profit. They offer resilience against climate change, reduce pesticide use, and improve soil structure.

If all farmers practiced rotation, soil nutrients would never become depleted. If permaculture had been adopted earlier, many ecosystems \_\_\_\_\_ (benefit) from more biodiversity.

## Vocabulary

**crop rotation** — growing different crops in the same field over time

**monoculture** — growing only one type of crop

**legumes** — plants like beans that add nitrogen to soil

**soil depletion** — loss of nutrients from soil

**permaculture** — a sustainable farming system based on natural ecosystems

**polyculture** — growing many plant species together

**mulch** — material placed on soil to protect it

**self-sustaining system** — a system that maintains itself naturally

**ecosystem balance** — stable interaction of living organisms

**long-term sustainability** — ability to continue without harming the future

## A. Complete the sentences

(monoculture / legumes / biodiversity / mulch / ecosystem)

1. \_\_\_\_\_ enrich soil by fixing nitrogen.
2. Permaculture aims to create a balanced \_\_\_\_\_.
3. Growing the same crop every year is called \_\_\_\_\_.
4. Straw, leaves, and grass used to cover soil are called \_\_\_\_\_.
5. Crop rotation increases \_\_\_\_\_ and reduces pest pressure.
6. \_\_\_\_\_ systems are more resilient to climate change.
7. Replacing monoculture with rotation improves soil \_\_\_\_\_.
8. Healthy \_\_\_\_\_ support sustainable food production.

## B. Choose the best option

1. Permaculture focuses on
  - a) short-term profit
  - b) chemical efficiency
  - c) long-term sustainability
2. Crop rotation helps reduce
  - a) soil fertility
  - b) pests and diseases
  - c) biodiversity

## Speaking and writing

## Speaking

1. Explain how crop rotation reduces pests and diseases.
2. Would permaculture be realistic for large-scale farming?
3. Compare monoculture and polyculture systems.

## Writing

1. Write a short essay: *How sustainable farming can protect ecosystems.*
2. Imagine a farm using permaculture. Describe how it functions as a self-sustaining system.

## Unit 2

### Deforestation and forest management

#### Reading

##### Forests and Wildlife Protection

Forests are among the most important ecosystems on Earth, yet they are disappearing at an alarming rate. Deforestation is mainly driven by human activities such as agricultural expansion, logging, mining, and infrastructure development. Large areas of forest are cleared to create farmland, especially for cattle grazing and monoculture crops like soy or palm oil. As a result, natural habitats are destroyed, biodiversity is reduced, and ecosystems lose their ability to function properly.

Forests provide a wide range of **ecosystem services** that are essential for both the environment and human well-being. They regulate the climate by absorbing carbon dioxide, protect soil from erosion, maintain the water cycle, and support countless plant and animal species. Forests also supply resources such as timber, food, and medicinal plants. When forests are degraded or destroyed, these services are weakened, leading to long-term ecological and economic consequences.

To counteract deforestation, many countries invest in **reforestation** and **afforestation** programs. Reforestation involves replanting trees in areas where forests previously existed, while afforestation refers to planting trees in regions that were not historically forested. Although these strategies can help restore degraded land and

absorb carbon, they are not always a perfect replacement for natural forests. Artificial plantations often support fewer species and may alter local ecosystems.

One of the most serious threats to forests is **illegal logging**, which involves cutting and trading timber without permission or regulation. Illegal logging contributes to forest degradation, corruption, and loss of government revenue. It also threatens wildlife by destroying habitats and opening remote forest areas to further exploitation. Strong law enforcement and international cooperation are crucial to combat this problem.

Forest loss has a direct impact on wildlife. Many species are forced to leave their natural habitats, increasing the risk of extinction. To protect endangered animals, conservationists use various strategies, including **captive breeding programs**, where animals are bred in controlled environments and later reintroduced into the wild.

While these programs can prevent species extinction, they are expensive and cannot replace habitat protection.

Another growing challenge is **human–wildlife conflict**. As human settlements expand into natural areas, encounters between people and wildlife become more frequent. Animals may damage crops, attack livestock, or even pose a danger to human life. In response, conservationists promote solutions such as compensation schemes, improved land-use planning, and the creation of **wildlife corridors**. These corridors connect fragmented habitats and allow animals to migrate safely.

Finally, **anti-poaching strategies** play a key role in wildlife protection. Poaching threatens iconic species such as elephants, rhinos, and tigers. Effective strategies include stronger legal penalties, community involvement, technology such as GPS tracking and drones, and education programs. Protecting forests and wildlife requires coordinated action at local, national, and global levels.

## Vocabulary

**Deforestation** — the large-scale removal of forest cover

**Ecosystem services** — benefits that humans receive from ecosystems

**Biodiversity** — the variety of plant and animal life in an ecosystem

**Reforestation** — replanting trees in previously forested areas

**Afforestation** — planting trees in areas that were not forested before

**Illegal logging** — unauthorized cutting and selling of timber

**Habitat fragmentation** — division of natural habitats into smaller parts

**Captive breeding** — breeding animals in controlled environments

**Human–wildlife conflict** — negative interactions between humans and wildlife

**Wildlife corridors** — natural pathways connecting habitats

**Poaching** — illegal hunting or capturing of wild animals

## Vocabulary Exercises

### A. Complete the sentences using words from the vocabulary list:

1. \_\_\_\_\_ reduces biodiversity and contributes to climate change.
2. Forests provide important \_\_\_\_\_ such as clean water and climate regulation.
3. \_\_\_\_\_ programs aim to restore degraded forest areas.
4. \_\_\_\_\_ often increases when forests are divided by roads and cities.
5. Many endangered species survive thanks to \_\_\_\_\_ programs.
6. \_\_\_\_\_ is a major threat to elephants and rhinos.
7. Creating \_\_\_\_\_ helps animals move safely between habitats.
8. \_\_\_\_\_ occurs when animals damage crops near human settlements.

### B. Choose the correct option:

1. Deforestation mainly occurs because of (forest conservation / agricultural expansion).
2. Ecosystem services support (human well-being / illegal trade).
3. Reforestation focuses on (restoring forests / expanding cities).
4. Habitat fragmentation is caused by (infrastructure development / wildlife corridors).
5. Captive breeding aims to (increase endangered populations / replace ecosystems).
6. Poaching threatens (wildlife survival / soil fertility).
7. Wildlife corridors help animals (migrate safely / avoid reproduction).
8. Human–wildlife conflict often results from (habitat loss / climate stability).

## Grammar Focus — Second and Third Conditionals

### Form:

- Second conditional: *If + past simple, would + base verb*
- Third conditional: *If + past perfect, would have + past participle*

## Grammar Exercises

### A. Complete the sentences:

1. If forests \_\_\_\_\_ (be) better protected, biodiversity would increase.
2. If governments \_\_\_\_\_ (act) earlier, many species would not have disappeared.
3. Wildlife conflicts would decrease if habitats \_\_\_\_\_ (not / fragment).
4. If illegal logging \_\_\_\_\_ (stop), ecosystems would recover faster.
5. Animals would not have migrated into cities if forests \_\_\_\_\_ (remain) intact.
6. If people \_\_\_\_\_ (understand) ecosystem services, they would value forests more.
7. If anti-poaching laws \_\_\_\_\_ (enforce) strictly, poaching would decline.
8. Species would have survived if humans \_\_\_\_\_ (protect) their habitats.

## Speaking and writing

### Speaking Tasks

1. Explain the main causes of deforestation in your country or region.
2. Discuss whether reforestation can fully replace natural forests.
3. What solutions can reduce human–wildlife conflict?

### Writing Tasks

1. Write a short essay (180–220 words) on the importance of forest ecosystem services.
2. Imagine you are an environmental policy maker. Describe what you would have done differently to prevent deforestation in the past. Use conditionals.

## Additional Texts for Unit 2

### Text 1: Causes of Deforestation

Deforestation occurs for a variety of interconnected reasons, most of which are closely linked to economic development, population growth, and global demand for natural resources. One of the primary drivers of deforestation is agricultural expansion. Large areas of forest are cleared to make space for crops and livestock, particularly in tropical regions. Commercial agriculture often focuses on monoculture farming, where a single crop such as soy, palm oil, or maize is grown over vast areas. This practice reduces biodiversity, exhausts soil nutrients, and increases vulnerability to pests and diseases.

Logging is another major cause of forest loss. While legal logging can be managed sustainably under strict regulations, illegal logging remains a serious problem in many parts of the world. Trees are often cut without permits, environmental impact

assessments, or replanting obligations. As a result, forest degradation accelerates, and ecosystems lose their ability to recover naturally. Illegal logging also undermines responsible forest management and contributes to corruption and economic inequality.

Infrastructure development plays an important indirect role in deforestation. The construction of roads, dams, and mining facilities opens previously remote forest areas to human activity. Once access is established, forests become more vulnerable to further logging, settlement, and land conversion. Urbanization increases demand for housing, paper products, furniture, and fuel, which puts additional pressure on forest resources.

Finally, weak governance and poor land-use regulation often allow deforestation to continue unchecked. In many cases, forests are cleared faster than authorities can respond. If governments had enforced environmental laws more effectively in the past, forest loss could have been significantly reduced. Addressing deforestation therefore requires not only environmental awareness but also strong political commitment and international cooperation.

### **Vocabulary**

**Agricultural expansion** — growth of farmland into natural areas

**Monoculture** — cultivation of a single crop species

**Forest degradation** — decline in forest quality

**Infrastructure development** — construction of roads and facilities

**Land-use regulation** — rules controlling land management

### **Vocabulary Exercise**

Complete the sentences:

1. \_\_\_\_\_ farming often replaces complex forest ecosystems.
2. \_\_\_\_\_ development makes remote forests more accessible.
3. Illegal activities contribute to forest \_\_\_\_\_.
4. \_\_\_\_\_ expansion is a leading cause of deforestation.
5. Strong \_\_\_\_\_ could slow forest loss.

### **Text 2: Forest Ecosystem Services**

Forest ecosystems provide a wide range of services that are essential for maintaining environmental balance and supporting human life. One of the most important

ecosystem services is climate regulation. Trees absorb carbon dioxide from the atmosphere and store it in their biomass, helping to slow down climate change. Forests also influence local and regional climates by regulating temperature and rainfall patterns.

Another key service is water regulation. Forests act as natural filters, improving water quality by trapping pollutants and sediments before they reach rivers and lakes. Tree roots help slow down surface runoff, reducing the risk of floods and allowing groundwater to recharge. In regions where forests have been removed, floods and droughts often become more frequent and severe.

Forests also play a critical role in soil protection. Root systems stabilize the soil, preventing erosion caused by wind and water. Without forest cover, fertile topsoil can be lost quickly, reducing agricultural productivity and increasing desertification. In addition, forests support biodiversity by providing habitats for countless plant and animal species, many of which cannot survive elsewhere.

Beyond environmental benefits, forests offer cultural, social, and economic value. They provide recreational opportunities, support tourism, and supply resources such as food, fuel, and medicinal plants. Indigenous communities often depend directly on forests for their livelihoods and cultural identity. If forest ecosystem services were lost, the consequences for human societies would be profound, affecting food security, water availability, and overall well-being.

### **Vocabulary List**

**Carbon storage** — absorption and storage of carbon dioxide

**Water regulation** — control of water movement and quality

**Soil erosion** — loss of topsoil due to wind or water

**Habitat provision** — supply of living space for species

**Recreational value** — benefits for leisure and tourism

### **Vocabulary Exercise**

Choose the correct word:

1. Forests help prevent \_\_\_\_\_ by stabilizing soil.
2. Trees contribute to \_\_\_\_\_ by absorbing CO<sub>2</sub>.
3. Clean water is part of forest \_\_\_\_\_ services.
4. Many species depend on forests for \_\_\_\_\_.

5. Forests have high \_\_\_\_\_ for tourism.

### **Text 3: Wildlife Protection and Conservation Strategies (≈400 words)**

Wildlife across the globe is facing increasing pressure from habitat destruction, climate change, pollution, and illegal exploitation. One of the most effective tools used to prevent species extinction is captive breeding. In these programs, endangered animals are bred in controlled environments such as zoos or conservation centers. Once populations become stable, individuals may be reintroduced into protected natural habitats. However, captive breeding alone cannot ensure long-term survival without habitat protection.

Anti-poaching strategies are equally important in wildlife conservation. Poaching threatens many iconic species, including elephants, rhinos, and big cats. Effective anti-poaching measures include stronger law enforcement, harsher penalties for wildlife crimes, and international cooperation to reduce illegal wildlife trade. In recent years, modern technologies such as GPS tracking, camera traps, and drones have improved the ability of conservationists to monitor animal populations and detect illegal activities.

Another major challenge is habitat fragmentation, which occurs when natural areas are divided by roads, farms, or urban development. Fragmented habitats limit animal movement and reduce genetic diversity. To address this issue, conservationists promote the creation of wildlife corridors. These natural pathways connect isolated habitats and allow animals to migrate, find food, and reproduce safely.

Community involvement is increasingly recognized as a key factor in successful conservation. When local people benefit from wildlife protection through eco-tourism or compensation programs, they are more likely to support conservation efforts. If conservation strategies had ignored local communities, many projects would have failed. Long-term wildlife protection therefore depends on a combination of science, policy, and social engagement.

#### **Vocabulary**

**Conservation strategy** — planned method to protect nature

**Reintroduction** — return of animals to natural habitats

**Law enforcement** — application of environmental laws

**Genetic diversity** — variety of genes within a species

**Habitat connectivity** — linkage between habitats

### **Vocabulary Exercise**

Complete the sentences:

1. \_\_\_\_\_ programs help save endangered species.
2. \_\_\_\_\_ diversity is vital for species survival.
3. Strong \_\_\_\_\_ reduces illegal wildlife trade.
4. Wildlife \_\_\_\_\_ connect separated habitats.
5. Species \_\_\_\_\_ depends on habitat quality.

### **Unit 3**

#### **Environmental policy and agreements, environmental ethics and sustainable lifestyles**

#### **Reading**

##### **Sustainable Lifestyles & Environmental Ethics**

Sustainable lifestyles have become a central concern in today's society as the environmental impact of human activities becomes increasingly evident. Ethical consumerism encourages individuals to make purchasing decisions that reflect concern for the environment, fair labor practices, and animal welfare. Consumers can choose products with eco-labels, boycott companies with harmful practices, or support local and sustainable businesses. Had more people prioritized ethical consumption, global ecological degradation might have been less severe.

Animal rights and welfare are closely related to ethical consumerism. Raising awareness about factory farming, hunting, and animal testing can influence behavior and policy. If governments had enforced stricter animal welfare laws, millions of animals would have been spared suffering. Educational campaigns in schools and communities help foster empathy and responsible choices, promoting a culture that respects the life and wellbeing of all creatures.

Green living habits extend beyond consumer choices. Simple actions such as reducing energy and water use, recycling, composting, and minimizing waste contribute to sustainability. Cities that implemented comprehensive recycling programs decades ago could have prevented tons of waste from polluting landfills

and waterways. Minimalism and low-impact lifestyles also emphasize mindful consumption, focusing on quality over quantity and prioritizing needs over wants. Individuals adopting these practices reduce their ecological footprint and promote a more balanced relationship with the planet.

Environmental justice highlights the social dimension of sustainability. Vulnerable communities often face disproportionate exposure to pollution, deforestation, or climate-related disasters. Policy measures and international agreements, such as the Paris Agreement, aim to address these inequalities. If international cooperation had been stronger in the past, the impacts of climate change would be less severe in marginalized regions.

Ultimately, sustainable living requires conscious decisions at both personal and societal levels. Citizens, governments, and companies must collaborate to reduce environmental impact. Through ethical consumerism, animal welfare advocacy, low-impact lifestyles, and attention to environmental justice, society can move towards a more equitable and sustainable future.

## Vocabulary

**Ethical consumerism** — choosing products that are environmentally and socially responsible

**Eco-label** — a label indicating environmentally friendly production

**Factory farming** — intensive animal farming with poor welfare standards

**Minimalism** — lifestyle focused on simplicity and essential needs

**Low-impact lifestyle** — habits that minimize environmental damage

**Ecological footprint** — the environmental impact of human activity

**Environmental justice** — fair treatment of all people regarding environmental laws and policies

**Marginalized communities** — groups that are socially or economically disadvantaged

## Vocabulary Exercises

**A. Complete the sentences using the correct word from the vocabulary list:**

1. Choosing products with an \_\_\_\_\_ helps support sustainable businesses.
2. People adopting \_\_\_\_\_ consume fewer resources and generate less waste.
3. \_\_\_\_\_ often involves crowded conditions and poor treatment of animals.
4. Awareness of \_\_\_\_\_ ensures that all communities are considered in environmental policies.
5. A \_\_\_\_\_ measures the total impact of a person's lifestyle on the planet.
6. \_\_\_\_\_ focuses on simplicity and prioritizing essential needs.
7. Supporting companies with fair labor practices is a part of \_\_\_\_\_.
8. \_\_\_\_\_ are often the first to experience pollution and environmental hazards.

**B. Rewrite the sentences using vocabulary words from the list (same number of sentences as A):**

1. Buying products that are made responsibly helps the environment. → \_\_\_\_\_
2. \_\_\_\_\_ Living simply with fewer possessions can reduce waste. → \_\_\_\_\_
3. Intensive animal farming can harm animal welfare. → \_\_\_\_\_
4. Policies should ensure that everyone is treated fairly regarding the environment. → \_\_\_\_\_
5. Human activities affect the planet and its ecosystems. → \_\_\_\_\_
6. A lifestyle focused on essentials avoids overconsumption. → \_\_\_\_\_
7. Choosing companies that follow fair labor practices reflects conscious consumption. → \_\_\_\_\_
8. Disadvantaged groups are more vulnerable to environmental harm. → \_\_\_\_\_

**Grammar Focus: Advanced Modal Verbs (Past Forms & Speculation)**

We can use some modal verbs + an infinitive to talk about how certain we are that something is or is not true. We can also use some modal verbs + **have** + past participle to talk about how certain we are that something was or was not true in the past

**Structure:**

- **must/might/could/should/ought to + have + past participle**

**Examples:**

- Consumers **must have realized** the impact of their choices earlier. (certainty)
- Governments **should have implemented** stricter recycling laws. (criticism/advice)
- Companies **might have underestimated** the effect of pollution on marginalized communities. (possibility)

**Grammar Exercises**

**A. Complete the sentences using the correct modal verb (must/might/could/should/ought to + have + past participle):**

1. People \_\_\_\_\_ reduced their energy use earlier to prevent waste.
2. Governments \_\_\_\_\_ introduced stronger animal welfare laws last decade.
3. Companies \_\_\_\_\_ considered the long-term environmental impact of their products.
4. Citizens \_\_\_\_\_ participated in recycling programs more actively.
5. We \_\_\_\_\_ chosen local products to support sustainable farming.
6. Policy makers \_\_\_\_\_ addressed the needs of marginalized communities sooner.
7. Consumers \_\_\_\_\_ checked eco-labels before buying.
8. Society \_\_\_\_\_ embraced low-impact lifestyles earlier to reduce ecological footprint.

**B. Rewrite the sentences using advanced modal verbs:**

1. They didn't support ethical brands. Pollution increased. → \_\_\_\_\_
2. People ignored recycling advice. Landfills grew. → \_\_\_\_\_
3. Governments delayed climate policies. Inequalities worsened. → \_\_\_\_\_
4. Consumers were unaware of minimalism. Overconsumption continued. → \_\_\_\_\_
5. \_\_\_\_\_ didn't assess animal welfare. Suffering persisted. → \_\_\_\_\_
6. Communities lacked access to green education. Awareness remained low. → \_\_\_\_\_
7. \_\_\_\_\_ didn't adopt water-saving habits. Resources were wasted. → \_\_\_\_\_
8. Policy makers ignored environmental justice. Vulnerable populations suffered. → \_\_\_\_\_

**Speaking and Writing**

**Speaking Tasks:**

1. Describe a choice you made that was environmentally responsible. Would you have done anything differently?
2. How could ethical consumerism influence animal welfare in your country?
3. Discuss how adopting a minimalism or low-impact lifestyle can help the environment.

**Writing Tasks:**

1. Write a paragraph about a sustainable habit you have adopted and its impact.
2. Imagine you are a policy maker. What measures should have been taken in the past to improve environmental justice? Use advanced modal verbs.

**Additional Texts for Unit 3**

## **Text 1: Ethical Consumerism in Practice**

Ethical consumerism has grown significantly as more people consider the environmental and social impacts of their purchases. Consumers increasingly seek products that are eco-friendly, fair-trade certified, and cruelty-free. Ethical consumerism is not only about personal choice but also about influencing corporate behavior. If more customers had boycotted harmful products in the past, companies might have adopted sustainable practices sooner.

Many individuals also focus on reducing plastic use, choosing reusable materials, and supporting brands with transparent supply chains. Social media campaigns have raised awareness and encouraged collective action. For instance, consumers posting online about unethical production have successfully pressured companies to improve labor conditions or eliminate harmful chemicals.

Education plays a central role in promoting ethical consumption. Schools and universities incorporate sustainability modules that teach students how to evaluate products, understand eco-labels, and make conscious decisions. If ethical education had been more widespread decades ago, the global shift toward responsible consumption could have occurred faster. As a result, adopting ethical consumerism contributes not only to environmental protection but also to social equity.

### **Vocabulary:**

**Ethical consumerism** — buying products that are environmentally and socially responsible

**Eco-friendly** — not harmful to the environment

**Fair-trade certified** — products made under fair labor conditions

**Cruelty-free** — products not tested on animals

**Boycott** — refusing to buy products to protest practices

**Reusable materials** — items that can be used multiple times instead of thrown away

**Supply chain transparency** — openness about how products are made and sourced

**Collective action** — people acting together to achieve a goal

### **Complete the sentences:**

1. Ethical consumerism encourages people to consider the \_\_\_\_\_ impact of their purchases.

2. Companies may improve working conditions if consumers \_\_\_\_\_ unethical products.
3. Products that are \_\_\_\_\_ are not tested on animals.
4. \_\_\_\_\_ supply chains allow buyers to trace product origins.
5. Social media can influence corporate behavior through \_\_\_\_\_ action.
6. Eco-labels help consumers make more \_\_\_\_\_ choices.
7. Supporting ethical brands promotes social \_\_\_\_\_.
8. Reusable packaging reduces environmental \_\_\_\_\_.

## **Text 2: Minimalism and Low-Impact Lifestyles**

Minimalism and low-impact lifestyles are growing trends for people seeking to reduce their environmental footprint. Minimalists prioritize essential items and avoid unnecessary consumption, which reduces waste and energy use. Low-impact living includes habits such as biking instead of driving, eating plant-based diets, and conserving water and electricity.

Communities that embraced minimalism years ago might have prevented tons of waste and reduced carbon emissions significantly. Adopting these practices requires mindfulness, planning, and sometimes social support to maintain motivation. Online groups and local workshops provide advice and encourage sustainable habits.

Low-impact lifestyles not only help the planet but also improve personal well-being. Reducing clutter, consuming responsibly, and choosing eco-friendly options can lower stress and promote a sense of purpose. If more individuals had embraced these principles in previous decades, urban areas might have experienced less pollution and resource depletion. Minimalism, therefore, represents a practical approach to personal responsibility and environmental ethics.

### **Vocabulary:**

**Minimalism** — lifestyle focused on simplicity and essentials

**Low-impact living** — habits that minimize environmental damage

**Environmental footprint** — the effect of a person's lifestyle on the planet

**Mindfulness** — conscious awareness and careful attention

**Carbon emissions** — greenhouse gases released into the atmosphere

**Eco-friendly options** — products or choices that reduce environmental harm

**Clutter** — excessive or disorganized possessions

**Sustainable habits** — routines that protect the environment

## Choose the correct word

1. Minimalists avoid (essential / unnecessary) consumption.
2. Low-impact lifestyles reduce a person's environmental (footprint / income).
3. Biking instead of driving lowers carbon (habits / emissions).
4. Online communities support sustainable (behavior / waste).
5. Reducing clutter can improve mental (pressure / well-being).
6. Plant-based diets are considered more (resource-efficient / harmful).
7. Sustainable habits require long-term (awareness / neglect).
8. Minimalism promotes personal responsibility and environmental (ethics / damage).

## Text 3: Environmental Justice and Policy

Environmental justice ensures that no community suffers disproportionately from environmental hazards. Marginalized communities often face higher exposure to pollution, deforestation, and climate-related disasters. Policies aimed at reducing these disparities are essential for social equity and sustainability.

International agreements, such as the Paris Agreement, set targets for reducing greenhouse gas emissions and protecting vulnerable populations. Had stronger action been taken globally, many communities would have experienced less severe impacts from climate change. Governments, NGOs, and citizens must collaborate to enforce policies and provide education on environmental rights.

Grassroots movements also play a role by raising awareness, pressuring authorities, and promoting local solutions. Community-led initiatives, such as urban gardens, clean energy projects, and disaster preparedness programs, empower residents and improve resilience. If environmental justice had been prioritized earlier, fewer people would have suffered from health issues and resource scarcity. Integrating policy, education, and community action is crucial for achieving both equity and sustainability.

### Vocabulary:

**Environmental justice** — fair treatment and protection for all people regarding environmental laws

**Marginalized communities** — socially or economically disadvantaged groups

**Greenhouse gas emissions** — gases that contribute to global warming

**Grassroots movements** — local, community-driven initiatives

**Resilience** — the ability to recover from difficulties

**Environmental rights** — legal protections for the environment and people

**Disparities** — inequalities or differences in treatment

**Urban gardens** — community-managed green spaces in cities

**Disaster preparedness** — readiness for environmental emergencies

### **Sentence transformation**

1. Communities that lack resources are often called \_\_\_\_\_ communities.
2. Environmental justice focuses on fair \_\_\_\_\_ of environmental risks.
3. \_\_\_\_\_ movements begin at the local level.
4. Climate policies aim to reduce \_\_\_\_\_ gas emissions.
5. Urban gardens strengthen community \_\_\_\_\_.
6. Preparing for natural disasters increases community \_\_\_\_\_.
7. Environmental \_\_\_\_\_ protect people from ecological harm.
8. Reducing inequalities helps address environmental \_\_\_\_\_.

## **UNIT 4**

### **Green technologies and eco-innovation**

#### **Reading**

#### **Green Technologies & Future Solutions**

The world is undergoing a technological transformation aimed at reducing environmental impact and promoting sustainability. Green technologies are at the forefront of this movement, encompassing innovations that improve energy efficiency, minimize waste, and provide alternatives to traditional industrial processes. Electric vehicles (EVs), smart grids, biodegradable materials, and circular economy practices are all examples of solutions designed to create a more sustainable future.

Electric vehicles have become increasingly common, offering a low-emission alternative to conventional gasoline-powered cars. Governments are investing in charging infrastructure to make EVs more practical for daily use. Had cities implemented widespread EV charging networks earlier, adoption rates would have increased faster, significantly reducing urban air pollution. EVs also contribute to reduced greenhouse gas emissions, making them essential in the fight against climate change.

Smart grids and energy-efficient technologies optimize the distribution and consumption of electricity. These systems monitor usage, integrate renewable energy sources, and reduce energy losses. Communities that adopted smart grid solutions earlier could have lowered electricity costs and reduced environmental strain. Using smart meters, automated controls, and energy storage systems allows households and industries to consume energy more responsibly.

Circular economy innovations focus on reducing waste by reusing, recycling, and regenerating materials. Companies are designing products that can be easily repaired, upgraded, or recycled at the end of their life cycle. Had manufacturers embraced circular principles decades ago, landfill volumes would have been drastically lower. Biodegradable materials complement these efforts by decomposing naturally, reducing pollution and environmental harm.

Eco-friendly industrial processes are also key. Factories are implementing cleaner production methods, reducing toxic emissions, and conserving water. Companies following these practices demonstrate corporate responsibility and align with sustainability goals. Principles of eco-tourism encourage travel that respects natural habitats and benefits local communities, promoting environmental education and cultural awareness.

Global energy trends indicate a steady shift towards renewable sources, such as solar, wind, and hydroelectric power. Governments, private companies, and researchers are exploring new professions in the green sector, from renewable energy engineers to sustainability consultants. These roles are essential for guiding society toward a low-carbon future.

Ultimately, the adoption of green technologies requires collaboration among citizens, businesses, and policymakers. If all stakeholders had prioritized sustainability earlier, the planet would be in a healthier state today. While challenges remain, continued innovation and proactive policies promise a more sustainable, efficient, and responsible future for all.

## **Vocabulary**

**Electric vehicles (EVs)** — vehicles powered by electricity instead of gasoline

**Charging infrastructure** — network of stations to charge electric vehicles

**Smart grids** — electricity networks that use technology to optimize energy distribution

**Energy-efficient technologies** — tools and systems that use less energy to perform the same tasks

**Circular economy** — economic model that minimizes waste by reusing and recycling materials

**Biodegradable materials** — substances that can naturally decompose

**Eco-friendly industrial processes** — manufacturing methods that reduce environmental impact

**Eco-tourism** — sustainable travel that respects nature and local communities

**Renewable energy** — energy derived from sources that are naturally replenished

**Sustainability consultant** — professional advising organizations on sustainable practices

## Vocabulary Exercises

### A. Complete the sentences using the correct word from the vocabulary list:

1. Governments are building \_\_\_\_\_ to support electric vehicles.
2. Factories are adopting \_\_\_\_\_ to reduce pollution.
3. Products designed to decompose naturally are made from \_\_\_\_\_.
4. Smart meters and automated controls are part of \_\_\_\_\_.
5. Traveling responsibly while respecting local communities is called \_\_\_\_\_.
6. Using less electricity to perform the same tasks involves \_\_\_\_\_.
7. Designing products to be reused or recycled is a principle of the \_\_\_\_\_.
8. Professionals guiding companies to reduce environmental impact are often \_\_\_\_\_.
9. Cars powered by electricity are called \_\_\_\_\_.
10. Solar and wind power are examples of \_\_\_\_\_.

### B. Rewrite the sentences using the vocabulary words (same number as A):

1. Vehicles that don't use gasoline help reduce emissions. → \_\_\_\_\_
2. Factories are changing their production to be less harmful. → \_\_\_\_\_
3. Materials that break down naturally are preferred for sustainability. → \_\_\_\_\_
4. Systems that optimize energy use help save electricity. → \_\_\_\_\_
5. Responsible tourism protects nature and benefits communities. → \_\_\_\_\_
6. Technologies that use less energy for the same work are important. → \_\_\_\_\_
7. Reusing and recycling products reduces landfill waste. → \_\_\_\_\_
8. Experts help companies implement sustainable solutions. → \_\_\_\_\_
9. Cars that run on electricity reduce greenhouse gas emissions. → \_\_\_\_\_
10. Power sources like wind and solar are replenished naturally. → \_\_\_\_\_

## Grammar Focus: Advanced Future Forms

### Forms covered:

- Future Simple (will)
- Future Continuous (will be + V-ing)
- Future Perfect (will have + past participle)
- Future Perfect Continuous (will have been + V-ing)
- Be going to (planned future)

### Examples:

- Electric vehicles **will become** the dominant mode of transport.
- By 2035, many cities **will have eliminated** fossil-fuel cars.
- Smart grids **will be transforming** energy consumption patterns.
- By the end of the decade, governments **will have been investing** heavily in renewables.
- Many countries **are going to expand** their charging infrastructure.

### Grammar Exercises

#### A. Complete the sentences using the correct advanced future form:

1. By 2040, electric vehicles \_\_\_\_\_ (replace) most petrol cars.
2. Governments \_\_\_\_\_ (invest) in smart grids throughout the next decade.
3. This time next year, cities \_\_\_\_\_ (install) thousands of new charging stations.
4. By the end of the century, renewable energy \_\_\_\_\_ (supply) most global electricity.
5. Engineers \_\_\_\_\_ (work) on energy-efficient technologies for many years.
6. Many industries \_\_\_\_\_ (adopt) circular economy principles soon.
7. In the next ten years, biodegradable materials \_\_\_\_\_ (become) more affordable.
8. By 2030, smart cities \_\_\_\_\_ (reduce) energy waste significantly.
9. Several countries \_\_\_\_\_ (introduce) stricter environmental regulations.
10. By the time these projects finish, governments \_\_\_\_\_ (spend) billions on green innovation.

#### B. Rewrite the sentences using a more advanced future form:

1. Electric vehicles will replace petrol cars.
2. Governments will invest in renewable energy.
3. Cities will install new charging stations next year.
4. Renewable energy will supply global electricity.
5. Engineers will work on green technologies.
6. Industries will adopt sustainable practices.
7. Biodegradable materials will become cheaper.
8. Smart cities will reduce energy waste.
9. Countries will introduce new environmental laws.
10. Governments will spend a lot of money on green innovation.

## **Speaking and Writing**

### **Speaking Tasks:**

1. Discuss how electric vehicles can reduce pollution in your city.
2. Explain the benefits of circular economy principles in manufacturing.
3. How can smart grids change the way people use energy?

### **Writing Tasks:**

1. Write a paragraph about a green technology that could be implemented in your community.
2. Imagine you are a sustainability consultant. Suggest strategies for your local government to promote renewable energy and eco-friendly practices.

## **Additional Texts for Unit 4**

### **Text 1: Electric Vehicles and Charging Infrastructure**

Electric vehicles (EVs) are expected to play a crucial role in the transition toward sustainable transportation. As concerns about climate change and air pollution increase, governments and industries are investing heavily in EV technologies. Charging infrastructure is being expanded to support the growing number of electric cars, buses, and delivery vehicles. Without sufficient charging stations, large-scale adoption would not be possible.

In many countries, public charging points are being installed along highways, in residential areas, and near workplaces. Fast-charging technologies are also being developed to reduce waiting times and improve user convenience. By the end of the next decade, most urban areas will have established dense charging networks, making electric vehicles a realistic option for the majority of drivers.

Electric vehicles contribute to sustainability not only by reducing emissions but also by encouraging innovation in energy storage and battery recycling. If battery reuse systems are successfully implemented, environmental damage caused by battery production will have been significantly reduced. However, challenges remain, including high costs, limited raw materials, and unequal access to infrastructure in rural areas.

Overall, electric vehicles and charging infrastructure represent a long-term investment in cleaner mobility. If governments continue supporting these systems,

transportation will become more efficient, quieter, and less harmful to the environment.

## Vocabulary

**Electric vehicles (EVs)** — vehicles powered by electricity

**Charging infrastructure** — systems that provide power for EVs

**Fast-charging stations** — chargers that reduce charging time

**Energy storage** — storing energy for later use

**Battery recycling** — reuse of battery materials

**Emission reduction** — lowering harmful gases released

**Raw materials** — natural resources used in production

**Infrastructure access** — availability of systems and services

## Vocabulary Exercises

### A. Complete the sentences:

1. Governments are investing in \_\_\_\_\_ to support electric transport.
2. \_\_\_\_\_ help reduce waiting times for drivers.
3. EVs contribute to \_\_\_\_\_ by lowering air pollution.
4. Effective \_\_\_\_\_ can reduce environmental damage.
5. Limited \_\_\_\_\_ can slow EV adoption.
6. Public \_\_\_\_\_ are being installed in cities.
7. Battery production requires specific \_\_\_\_\_.
8. Cleaner transport leads to lower \_\_\_\_\_.

### B. Rewrite using vocabulary words:

1. Systems that power electric cars are expanding.
2. Stations that charge cars quickly are becoming common.
3. Electric transport helps protect the environment.
4. Reusing batteries can reduce pollution.
5. Poor system availability limits progress.
6. Charging points are appearing in public areas.
7. Natural resources are needed for batteries.
8. Cutting harmful gases improves air quality.

## Text 2: Smart Grids and Energy-Efficient Technologies

Smart grids represent a major advancement in how electricity is produced, distributed, and consumed. Unlike traditional grids, smart grids use digital

technologies to monitor energy flow and respond to demand in real time. This allows energy to be used more efficiently and reduces waste.

Energy-efficient technologies are being integrated into homes, industries, and cities.

Smart meters, automated lighting systems, and energy-efficient appliances help consumers reduce consumption. By the time smart grids are fully implemented worldwide, energy losses will have decreased significantly.

Smart grids also support renewable energy integration. Solar panels and wind turbines can supply electricity more reliably when connected to intelligent systems. If energy storage technologies continue to improve, renewable sources will become even more dependable.

Despite their benefits, smart grids require significant investment and cybersecurity protection. However, their long-term advantages include lower costs, improved energy security, and reduced environmental impact.

## Vocabulary

**Smart grid** — intelligent electricity distribution system

**Energy-efficient technologies** — systems that use less energy

**Smart meters** — devices that track electricity use

**Energy losses** — wasted electricity during transmission

**Renewable integration** — connecting renewables to the grid

**Energy storage** — holding energy for later use

**Cybersecurity** — protection of digital systems

**Energy security** — reliable access to energy

## Vocabulary Exercises

### A. Complete the sentences:

1. A \_\_\_\_\_ monitors electricity in real time.
2. \_\_\_\_\_ help households track energy use.
3. Using \_\_\_\_\_ reduces electricity waste.
4. Smart grids reduce \_\_\_\_\_ during transmission.
5. \_\_\_\_\_ allows renewable energy to be used efficiently.
6. Improved \_\_\_\_\_ makes renewables more reliable.
7. Digital systems require strong \_\_\_\_\_.
8. Smart grids improve national \_\_\_\_\_.

## **B. Rewrite using vocabulary words (same number as A):**

1. Intelligent power systems are becoming common.
2. Devices measure household electricity use.
3. Technologies that save energy reduce costs.
4. Less power is wasted during delivery.
5. Renewables need better system connections.
6. Storing power improves reliability.
7. Digital protection is essential.
8. Countries need stable access to electricity.

### **Text 3: Circular Economy Innovations and Biodegradable Materials**

The circular economy challenges the traditional linear model of production and consumption. Instead of producing, using, and discarding products, circular systems aim to keep materials in use for as long as possible. Innovations include product redesign, material recovery, and biodegradable alternatives.

Biodegradable materials are increasingly used in packaging, agriculture, and manufacturing. These materials break down naturally, reducing long-term pollution. By the time circular economy practices are fully adopted, landfill waste will have been reduced dramatically.

Businesses are exploring eco-friendly industrial processes that minimize waste and emissions. However, transitioning to circular models requires investment, technological development, and changes in consumer behavior.

Circular economy innovations promise economic growth while protecting the environment. If industries commit to these principles, future production systems will be more resilient and sustainable.

### **Vocabulary**

**Circular economy** — system focused on reuse and recycling

**Linear model** — produce–use–discard approach

**Material recovery** — reclaiming useful materials

**Biodegradable materials** — substances that decompose naturally

**Eco-friendly processes** — environmentally safe production methods

**Landfill waste** — discarded materials in landfills

**Consumer behavior** — how people make purchasing decisions

**Resilient systems** — systems able to adapt and recover

## **Vocabulary Exercises**

### **A. Complete the sentences:**

1. The \_\_\_\_\_ model leads to excessive waste.
2. \_\_\_\_\_ keeps materials in use longer.
3. \_\_\_\_\_ reduce long-term pollution.
4. Companies invest in \_\_\_\_\_ to lower emissions.
5. \_\_\_\_\_ decreases landfill pressure.
6. Changing \_\_\_\_\_ supports sustainability.
7. Circular systems create more \_\_\_\_\_ industries.
8. Reclaiming resources is known as \_\_\_\_\_.

### **B. Rewrite using vocabulary words (same number as A):**

1. The produce-use-discard approach is outdated.
2. Recycling systems reduce waste.
3. Materials that break down naturally are preferred.
4. Environmentally safe production reduces harm.
5. Waste dumped in landfills causes pollution.
6. Buying habits affect sustainability.
7. Strong systems adapt to change.
8. Recovering materials saves resources.

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