

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЖИТОМИРСЬКИЙ АГРОТЕХНІЧНИЙ КОЛЕДЖ**

АНГЛІЙСЬКА МОВА

**НАВЧАЛЬНИЙ ПОСІБНИК ДЛЯ СТУДЕНТІВ
СПЕЦІАЛЬНОСТІ 205 «ЛІСОВЕ ГОСПОДАРСТВО»
ВИЩИХ АГРАРНИХ НАВЧАЛЬНИХ ЗАКЛАДІВ**

Житомир
Видавець О. О. Євенок
2020

УДК 811.111:630
ББК 81.2 Англ+43
А 64

*Навчальний посібник друкується за рішенням методичної ради
Житомирського агротехнічного коледжу (м. Житомир),
Протокол № 2 від 24.10.2019 р.*

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Англійська мова. Навчальний посібник для студентів спеціальності А 64 205 «Лісове господарство» вищих аграрних навчальних закладів / Житомир: Вид. О. О. Євенок, 2020. - 236 с.

Навчальний посібник створений відповідно до нормативної програми з дисципліни «Іноземна мова за фаховим спрямуванням» і освітньої програми підготовки бакалаврів галузі знань 20 «Аграрні науки та продовольство», спеціальності 205 «Лісове господарство» та змін, що відбулися в лінгвістичних та соціально-психологічних концепціях, які лежать в основі неспеціалізованої методики навчання іноземних мов.

Посібник містить ефективну систему засобів, зокрема вправ і завдань, які сприяють формуванню комунікативної компетентності як пріоритетної мети оволодіння студентами іншомовним спілкуванням за професійним спрямуванням.

Посібник розрахований на фахівців з лісового господарства та охорони навколишнього середовища, наукових працівників, викладачів та студентів вищих навчальних закладів, лісових технікумів і коледжів.

УДК 811.111:630
ББК 81.2 Англ+43

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ВСТУП

Оновлення змісту навчання іноземних мов у вищих навчальних закладах пов'язується з деякими змінами в стратегічних напрямках розвитку сучасної вищої освіти – спрямуванням навчальної діяльності на вироблення у студентів необхідних життєвих компетентностей, що в майбутньому давали б можливість випускникам ВНЗ комфортно почуватися в сучасному світовому мультинаціональному просторі.

Запропонований посібник з англійської мови можна розглядати в якості носія змісту іншомовної освіти та засобу навчання іншомовного спілкування. Його метою є відображення певної моделі діяльності студентів, яка забезпечується на дидактичному і методичному рівнях за допомогою доцільно підібраних засобів навчання, що узгоджуються з комунікативно-діяльнісним підходом і сприяють успішному виконанню цілей, визначених чинною програмою.

Цей посібник – поліфункціональний та вигідно вирізняється серед інших видань як способами подання фактичного і мовного матеріалу, так і запропонованою методикою роботи з ним.

У змісті навчального посібника передбачена ефективна система засобів, зокрема вправ і завдань, які сприяють формуванню комунікативної компетентності як пріоритетної мети оволодіння студентами іншомовним спілкуванням за професійним спрямуванням.

Автори посібника пропонують завдання, що потребують умінь комбінувати матеріал з різних дисциплін і висловлюватися щодо між тематичних ситуацій. Завдання, запропоновані в посібнику, збагачують лексику студентів і націлюють їх на активне сприйняття тексту та цілеспрямований пошук інформації у ньому. Після текстові завдання дозволяють не лише перевірити розуміння і закріпити необхідні лексичні одиниці, але й дати студентам можливість висловити свою точку зору стосовно проблеми, спираючись на власний досвід і знання інших

дисциплін. Як результат – висловлювання студентів набувають різнобічності і особистісної значущості.

Більшість текстових матеріалів у посібнику є автентичними, знайденими у друкованих джерелах виданих у Великій Британії, США та Австралії, а також у відкритому доступі в Інтернет мережі. Окремі тексти є авторськими перекладами. Завдання і вправи розроблено авторським колективом з урахуванням Загальноєвропейських рекомендацій з мовної освіти. Тестові завдання пропонуються у форматах, що відповідають міжнародним екзаменам (TOEFL, KET, PTE). Додатки до основної частини посібника у формі тематичного та термінологічного словників допоможуть майбутнім фахівцям засвоїти професійну лексику та оперувати спеціальною термінологією у процесі ділового спілкування з представниками інших країн.

Загалом, матеріали посібника стимулюють розвиток пізнавальних інтересів студентів та сприяють мотивації до вивчення англійської мови.

Автори висловлюють вдячність завідувачу кафедру Таксації лісу та лісовпорядкування Житомирського агротехнічного коледжу, кандидату с.-г. наук, доценту В. Б. Левченку за дозвіл використати матеріали підручника «Світове лісове господарство» за його редакцією.

Посібник розрахований на фахівців з лісового господарства та охорони навколишнього середовища, наукових працівників, викладачів та студентів вищих навчальних закладів, лісових технікумів і коледжів.

UNIT 1. WORLD FORESTRY



ACTIVITY 1. Find the meaning of the words given in bold print in the dictionary and translate the following article.

A forest is a large area dominated by trees. Hundreds of more precise definitions of forest are used throughout the world, incorporating factors such as **tree density**, **tree height**, land use, **legal standing** and ecological function.

Forests are **the dominant terrestrial ecosystem** of Earth, and are distributed around the globe. Forests account for 75% of the **gross primary production** of the Earth's biosphere, and contain 80% of the Earth's plant biomass.

Forests at different latitudes and elevations form distinctly different ecozones: **boreal forests** near the poles, **tropical forests** near the equator and **temperate forests** at mid-latitudes.

There are three **broad categories of forest** definitions in use: administrative, land use, and land cover. **Administrative definitions** are based primarily upon the legal designations of land, and commonly bear little relationship to the vegetation growing on the land.

Land use definitions are based upon the primary purpose that the land serves. For example, a forest may be defined as any land that is used primarily for production of timber. Under such a land use definition, cleared roads or infrastructure within an area used for forestry, or areas within the region that have been cleared by harvesting, disease or fire are still considered forests even if they contain no trees.

Land cover definitions define forests based upon the type and density of **vegetation growing** on the land. Such definitions typically define a forest as an area growing trees above some threshold. These thresholds are typically the number of trees per area (**density**), the area of ground under the tree canopy (**canopy cover**) or the section of land that is occupied by the **cross-section of tree trunks** (basal area). Under such land cover definitions, an area of land can only be known as forest if it is growing trees. Areas that fail to meet the land cover definition may be still included under while **immature trees** are establishing if they are expected to meet the definition at maturity.

A forest consists of many components that can be broadly divided into two categories that are **biotic** (living) and **abiotic** (non-living) **components**. The living parts include trees, **shrubs**, **vines**, grasses and other **herbaceous** (non-woody) plants, **mosses**, **algae**, **fungi**, insects, **mammals**, birds, reptiles, **amphibians**, and microorganisms living on the plants and animals and in the soil.

A forest is made up of many layers. Starting from the ground level and moving up, the main layers of all forest types are the **forest floor**, **the understory** and **the canopy**. The emergent layer exists in tropical rainforests. Each layer has a different set of plants and animals depending upon the availability of sunlight, moisture and food.

Forest floor contains decomposing leaves, animal droppings, and dead trees. Decay on the forest floor forms new soil and provides nutrients to the plants. The forest floor supports ferns, grasses, mushrooms and tree seedlings. **Understory** is made up of bushes, shrubs, and young trees that are adapted to living in the shades of the canopy. **Canopy** is formed by the mass of **intertwined branches**, twigs and leaves of the mature trees. The crowns of the dominant trees receive most of the sunlight. This is the most productive part of the trees where maximum food is produced. The canopy forms a shady, protective "umbrella" over the rest of the forest.

Emergent layer exists in the tropical rain forest and is composed of a few scattered trees that tower over the canopy.

ACTIVITY 2. Choose the correct items to complete the sentences. Translate the following sentences into Ukrainian:

- 1) Land cover definitions define forests based upon the type and density of vegetation growing on the _____. (land, soil, underground)
- 2) Forest floor _____ decomposing leaves, animal droppings, and dead trees. (displaces, discharges, contains)
- 3) There are three broad _____ of forest definitions in use: administrative, land use, and land cover. (areas, categories, regions)
- 4) A forest is a large area dominated by _____. (water, coins, trees)
- 5) The crowns of the dominant trees receive most of the _____. (natural light, sunlight, rains)
- 6) A forest _____ of many components that can be broadly divided into two categories that are biotic and abiotic components. (includes, consists, joins)
- 7) Forests are the dominant terrestrial ecosystem of _____, and are distributed around the globe. (Moon, Earth, planet)

ACTIVITY 3. Fill in the gaps in the text below with one of the words given in the box.

FOREST TYPES

Temperate needle leaf forests mostly ____1____ the higher latitude regions of the Northern Hemisphere, as well as high altitude zones and some warm temperate areas, especially on nutrient-poor or otherwise unfavourable soils. These forests are ____2____ entirely, or nearly so, of coniferous species (Coniferophyta). In the Northern Hemisphere pines *Pinus*, spruces *Picea*, larches *Larix*, firs *Abies*, Douglas firs *Pseudotsuga* and hemlocks *Tsuga*, make up the canopy, but other taxa are also ____3____. In the Southern Hemisphere, most coniferous trees (members of the *Araucariaceae* and *Podocarpaceae*) occur in mixtures with broadleaf ____4____, and are classed as broadleaf and mixed forests.

species, important, occupy, composed



The taiga or boreal forest is the world's largest land biome. In North America, it ____1____ most of inland Canada, Alaska, and parts of the northern contiguous United States. In Eurasia, it covers most of Sweden, Finland, much of Norway, some of the Scottish Highlands, some lowland / coastal ____2____ of Iceland, much of Russia from Karelia in the west to the Pacific Ocean (including much of Siberia), and areas of northern Kazakhstan, northern Mongolia, and northern Japan (on the island of Hokkaidō). However, the main ____3____ species, the length of the growing season and summer temperatures vary. For example, the taiga of North America mostly ____4____ of spruces; Scandinavian and Finnish taiga consists of a mix of spruce, pines and birch; Russian taiga has spruces, pines and larches depending on the region, while the Eastern Siberian taiga is a vast larch forest.

tree, areas, consists, covers

Temperate broadleaf and mixed forests include a substantial component of trees in the Anthophyta. They are generally ____1____ of the warmer temperate latitudes, but extend to cool temperate ones, particularly in the southern ____2____. They include such forest types as the mixed deciduous ____3____ of the United States and their counterparts in China and Japan, the ____4____ evergreen rainforests of Japan, Chile and Tasmania, the sclerophyllous forests of Australia,

central Chile, the Mediterranean and California, and the southern beech *Nothofagus* forests of Chile and New Zealand.

broadleaf, hemisphere, forests, characteristic

Rainforests are forests characterized by high rainfall, with ____1____ rainfall in the case of tropical rainforests between 250 and 450 centimetres (98 and 177 in), and definitions varying by region for temperate rainforests. The monsoon trough, alternatively known as the intertropical convergence zone, plays a significant role in creating the climatic ____2____ necessary for the Earth's tropical rainforests.

Around 40% to 75% of all biotic species are indigenous to the rainforests. There may be many millions of species of ____3____, insects and microorganisms still undiscovered in tropical rainforests. Tropical rainforests have been called the "jewels of the Earth" and the "world's largest pharmacy", because over one quarter of natural medicines have been discovered there. Rainforests are also responsible for 28% of the world's oxygen turnover, sometimes misnamed oxygen ____4____, processing it through photosynthesis from carbon dioxide and consuming it through respiration.

conditions, plants, annual, production

There are many different types of **tropical moist forests**, with lowland evergreen broad leaf ____1____ rainforests, for example várzea and igapó forests and the terra firma forests of the Amazon Basin; the peat swamp ____2____, dipterocarp forests of Southeast Asia; and the high forests of the Congo Basin. Seasonal tropical forests, perhaps the best description for the colloquial term "jungle", typically range from the rainforest zone 10 ____3____ north or south of the equator, to the Tropic of Cancer and Tropic of Capricorn. Forests located on mountains are also included in this ____4____, divided largely into upper and lower mountain formations on the basis of the variation of physiognomy corresponding to changes in altitude.



forests, degrees, category, tropical

Tropical dry forests are characteristic of areas in the tropics affected by seasonal drought. The seasonality of rainfall is usually ____1____ in the deciduousness of the forest canopy, with most trees being leafless for several months of the year. However, under some ____2____, e.g. less fertile soils or less predictable drought regimes, the proportion of ____3____ species increases and the forests are characterised as "sclerophyllous". Thorn forest, a dense forest of low stature with a high frequency of thorny or spiny ____4____, is found where drought is prolonged, and especially where grazing animals are plentiful.

conditions, species, evergreen, reflected

Sparse trees and savanna are forests with lower canopy ____1____ of trees. They occur principally in areas of transition from forested to non-forested landscapes. The two major zones in which these ____2____ occur are in the boreal region and in the seasonally dry tropics. At high latitudes, north of the main zone of boreal forest, growing conditions are not adequate to maintain a continuous closed forest cover, so tree cover is both sparse and discontinuous. This ____3____ is variously called open taiga, open lichen woodland, and forest tundra. A savanna is a mixed woodland grassland ecosystem characterized by the trees being



sufficiently widely spaced so that the canopy does not close. The open canopy allows sufficient light to reach the ground to _____⁴_____ an unbroken herbaceous layer consisting primarily of grasses. Savannas maintain an open

canopy despite a high tree density.

ecosystems, vegetation, support, cover

ACTIVITY 4. Try to match the words in COLUMN A with their equivalents in COLUMN B and form meaningful phrases with them.

A	B
1) A forest consists of many components that can be	a) terrestrial ecosystem of Earth.
2) Forests are the dominant	b) most of the sunlight.
3) Forest floor contains	c) broadly divided into two categories that are biotic and abiotic components.
4) The crowns of the dominant trees receive	d) the forest floor, the understory and the canopy.
5) The canopy forms a shady,	e) many layers.
6) The main layers of all forest types are	f) protective "umbrella" over the rest of the forest.
7) A forest is made up of	g) decomposing leaves, animal droppings, and dead trees.

ACTIVITY 5. Read and translate the text. Complete the following sentences with the correct words.

Forest resources of the world amount to 3.8 billion **1**_____. Industrial stocks of wood make up more than 50 billion m³. Most of the forests are concentrated in two forest belts – the **2**_____ one, with the dominance of coniferous species (runs through Canada, the USA, Scandinavia, Russia) and **3**_____, with the predominance of hardwood species (Central and South America, Equatorial Africa, Southern and Southeast Asia).

Woods are the main producer of **4**_____ in the atmosphere. Wood is used as fuel, valuable material for the construction and chemical industry. **5**_____ fulfill soil protection and water-saving functions, are a place of rest, play an extremely important environmental role.

The largest forest **6**_____are preserved in Asia and South America, the smallest in Australia and Europe. Each year the area of forests is reduced by 25 million hectares, which is an important aspect of the environmental **7**_____ of the present. According to the reserves of wood, the leading places in the world are occupied by: Russia, Canada, Brazil, the USA, Indonesia.

1	A	soils	B	woods	C	lands	D	hectares
2	A	norlander	B	north	C	northern	D	northerly
3	A	meridional	B	southern	C	southerly	D	south
4	A	oxygen	B	carbon dioxide	C	carbonic acid	D	hydrochloric acid
5	A	Woods	B	Forests	C	Timbers	D	Preserves
6	A	branches	B	measures	C	areas	D	squares
7	A	question	B	puzzle	C	objective	D	problem

ACTIVITY 6. Decide whether the following statements are TRUE or FALSE:

- 1) The rainforests or boreal forest is the world's largest land biome.
- 2) Forests form two roughly equal area and forest reserves of forest strips – northern and southern.

3) Thanks to forests, carbon dioxide is synthesized in the atmosphere, the flow of groundwater is regulated, and soil erosion is prevented.

4) The main reasons for the destruction of forests are: the decrease of agricultural land and deforestation for the purpose of using wood.

5) The forest floor supports ferns, grasses, mushrooms and tree seedlings.



ACTIVITY 7. Match the beginnings and the end of the sentences.

1.Woods are the main producer of	a. by 25 million hectares.
2.Most of the forests are concentrated in	b. water-saving functions.
3.Each year the area of forests is reduced	c. oxygen in the atmosphere.
4.Forests fulfill soil protection and	d. two forest belts.

ACTIVITY 8. Read and complete the text with the missing parts (A - E).

World forest resources are characterized by two important indicators: the size of the forest area and the amount of forest rehabilitated areas. But since the area of forests is removed for arable land, forests, wood is used as a fire wood, raw material for woodworking and other types of industry (production of paper, furniture, etc.), ____**(1)**____. For rational use of forest resources, it is necessary to



complexly process the raw materials, not cut down forests in volume exceeding their annual growth, carry out reforestation works.

Forests of the world are spread unevenly. They form two roughly equal area and forest reserves of forest strips – northern and southern. The most forested countries of the northern zone are: Russia, the USA, Canada, Finland, and Sweden. The southern belt is located in the zone of tropical and equatorial climates. The main forest areas of the southern belt are ____**(2)**____.

Forest resources are called ____**(3)**____; they play a huge role in the life of all mankind. Thanks to forests, oxygen is synthesized in the atmosphere, the flow of groundwater is regulated, and soil erosion is prevented. The erosion of the tropical rainforests of Amazonia today has led to a disturbance in this region of rather dangerous natural phenomena, namely hurricanes, tornadoes and whirlwinds.

Forest resources that humanity uses include: ____**(4)**____ and industrial resources, etc., as well as recreational properties of the forest - water protection, climatic control, anti-erosion. Forest resources are renewable.

The main reasons for the destruction of forests are: the expansion of agricultural land and deforestation for the purpose of using wood. Forests are cut down due to the construction of communication lines. The greenest covering of the tropics is most intensively destroyed. In most developing countries, cutting is carried out in connection with the use of wood as fuel, as well as burning forests to obtain arable land. As a result of global warming, massive drying of pine and oak plantations is observed. Such a situation could not remain ecologically isolated. The most technologically advanced and at the same time poorly forested countries are already implementing ecological programs for ____**(5)**____.

So, in Japan and Australia, as well as in some Western European countries, the area under the forests remains stable, and there is no depletion of the dugout.

A – wood, grass, cork, mushrooms, fruits, berries, nuts, medicinal plants, hunting

B – the "lungs" of the planet

C – the problem of reducing forest resources and degradation of the territories is quite acute.

D – the conservation, regeneration and improvement of forest lands.

E – Amazonia, the Congo River Basin, Southeast Asia, Brazil, and Venezuela.

ACTIVITY 9. Answer the questions.

1. What indicators are world forest resources characterized by?
2. What countries of the northern zone are the most forested?
3. How are forest resources called?
4. What is it necessary for rational use of forest resources?
5. What do forest resources that humanity uses include?
6. Forest resources are renewable, aren't they?
7. What are the main reasons for the destruction of forests?
8. What countries are already implementing ecological programs?

ACTIVITY 10. Fill in the gaps with necessary words and translate the following sentences.

1. The main reasons for _____ of forests are: the expansion of agricultural land and deforestation for the purpose of using wood.

2. As a result of global _____, massive drying of pine and oak plantations is observed.

3. In most developing countries, cutting is carried out in connection with the use of wood as fuel, as well as burning forests to obtain _____ land.

4. Thanks to _____, oxygen is synthesized in the atmosphere, the flow of groundwater is regulated, and soil erosion is prevented.

5. Forests of the world are _____ unevenly.

6. For rational use of forest resources, it is necessary to complexly process the raw materials, not cut down forests in volume exceeding their annual _____, carry out reforestation works.

7. World forest resources are _____ by two important indicators: the size of the forest area and the amount of forest rehabilitated areas.

ACTIVITY 11. Find the meaning of the words given in bold print in the dictionary and translate the following sentences.



1) Forests play a huge role in the **gas balance** of the atmosphere and the regulation of the **planetary climate** of the planet Earth.

2) The overall balance for the forests of the continent Eurasia for **carbon dioxide** amounted to 1789064.8 thousand tons, and for

oxygen - 1299019.9 thousand tons.

3) **Annually** 600 million tons of carbon are deposited in the forests of the world.

4) These gigantic **volumes of gas** migration substantially stabilize the **gas composition** and climate of the planet.

5) The main reserves of the forest on the planet **are concentrated** in Siberia, the Far East, North and Central America, as well as in the European North.

ACTIVITY 12. Fill in the gaps in the text below with one of the words given in the box.

The ____**(1)**____ of forests has been steadily declining for 500 years, but, of course, the most dramatic - in the XX ____**(2)**____. It is

established that in the last 10 thousand years, 2/3 of the forests of the ____**(3)**____ of Eurasia were destroyed.

Forest resources are some of the most important of biological resources. This is an exhaustive, but ____**(4)**____ resource for multipurpose purposes. World forest ____**(5)**____ are characterized by two main indicators: the size of the forest ____**(6)**____ 4 billion hectares) and the ____**(7)**____ of wood on stumps (350 billion cubic meters).

area, resources, area, types, century, stock, continent, renewable

ACTIVITY 13. Order the paragraphs (a – d) to build a text. Then read and translate it.

TREES



(A)____ Trees usually reproduce using seeds. Flowers and fruit may be present, but some trees, such as conifers, instead have pollen cones and seed cones. Palms, bananas, and bamboos also produce seeds, but tree ferns produce spores instead.

(B)____ In botany, a tree is a perennial plant with an elongated stem, or trunk, supporting branches and leaves in most species. In some usages, the definition of a tree may be narrower, including only woody plants with secondary growth, plants that are usable as lumber or plants above a specified height. Trees are not a taxonomic group but include a variety of plant species that have independently evolved a woody trunk and branches as a way to tower above other plants to compete for sunlight. Trees tend to be long-lived, some reaching several thousand years old. In wider definitions, the taller

palms, tree ferns, bananas, and bamboos are also trees. Trees have been in existence for 370 million years. It is estimated that there are just over 3 trillion mature trees in the world.

(C)___ Trees play a significant role in reducing erosion and moderating the climate. They remove carbon dioxide from the atmosphere and store large quantities of carbon in their tissues. Trees and forests provide a habitat for many species of animals and plants.

(D)___ A tree typically has many secondary branches supported clear of the ground by the trunk. This trunk typically contains woody tissue for strength, and vascular tissue to carry materials from one part of the tree to another. For most trees it is surrounded by a layer of bark which serves as a protective barrier. Below the ground, the roots branch and spread out widely; they serve to anchor the tree and extract moisture and nutrients from the soil. Above ground, the branches divide into smaller branches and shoots. The shoots typically bear leaves, which capture light energy and convert it into sugars by photosynthesis, providing the food for the tree's growth and development.

1_____ 2_____ 3_____ 4_____

ACTIVITY 14. Read and discuss the main problems of using forest resources.



The main problems of using forest resources include:

1) reduction of forest area due to the expansion of agricultural land, deforestation, for the purpose of economic use of wood, in connection with construction;

2) desertification of territories due to excessive felling, resulting

in the upper layer of soil, which is not bound by the roots completely eroded.

The ways to solve these problems include:

- 1) integrated processing of forest raw materials;
- 2) not cut down forests in a volume that exceeds their growth;
- 3) reforestation works;
- 4) control over the quality of water and air;
- 5) replacement of wood with other structural materials and fuel sources.

Thus, the problem of preserving and multiplying forests puts humankind in the task of optimizing wood processing processes, as well as replacing wood with innovative materials, which in the future will enable humanity to more effectively use wood resources.

ACTIVITY 15. Choose the proper words and fill them in the blanks:

- 1) For most trees it is surrounded by a layer of bark which serves as a _____ barrier.
 A sheltering B fenceful C protective D intercessory
- 2) The _____ of preserving and multiplying forests puts humankind in the task of optimizing wood processing processes
 A objective B issue C exercise D problem
- 3) Trees and forests _____ a habitat for many species of animals and plants.
 A give B provide C produce D allow
- 4) Trees have been in existence for 370 _____ years.
 A million B thousand C hundred D century
- 5) Flowers and fruit may be present, but some trees, such as _____, instead have pollen cones and seed cones.
 A deciduous trees B larch C ash trees D conifers

ACTIVITY 16. Match the following words in the left-hand column with their definitions in the right- hand column:

1. A tree	a. - is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources for human and environmental benefits.
2. Habitat conservation	b. - is a large area dominated by trees.
3. Conservation biology	c. - is a branch of forestry concerned with overall administrative, economic, legal, and social aspects, as well as scientific and technical aspects, such as silviculture, protection, and forest regulation.
4. Forest farming	d. - is a management practice that seeks to conserve, protect and restore habitats and prevent species extinction, fragmentation or reduction in range.
5. A forest	e. - is a perennial plant with an elongated stem, or trunk, supporting branches and leaves in most species.
6. Forest management	f. - is the cultivation of high-value specialty crops under a forest canopy that is intentionally modified or maintained to provide shade levels and habitat that favor growth and enhance production levels.
7. Forestry	g. - is the management of nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions.

EXTENSIVE READING

TEXT 1. WORLD BIOMES AND ECOSYSTEMS



Each individual plant and animal could not exist by itself on planet Earth. All living organisms need millions of other living organisms to survive. How these organisms interact with the sun, soil, water, air and each other in a specific area is called an ecosystem.

An ecosystem describes a specific area where the organisms work together as a unit. It could be any size from a tiny pool of water to hundreds of square miles of desert. Each ecosystem is different and each has established a balance over time that is important to every form of life within the ecosystem.

A biome is way to describe a large group of similar ecosystems. Biomes have similar weather, rainfall, animals, and plants. There are a number of biomes on planet Earth. See the map of the world biomes below.

Ecosystems maintain important balances in order that all the organisms within the ecosystem can survive. These balances involve food, water, oxygen, nitrogen, and carbon.

The sun provides the energy needed by ecosystems. Plants take this energy and use photosynthesis to create sugar which they can use for energy. Nutrients in the soil, the air, and water also play a part in keeping an ecosystem thriving and in balance.

TEXT 2. TEMPERATE FOREST BIOME

All forests have lots of trees, but there are different types of forests. They are often described as different biomes. One of the main differences is where they are located in relation to the equator and the

poles. There are three main types of forest biomes: the rainforest, the temperate forest, and the Taiga. Rainforests are located in the tropics, near the equator. Taiga forests are located far north. Temperate rainforests are located in between.

Temperature - Temperate means "not to extremes" or "in moderation". In this case temperate is referring to the temperature. It never gets really hot (like in the rainforest) or really cold (like in the Taiga) in the temperate forest. The temperature is generally between minus 20 degrees F and 90 degrees F.

There are four distinct seasons: winter, spring, summer, and fall. Each season is about the same length of time. With only a three month winter, plants have a long growing season.

There is lots of rain throughout the year, usually between 30 and 60 inches of rain.

Rotted leaves and other decaying matter provide a rich, deep soil that is good for trees to grow strong roots. They are located in several locations around the world, around halfway between the equator and the poles.

There are actually many **types of temperate forests**. Here are the main ones:

Coniferous - These forests are made up mostly of conifer trees such as cypress, cedar, redwood, fir, juniper, and pine trees. These trees grow needles instead of leaves and have cones instead of flowers.

Broad-leafed - These forests are made up of broad-leafed trees such as oak, maple, elm, walnut, chestnut, and hickory trees. These trees have big leaves that change color in the fall.

Mixed coniferous and broad-leafed - These forests have a mix of conifers and broad-leafed trees.

There are major temperate forests located around the world including: Eastern North America, Europe, Eastern China, Japan, Southeast Australia, New Zealand.

The plants of the forests grow in different layers. The top layer is called the canopy and is made up of full grown trees. These trees form an umbrella throughout most of the year providing shade for the layers

below. The middle layer is called the understory. The understory is made up of smaller trees, saplings, and shrubs. The lowest layer is the forest floor which is made up of wildflowers, herbs, ferns, mushrooms, and mosses.

The plants that grow here have some things in common.

They lose their leaves - Many of the trees that grow here are deciduous trees, meaning they lose their leaves during the winter. There are a few evergreen trees as well that keep their leaves for the winter.

Sap - many trees use sap to help them through the winter. It keeps their roots from freezing and is then used as energy in the spring to start growing again.

There are a wide variety of animals that live here including black bears, mountain lions, deer, fox, squirrels, skunks, rabbits, porcupines, timber wolves, and a number of birds. Some animals are predators like mountain lions and hawks. Many animals survive off of nuts from the many trees like squirrels and turkeys.

Each species of animal has adapted to survive the winter.

Remain active - Some animals stay active during the winter. There are rabbits, squirrels, fox, and deer which all stay active. Some are just good at finding food while others, like squirrels, store up and hide food during the fall that they can eat during the winter.

Migrate - Some animals, like birds, migrate to a warmer place for the winter and then return home come springtime.

Hibernate - Some animals hibernate or rest during the winter. They basically sleep for the winter and live off of fat stored in their body.

Die and lay eggs - Many insects can't survive the winter, but they lay eggs that can. Their eggs will hatch come spring.

Much of the forests in Western Europe are gone due to overdevelopment. Unfortunately, the ones in Eastern Europe are now dying from acid rain.

TEXT 3. TUNDRA BIOME

The tundra biome is a cold and treeless plain where harsh conditions make it hard for plants and animals alike to survive. Around 20% of the Earth's land surface is covered with tundra.

The word tundra comes from a Finnish word *tunturi*, which means treeless plain or barren land.

The tundra is a very fragile biome that is shrinking as the permafrost melts.

Characteristics of the Tundra Biome

It's cold - The tundra is the coldest of the biomes. The average temperature in the tundra is around -18 degrees F. It gets much colder in the winter and warmer during its short summer.

It's dry - The tundra gets about as much precipitation as the average desert, around 10 inches per year. Most of this is snow.

Permafrost - Below the top soil, the ground is permanently frozen year round.

It's barren - The tundra has few nutrients to support plant and animal life. It has a short growing season and a slow rate of decay.

Two Types of Tundra

Alpine tundra - Alpine tundra is the area of land high in the mountains above the tree line.

Arctic tundra - The Arctic tundra is located far north in the northern hemisphere along the Arctic Circle. There are large areas of tundra in northern North America, northern Europe, and northern Asia.

The tundra has two distinct seasons: a long winter and a short summer. Being so far north, the tundra has long nights in the winter and long days in the summer.

The winter lasts around 8 months and is extremely cold. In the middle of winter the sun may not rise for weeks. The tundra is frozen and often covered with snow during the winter and will reach temperatures of -60 degrees F.

The summer is shorter and is marked by the other extreme of the sun not setting. In the middle of summer the sun will be up for 24 hours.

During the summer the temperatures may reach 50 degrees F causing the snow to melt in areas and wetlands to form.

Permafrost is a layer of ground below the topsoil that remains frozen throughout the year. This layer is generally only a few feet below the surface. Permafrost prevents trees from growing in the tundra because trees need to have deep roots and they can't grow in the frozen ground.

Plants that grow in the tundra include grasses, shrubs, herbs, and lichens. They grow in groups and stay low to the ground to stay protected from the icy winds. They tend to have shallow roots and flower quickly during the short summer months.

Most of the plants in the tundra are perennials that come back each year from the same root. This allows them to grow during the summer and save up nutrients as they lay dormant for the winter. They also tend to have hairy stems and dark leaves. This helps them in absorbing energy from the sun.

The tundra has a lot more animal activity during the summer than the winter. This is because most birds migrate south for the summer, insects lay eggs that wait for the summer to hatch, and some mammals hibernate for the winter. There are even some animals, like the caribou, which migrate south for the winter.

There are some animals that have adapted to winter in the tundra. Some of them change coats from brown in the summer to white in the winter so they can blend in with the snow. These include the arctic hare, the ermine, and the arctic fox. Other animals that are active in the winter include the snowy owl, musk oxen, and ptarmigans.

During the summer, the tundra will be teeming with insects. Wetland areas will be filled with mosquitoes. There will also be a lot of bird activity as they come to eat the insects and fish. Animals will be more active, coming out of hibernation or migrating from the south.

TEXT 4. TROPICAL RAINFOREST BIOME

One of the most fascinating biomes on planet Earth is the tropical rainforest. It is filled with tall trees, interesting plants, giant insects, and all sorts of animals.

As you might have guessed from the name, rainforests are forests that get a lot of rain. Tropical rainforests are located in the tropics, near the equator. Most rainforests get at least 75 inches of rain with many getting well over 100 inches in areas.

Rainforests are also very humid and warm. Because they are close to the equator, the temperature stays between 70 and 90 degrees F for most of the year.

Surprisingly, the soil in a rainforest is shallow and has little nutrients.

In the Amazon rainforest there are over 2,000 species of butterflies.

They are home to interesting "flying" animals such as squirrels, snakes, and frogs.

It is estimated that 25% of the ingredients in medicines today come from the rainforest.

Rainforests impact the temperatures and weather patterns throughout the world.

One fifth of the world's freshwater supply is in the Amazon rainforest.

Every second, a section of rainforest the size of a football field is cut down.

Only about 2% of the sunlight hits the forest floor.

There are three major areas of tropical rainforests:

Africa - The major tropical rainforest in Africa is in the southern central portion of the continent with the Congo River running through it. There are also rainforests in western Africa and Madagascar.

Southeast Asia - Much of Southeast Asia is considered part of a tropical rainforest biome. It runs all the way from Myanmar to New Guinea.

South America - This is the world's largest tropical rainforest. It covers much of the northern part of South America as well as the southern portion of Central America. The area is often called the Amazon basin and has the Amazon and Orinoco Rivers running through it.

The tropical rainforest has the most biodiversity of all the land biomes. Despite only covering around 6% of the Earth's surface, scientists estimate that around half of the planet's animal and plant species live in the world's rainforests.

The rainforest can be divided up into three layers: the canopy, the understory, and the forest floor. Different animals and plants live in each different layer.



The canopy - This is the top layer of trees. These trees are usually at least 100 feet tall. Their branches and leaves form an umbrella over the rest of the layers. Most of the plants and animals live on this layer. This

includes monkeys, birds, insects, and reptiles of all sorts. Some animals can live their entire lives without leaving the canopy to touch the ground. This layer is the loudest layer with the animals making lots of noise.

The understory - Beneath the canopy is the understory. This layer is made up of some shorter trees and shrubs, but mostly the trunks and branches of the canopy trees. This layer is home to some of the larger predators like snakes and leopards. It is also home to owls, bats, insects, frogs, iguanas, and various other animals.

The forest floor - Because of the thickness of the canopy, very little sunlight makes it to the forest floor. This layer is home to lots of insects and spiders. There are also some animals that live on this layer including

deer, pigs, and snakes. This layer is the quietest layer as animals sneak around in the dark making little noise.

Sometimes scientists refer to a fourth layer called the emergent layer. This is made up of tall trees that grow above the canopy.

The rainforests are important to the world for many reasons. One reason is that they act as the Earth's lungs by producing around 40% of the world's oxygen. Since all of us need oxygen to live, that reason ranks pretty high. The rainforests also provide a number of important drugs to help sick people and cure diseases. It is believed by many that there are even cures for cancer waiting for us to discover in the rainforest. The rainforest is also home to many species of animals and is a beautiful and irreplaceable part of nature.

Unfortunately, human development is killing off much of the world's rainforest. Around 40% of the world's rainforests have already been lost. Environmentalists are doing what they can to help countries preserve this vital biome.

TEXT 5. TAIGA FOREST BIOME

The Taiga is one of the three main forest biomes. The other two are the temperate forest and the tropical rainforest. The taiga is the driest and coldest of the three. The taiga is sometimes called the boreal forest or the coniferous forest. It is the largest of all the land biomes. Many years ago the taiga was covered with icy glaciers. The word boreal means northern or "of the north wind".

The occasional wildfire is good for the taiga as it opens up area for new growth. The trees have adapted to fires by growing tough bark. This will help some of them survive a mild fire.

Many of the forest floor plants are perennials that come back each summer after laying dormant for the winter.

These forests are endangered and shrinking due to logging.

The taiga has several **characteristics** that distinguish it from the other forest biomes:

Evergreen trees - This forest is covered with evergreen, or coniferous, trees. These are trees that don't drop their leaves, or needles, in the winter. They keep their leaves so they can soak up as much sunlight for as long as possible. The dark green color of their leaves also helps them to soak up more sun and gain more energy through photosynthesis.

Cold weather - The taiga has the coldest weather of the forest biomes. Winters can get as cold as -60 degrees F. Winter can last for six months with the temperature averaging below freezing. Summers are warmer, but very short.

Dry - The precipitation is only slightly more than the desert or the tundra. Average precipitation is between 12 and 30 inches per year. It falls as rain in the summer and snow in the winter.

Thin layer of soil - Because the leaves don't fall from the trees, like in the temperate forest, the layer of good soil is thin. Also, the cold weather causes a slow rate of decay taking it longer for nutrients to get back into the soil.

Short growing season - With a long winter and short summer, plants don't have a lot of time to grow in the taiga. The growing season only lasts for around three months. This compares to at least six months in the temperate forest and a year round growing season in the rainforest.

These forests are located in the far north typically between the temperate forest biome and the tundra biome. On the globe this is between 50 degrees latitude north and the Arctic Circle. The largest taiga forest covers much of northern Russia and Siberia. Other major taiga forests include North America (Canada and Alaska) and Scandinavia (Finland, Norway, and Sweden).

The dominant plant in the taiga is the coniferous evergreen tree. These trees include spruce, pine, cedar, and fir trees. They grow close together forming a canopy over the land, like an umbrella. This canopy soaks up the sun and only lets a little bit of sunlight through to the ground.

The conifers of the taiga produce their seeds in cones. They also have needles for leaves. Needles are good at holding in water and

surviving the harsh cold winds each winter. The trees also grow in a cone shape. This helps the snow to slide off their branches.

Under the canopy of the trees, few other plants grow. In some moist areas plants such as ferns, sedges, mosses, and berries will grow.

The animals of the taiga must be able to survive the cold winters. Some animals, like birds, migrate to the south for the winter. Insects lay eggs that can survive the winter and then die. Other animals, like squirrels, store up food for the winter while others hibernate by going into a long, deep sleep.

Predators of this biome include the lynx, wolverines, Cooper's hawk, and wolves. Other animals include moose, the snowshoe hare, deer, elk, bears, chipmunks, bats, and woodpeckers.

Animals that live here have certain characteristics that help them to survive:

They generally have thick fur or feathers to keep them warm.

Many animals have sharp claws and are good at climbing trees.

They have large feet to allow them to walk on the snow without sinking.

Many of them change colors from white fur in the winter, to help them hide in the snow, to brown fur in the summer, to help them hide in the trees.

ANSWER THE COMPREHENSION QUESTIONS:

1. What is an ecosystem?
2. What is a biome?
3. What is permafrost?
4. What makes a forest a rainforest?
5. Where are the world's rainforests?
6. What makes a forest a temperate forest?
7. Where are the temperate forests located?
8. What makes a forest a taiga forest?
9. Where are the taiga forests located in the world?

AFTER-READING ACTIVITY



Project work. Aim: to design a poster, make a brochure or presentation about world forestry.

UNIT 2. PLANTS AND ANIMALS OF UKRAINE



ACTIVITY 1. Match the names of trees to their Ukrainian equivalents.

a) oak	1) вільха
b) pine	2) бук
c) fir	3) липа
d) beech	4) клен
e) birch	5) ялиця
f) aspen	6) дуб
g) maple	7) верба
h) linden	8) осика
i) alder	9) сосна
j) willow	10) береза

ACTIVITY 2. Read and translate the text.

The area of natural vegetation occupies about 30% of Ukraine's territory, of which 14% is forested, 3% is highlands, 8% swampland. Most forests are in the Carpathians and Polissia.

Ukraine has mostly coniferous and deciduous trees (pine, oak, fir, beech and birch). Plantations of valuable species (oak and beech) are increasing, while plantations of little-used trees such as hornbeam and aspen are diminishing. The wealth of the forest includes not only timber, but also, berries, mushrooms and medicinal herbs.



ACTIVITY 3. Try to match the words in COLUMN A with their equivalents in COLUMN B and form meaningful phrases with them.

A	B
1) Ukraine has mostly	a) rare or extinct in other places.
2) The Forest-Steppe zone contains	b) but also, berries, mushrooms and medicinal herbs.
3) The wealth of the forest includes not only timber,	c) animals from southern countries.
4) Birds and animals have survived here which are	d) the oak, elm, hornbeam, black poplar, willow, ash and pine.
5) The animal life includes many	e) coniferous and deciduous trees

ACTIVITY 4. Decide whether the following statements are TRUE or FALSE:

- 1) Characteristic of Polissia are the pine, oak, birch, aspen, maple, linden, alder and willow.
- 2) The area of natural vegetation occupies about 50% of Ukraine's territory.
- 3) The mountains of the Forest-Steppe zone are home to ducks and storks, geese and cranes.
- 4) The Steppe zone is the less natural geographic zone in Ukraine.

5) The wealth of the forest includes not only timber, but also, berries, mushrooms and medicinal herbs.

ACTIVITY 5. Group the words into four groups.

Nutria, stone thrushes, pine, grouse, mink, oak, birch, titmouse, bream, silver-black fox, musk-rat, willow, geese, beaver, palms, pike, cranes, magnolias, jerboa, maple, linden, marmot, hamster, owl, wolf, storks, fox, partridge, badger, alder, sparrow, perch, marten, golden eagles, wild pig, elk, lynx, polecat, ducks, raccoon, aspen, bear, carp, laurels, black woodpeckers.

ANIMALS	TREES	FISH	BIRDS

ACTIVITY 6. Match choices A – H to the pictures 1 – 8.

A – marten, B – roe, C – elk, D – beaver, E – lynx,
F – deer, G – wild pig, H – wolf.

1 	2 
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3



4



5



6



7



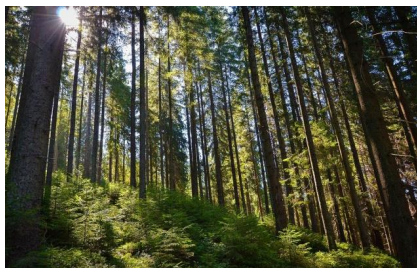
8

ACTIVITY 5. Fill in the gaps in the text below with one of the words given in the box.

The animal ___1___ of Ukraine is diverse, with hundreds of ___2___ of mammals and birds. ___3___ include wolf, fox, badger, marten; ___4___ animals include roe, deer, wild pig and elk; there is beaver, jerboa, marmot, hamster and fieldmouse. Characteristic of the ___5___ are the sparrow, titmouse, grouse, owl and partridge. Certain ___6___ animals (nutria, mink, silver-black fox, musk-rat) introduced into Ukraine have acclimatized well. In the rivers, lakes and reservoirs there are perch, bream, pike and carp.

Predators, birds, world, fur, hoofed, species
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ACTIVITY 7. Read and discuss the article. Use the internet to find more information about nature of different regions of Ukraine.



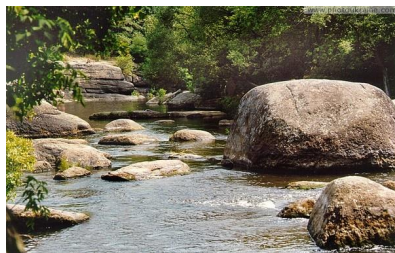
Characteristic of **Polissia** are the pine, oak, birch, aspen, maple, linden, alder and willow. Animals here include the wolf, wild pig, elk, lynx, marten, beaver, polecat, raccoon and bear and such birds as black, hazel and wood goose.



The Forest-Steppe zone contains the oak, elm, hornbeam, black poplar, willow, ash and pine. The animals include squirrels, forest martens, foxes, hares and roes. The rivers are home to ducks and storks, geese and cranes.



The Steppe zone is the largest natural geographic zone in Ukraine. The Donetsk Ridges character is similar to the forest-steppe.



In **the Carpathians** the vegetation is located in zones according to altitude. Up to 1,200 m we find mixed forests with beech, hornbeam, platan, fir and oak. Above 1,500 m spread the alpine plateaux, on which grow grasses and low scrub, especially the creeping pine. In spring the plateau are abloom with saffron, primrose, mercury, snowdrop and edelweiss.

The animal life of the Carpathians is unique. Here one finds deer, brown bears, wild cats and pigs, ermines and black squirrels. Bird life includes stone thrushes, golden eagles and black woodpeckers.

The Crimean Mountains vegetation is very diverse. In the coastal strip forests of oak and juniper grow. Thickets of arid-loving scrub and grassy vegetation are very widespread. The strip of the

Southern Crimean Coast is covered in forest, mostly beech with hornbeam, pear and maple. The principal tree species in the Crimean



Mountains is the oak. The upper flat parts are treeless rocky plateaux covered in grassy vegetation. In late April snowdrops, crocuses, steppe sedge and other flowers come into bloom here. In May these meadows

are a multicoloured carpet of flowers, with splashes of bright-red peonie and blue cornflower.



The parks of the Southern Coast contain cypresses, palms, magnolias, platans and laurels. Near Yalta there is the Nikitsky Botanical Garden containing trees, bushes and grasses from all over the world.

The animal world of this region is distinct from the other zones. Birds and animals have survived here which are rare or extinct in other places. Such birds include the carrion eagle, black griffons, owls: reptiles include the gecko and others. We can also find red deer, roe, wild pigeon, small weasel, white- tailed eagle, mountain linnets, blue stone thrushes etc. The animal life includes many animals from southern countries.

ACTIVITY 8. Match the following words and word combinations with their Ukrainian equivalents:

1) Plateau	a) дятел
2) Vegetation	b) шафран
3) Alpine	c) плато
4) Saffron	d) рослинність
5) Mercury	e) альпійський
6) Snowdrop	f) ртуть
7) wood-pecker	g) пролісок
8) Primrose	h) дуб
9) Oak	i) первоцвіт

ACTIVITY 9. Read the article again and decide whether the statements are TRUE (T) or FALSE (F).

- 1) The strip of the Central Crimean area is covered in forest, mostly beech with hornbeam, pear and maple.
- 2) The Steppe zone is the largest natural geographic zone in Ukraine.
- 3) Characteristic of Steppe zone are the pine, oak, birch, aspen, maple, linden, alder and willow.
- 4) The Forest-Steppe zone contains the oak, elm, hornbeam, black poplar, willow, ash and pine.
- 5) In the Carpathians the vegetation is located in zones according to altitude.

ACTIVITY 10. Answer the questions.

1. How much Ukraine's territory does natural vegetation occupy?
2. What coniferous trees does Ukraine have?
3. What deciduous trees are there in Ukraine?
4. What species of mammals live in Ukraine?
5. What Animals and plants are widespread in Polissya?
6. What is the largest natural geographic zone in Ukraine?

7. What does the Forest-Steppe zone contain?
8. Where can be seen black squirrels, stone thrushes, golden eagles and black woodpeckers?
9. What botanical garden contains trees, bushes and grasses from all over the world?
10. What is the oldest reserve in Ukraine?
11. What is the largest reserve in Ukraine?
12. How many reserves are there in Ukraine?

EXTENSIVE READING

RESERVES AND NATURAL RESERVE TERRITORIES OF INDEPENDENT UKRAINE

Dnipro – Teteriv Protected Forestry-Hunting Farm.



Established in 1967, the area is 30.5 thousand hectares (Forest covers 17.3 thousand hectares or 57%). Kyiv region. It is located in the zone of mixed forests, namely in the southern part of Eastern Polissya. Mammals include beavers, wild boars, roes, red deer; there are also black-

cocks, grey grouses, waterfowls and marsh wildings.

Zalisk Protected Forestry-Hunting Farm.



Founded in 1957, the area is 35.1 thousand hectares (Forest covers 13.7 thousand hectares or 39%). Kyiv region. Island pine forests and leaf-breeding forests of Ukrainian Polissya. Fauna: wild boar, European roe,

European and spotted deer, hare, bison, hind and others.

Kaniv Reserve.



Founded in 1931, the area is 1 thousand hectares. (Forest covers 0.9 thousand hectares, 90%). Cherkasy region. Hornbeam grove and hornbeam forest. In the flora there are 1089 species; many endemics and relics. In the fauna

there is elk, roe, wild boar, badger, marten, squirrel. On the island Kruglik there is a colony of beavers and there are otters.

Carpathian Reserve.

Founded in 1968, the area is 12.7 thousand hectares. (Forest covers 12.1 thousand hectares or 95%). Ivano - Frankivsk and Transcarpathian region. Natural complexes of mountain forests of the Carpathians: European cedar, thistle berries, European larch, Cossack juniper, rhododendron of Kochi, green alder. 4 endemic, 17 rare and 4 endangered species have been registered. Representatives of the mountain taiga fauna - deer, roe deer, wild boar, lynx, wild cat, deer, tortoise, black stork, etc.

Reserve «Cape Martian».



Established in 1973, the area is 0.2 thousand hectares. (Forest covers 0.1 thousand hectares or 50%). Crimea area, near by the Nikitsky botanic garden. Oak-juniper forest of Southern Crimea with fluffy oak, juniper high and pistachio.

Polissya Natural Biosphere Reserve.

Founded in 1968, the area is 20.1 thousand hectares. (Forest covers 17.1 thousand hectares or 85%). Territorially located in the Zhytomyr region. Volyn forests of Polissya (rocky oak). Pine forests, relict thickets of azaleas of the Pontic, yellow rhododendron. Fauna: elk, beaver, wild boar, muskrat, woodpecker, deer, black stork, etc.

Crimean Reserve-Hunting Farm.

It was founded in 1957 on the basis of the reserve, established in 1923. Area - 33.4 thousand hectares (Forest covers 27.9 thousand hectares or 84%). Territorially located in the Crimean region. Natural complexes of mountain forest Crimea: beech, oak, pine forests (Pallas pine and ordinary). In the flora there are about 1100 species of plants, including about 100 species of trees and shrubs. Fauna: red deer, roe, wild boar, stone marten, badger, etc.

Luhansk Reserve.



Founded in 1968, the area is 1.6 thousand hectares. (Forest covers 0.5 thousand hectares or 31%). Luhansk region. Floodplain forests of the Siversky Donets and the steppe. In the flora 1015 species were found, including 50 rare ones.

Typical covering grasses are fescue, feather grass, steppe cherry and others. Wildlife: elk, wild boar, roe deer, marmot - dumpling, etc.; 230 species of birds.

Yalta Mountain - Forest Reserve.

Founded in 1973, the area is 14.2 thousand hectares. (Forest covers 10.9 thousand hectares or 77%). Located in Crimean region. Pine forests from the Crimean (Pallas) pine. In the flora there are 1800 species, many rare and endemic. Valuable fauna: red deer, roe, wild boar, marten, badger, squirrel, hare, pheasant and others.

AFTER-READING ACTIVITY



Project work. Aim: to design a poster, make a brochure or presentation about plants and animals of Ukraine.

UNIT 3. NATURE OF ENGLISH- SPEAKING COUNTRIES

ACTIVITY 1. Fill in the gaps in the text below with one of the words given in the box and read about the plant life of England.



England shares with the rest of Britain a diminished range of ____1____ and living creatures, partly because the island was separated from the ____2____ of Europe soon after much of it had been swept bare by the last Ice Age and partly because the land has been so industriously

worked

Woodland covers merely 7 per cent of England's total ____3____. A drastic depiction of mature broad-leaved forests, especially oak, was a result of the overuse of timber in the iron and shipbuilding ____4____. A modified pattern of vegetation has now emerged through overgrazing, forest clearance, reclamation and drainage of marshlands, and the introduction of exotic ____5____. Though there are fewer species of plants than in the European mainland, they span a wide range and include some rarities. Tundra survives in parts of the moorland of the northeast. England has a profusion of summer wildflowers in its fields. In some parts these have been severely reduced by the use of ____6____ on farms. Cultivated gardens, which contain many species of trees, shrubs, and flowering plants from all over ____7____, account for much of the varied vegetation of the country.

**plant species, land area, mainland, herbicides, the world,
vegetation, industries**

ACTIVITY 2. Scan the article and answer the questions given after it.

ANIMAL LIFE OF ENGLAND

Several animal species such as the bear, wolf, and beaver were exterminated in historic times. More recently birds of prey have suffered at the hands of farmers protecting their stock and their game birds. Under protective measures, including a law restricting the collecting of birds' eggs, some of the less common



birds have been re-establishing themselves. The country lies along the line of bird migrations, some birds have found town gardens, where they are often fed, a favourable environment. In London about 100 different species are recorded annually. London also is a favourable habitat for foxes, which in small numbers have colonized woods and heaths within a few miles of the city centre. There are few kinds of reptiles and amphibians — about half a dozen species of each — but they are nearly all plentiful where conditions suit them.

Freshwater fish are numerous; the char and allied species of the lakes of Cumbria probably represent an old group related to the trout that migrated to the sea before the tectonic changes that formed these lakes cut off their outlet. The marine fishes are abundant in species and in absolute numbers. The great diversity of shores produces habitats for numerous species of invertebrate animals.

1. What animal species were exterminated in historic times?
2. What have some of common birds been re-establishing themselves after?
3. How many species are recorded in London annually?
4. What animals have colonized woods and heaths?
5. Where can the char be found?

ACTIVITY 3. Make up sentences matching two parts of the sentences:

1) The marine fishes are abundant	a) nearly all plentiful where conditions suit them.
2) There are few kinds of reptiles and amphibians but they are	b) which in small numbers have colonized woods and heaths within a few miles of the city center.
3) Several animal species such as the bear, wolf, and beaver	c) in species and in absolute numbers.
4) London is a favourable habitat for foxes,	d) numerous species of invertebrate animals.
5) The country lies along the line of bird migrations, some birds have found town gardens, where	e) were exterminated in historic times.
6) The great diversity of shores produces habitats for	f) are recorded annually.
7) In London about 100 different species	g) they are often fed, a favourable environment.

ACTIVITY 4. Read and complete the text about plant and animal life of wales. Fill in the parts (A – E).



The combination of physical conditions and centuries of human activity has led to 1 in which induced grassland and plantation woodland currently predominate. Grassed varies from mountain grasses and feather to lowland ryegrass pastures.

The remoter parts of Wales shelter some mammals and birds 2 elsewhere in Britain. The polecat is fairly common in central

Wales though hardly known elsewhere; the pine marten occurs in ____3____.

Various seabirds and shorebirds occur in large numbers as might be expected in a country with ____4____ (965 kilometers) of varied coastline.

There are three ____5____ in Wales (Snowdonia, Pembrokeshire Coast, Brecon Beacons).

- A – extinct or rare
- B – about 600 miles
- C – a vegetation coverage
- D – designated national parks
- E – a few places

ACTIVITY 5. Order the paragraphs (A - C) to build a text about plant and animal life of northern Ireland then read and translate it.

(A) As the result of an increasing concern with conservation, there are some 40 nature reserves and several bird sanctuaries controlled by the Ulster Trust for Nature Conservation and by the Department of the Environment.

(B) The general features of the vegetation of the province are similar to those in the northwest of Britain. The human imprint is heavy on the landscape and is particularly evident in the absence of trees. Most of the land has been ploughed, drained, and cultivated for centuries. Only about 5 per cent of the land is now under forest, and most of this has been planted by the state. Young trees in these plantations help to diversify the landscape.

(C) The fauna of Northern Ireland is not very different from that of Great Britain; there are, however, fewer species of mammals and birds. Only two mammals — the Irish stoat and the Irish hare — and three species of birds are exclusively Irish. The province is rich in fish, particularly pike, perch, trout, and salmon.

ACTIVITY 6. Three sentences have been removed from the article below. Put them in the right places and read about plant life of the United States of America



The United States is rich in the variety of its native forest trees, some of which, as the species of sequoia, are the most massive known. ____1____.

A coniferous forest of white and red pine, hemlock, spruce, and balsam fir extends interruptedly in a narrow strip near the Canadian border from Maine to Minnesota and southward along the Appalachian Mountains. ____2____. Southward, a transition zone of mixed conifers and deciduous trees gives way to a hardwood forest of broad-leaved trees. This forest, with varying mixtures of maple, oak, ash, locust, linden, walnut, hickory, sycamore, beech, once extended uninterruptedly from New England to Missouri and eastern Texas.

Pines, palmettos, and live oaks are replaced at the southern tip of Florida by the more tropical palms, figs, satinwood, and mangrove.

The alpine tundra, located in the conterminous United States only in the mountains above the limit of trees, consists principally of small plants that bloom brilliantly for a short season. ____3____. The desert, extending from south-eastern California to Texas, is noted for the many species of cactus, some of which grow to the height of trees, and for the Joshua tree and other yuccas, creosote bush, and acacias.

A - There may be found smaller stands of tamarack, spruce, paper birch, willow, alder, and aspen or poplar.

B - Sagebrush is the most common plant of the arid basins and semideserts west of the Rocky Mountains, but juniper, nut pine, and mountain mahogany are often found on the slopes.

C - More than 1000 species and varieties have described, of which almost 200 are of economic value.



ACTIVITY 7. Fill in the gaps with necessary words and translate the following sentences.

1. Southward, a transition zone of mixed _____ and _____ trees gives way to a hardwood forest of broad-leaved trees.

2. Pines, palmettos, and live oaks are _____ at the southern tip of Florida by the more tropical palms, figs, satinwood, and mangrove.

3. The United States is rich in _____ of its native forest trees, some of which, as the species of sequoia, are the most massive known.

4. This forest, with varying _____ of maple, oak, ash, locust, linden, walnut, hickory, sycamore, beech, once extended uninterruptedly from New England to Missouri and eastern Texas.

5. Sagebrush is the most common plant of the arid basins and _____ west of the Rocky Mountains, but juniper, nut pine, and mountain mahogany are often found on the slopes.

6. A coniferous forest of white and red pine, hemlock, spruce, and balsam fir extends interruptedly in a narrow strip near the Canadian border from _____ to _____ and southward along the Appalachian Mountains.

7. The alpine tundra, located in _____ United States only in the mountains above the limit of trees, consists principally of small plants that bloom brilliantly for a short season.

ACTIVITY 8. Decide whether the following statements are TRUE or FALSE:

1) Only about 15 per cent of the Britain land is now under forest, and most of this has been planted by the state.

2) The general features of the vegetation of the province are similar to those in the northwest of Britain.

3) The fauna of Northern Ireland is very different from that of Great Britain.

4) The Irish province is rich in fish, particularly pike, perch, trout, and salmon.

5) Old trees in the Britain forest plantations help to diversify the landscape.

ACTIVITY 9. Scan the article and answer the questions given after it.

ANIMAL LIFE OF THE UNITED STATES OF AMERICA



The animal geography of the United States, however, is far from a natural pattern, for European settlement produced a series of environmental changes that grossly altered the distribution of animal communities.

First, many species were hunted to extinction or near extinction, most conspicuously, perhaps, the American bison, which ranged by the millions nearly from coast to coast but now rarely lives outside of zoos and wildlife preserves.

Second, habitats were destroyed throughout most of the country: forests cut, grasslands ploughed and overgrazed, and migration paths interrupted by fences, railroads and highways. Third, certain introduced species found hospitable niches and, like the English sparrow, spread over huge areas, often preempting the habitats of native animals. Fourth, though their effects are not fully understood, chemicals such as DDT were used for so long and in such volume that they are believed at least partly responsible for catastrophic mortality rates among large mammals and birds. Fifth, there has been a gradual northward migration of certain tropical and subtropical insects, birds, and mammals, perhaps encouraged by gradual climatic warming.

In consequence, many native animals have been reduced to tiny fractions of their former ranges or exterminated completely, while other animals, both native and introduced, have found the new environment well suited to their needs, with explosive effects on their populations. The coyote, opossum, armadillo, and several species of deer are among the animals that now occupy much larger ranges than they once did.

1. What produced a series of environmental changes that grossly altered the distribution of animal communities?
2. Where do American bison live now?
3. Why have many native animals been reduced to tiny fractions of their former ranges?
4. What animals have found the new environment well suited to their needs, with explosive effects on their populations?

ACTIVITY 10. Fill in the gaps with necessary words and translate the following sentences.

1. Certain introduced species found hospitable _____ and, like the English sparrow, spread over huge areas, often preempting the habitats of native animals.

2. There has been a gradual northward _____ of certain tropical and subtropical insects, birds, and mammals, perhaps encouraged by gradual climatic warming.

3. Many species were hunted to extinction or near extinction, most conspicuously, perhaps, the American bison, which _____ by the millions nearly from coast to coast but now rarely lives outside of zoos and wildlife preserves.

4. Though their effects are not fully understood, chemicals such as DDT were used for so long and in such volume that they are believed at least partly _____ for catastrophic mortality rates among large mammals and birds.

5. Many native animals have been reduced to tiny fractions of their former ranges or _____ completely, while other animals, both native and introduced, have found the new environment well suited to their needs, with explosive effects on their populations.



EXTENSIVE READING

TEXT 1. THE CANADIAN WILDERNESS



Canada is a land of magnificent natural beauty. Towering mountains, crystal-clear lakes, rocky coastlines, and green forests mark its wilderness areas, which cover about nine-tenth of Canada. Most of the Canadian people live near the southern border in about one-tenth of the country's land area.

To preserve some of this great wilderness and the wildlife it supports, Canada has established an extensive system of national parks. The system began in 1885, when Banff National park was established in Alberta. Today, the system has a total of 35 national parks, plus about 700 national historic parks and sites. All the provinces and territories have at least one national park. Each province also has its own park system.

Canadians enjoy a wide variety of recreational activities, such as canoeing, fishing, hiking, and snowshoeing. Many of these activities take place in their national parks.

The Atlantic, or Maritime, Provinces include a number of superb natural areas. Gros Morne National Park, for example, on the west coast of Newfoundland, has fiordlike lakes, waterfalls, a rugged seacoast, and the scenic Long Range Mountains. At Sir Richard Square Memorial Park, also in Newfoundland, Atlantic salmon make spectacular jumps up the Big Falls reach their egg laying grounds upstream.

A well-known wilderness area in Quebec is the Gasper Peninsula. It attracts artists, hikers, and mountain climbers. Ontario has more people than any other Canadian province, but almost I all of them live in the extreme southeast section. Huge forests I cover much of the land, and

wild flowers are plentiful. Ontario has six national parks and more than 200 provincial parks.

Stretching west, Canada's landscape changes, and the wilderness areas and parks change too. Some of the best known parks in the world are located in the Rockies. Alberta has more square miles of national parks than any



other province. Alberta also lies along three of the major North American flyways used by birds migrating between their winter and summer homes. Wet lands are managed to help ensure the success of nesting waterfowls. Wood Buffalo National Park in the north eastern part of the province protects the largest buffalo herd in North America and the nesting grounds of rare whooping cranes.

The Far North of Canada is itself one vast wilderness. The territories make up more than one-third of Canada's land area, yet less than one per cent of its people live there. Forest-covered mountains spread over the Yukon and contain the highest peak – Mount Logan.

TEXT 2. WILDLIFE OF AUSTRALIA



At one time, all the world's continents were part of one huge land mass. The region that is now Australia became separated from this land mass about 200 million years ago, and as a result, the animal world of Australia developed differently from that of other continents. For example, marsupials — animals with pouches — are Australia's most unusual and famous creatures.

Most mammals give birth to relatively well developed offspring, but Australia's marsupials give birth to tiny, poorly developed offspring. The marsupial newborn undergoes most of its development while attached to one of its mother's nipples in a pouch called the marsupium. Kangaroos, koalas, wallabies, and wombats are marsupials. Australia has about 150 species of marsupials, all of which have pouches.

The platypus and the echidna, found only in Australia, are the only mammals in the world that hatch their young from eggs. Platypuses live in long burrow that they dig in the banks of streams. Except for females with their young, each platypus lives in its own burrow. Platypuses can walk on land as well as swim, and they use their bills to scoop their food from the bottom of streams.

Australia also has about 700 species of native birds. They include the world's only black swans and about 60 kinds of species, parakeets, and other parrots. The emu, a large, flightless bird, has long legs for running and stands 1.7 meters high. The kookaburra, one of Australia's best-known birds, nests in tree holes and has a call that sounds like a loud laugh.

Two kinds of native plants dominate Australia's landscape. Varieties of acacias and eucalyptuses are the most common shrubs in dry areas and the most common trees in moist areas. Acacias, which Australians call wattles, bear their seeds in pods. Australia has about 700 species of acacias, many with brightly colored flowers.



Eucalyptuses, or eucalypts, as the Australians call them, are the most widespread plants in the country. Most species have narrow, leathery leaves that contain fragrant oil. Scrubby eucalyptuses cover large areas of Australia's hot, dry interior. Eucalyptus trees, known as gum trees or gums, are the tallest trees in the country and among the tallest in the world. Some types of eucalyptus may grow to a height of 100 meters. At

one time, the eucalyptus grew only in Australia and on few islands to the north. But these trees have been planted in California, Hawaii, and in many other warm areas.

To a great extent, Australia's wildlife has suffered at the hands of the European settlers, who have greatly changed the environment since they arrived in the 1700's. Many wildlife species became extinct in the 1800's, and many others have been lost since then. Today, at least 40 Australian animals are endangered. Many others are protected.



AFTER-READING ACTIVITY



PROJECT WORK. Aim: to design a poster, make a brochure or presentation about plants and animals of English-speaking countries.

UNIT 4. HUMAN ACTIVITIES

ACTIVITY 1. Find the meaning of the words given in bold print in the dictionary and translate the following article.

MAN AND THE LANDSCAPE



The **landscape** is the visible result of various natural geographical processes — **the formation** of rocks, their uplift into mountains, **subsequent erosion** of the mountains, distribution and deposition of **eroded**

sediments, movements of the continents, and the modification of coastlines by the action of the sea. But most **natural processes** tend to take a long time to produce noticeable **alterations**. During the past few thousand years, by far the most significant **landscape modifications** have been produced by man.

Human beings are unique because of their intelligence and **technological ability**. Thus humans are less restricted by the constraints of ecology and evolution than the other species that **inhabit** the earth. Instead of adapting to their **surroundings**, humans can modify the environment to provide for many of their needs.

Because of the relatively **rapid development** of technology and medicine, the human population has increased exponentially during the last 5,000 years. In geological terms, this period is extremely short — less than one - millionth part of the time the earth has existed — but during that time, the world's population has increased to about 5 billion. This population will probably double in the next 40 years. In the process of providing food and dwellings, civilization has substantially altered the natural world. Today, very little of the earth's land surface remains in a **virgin state**.

The earliest known fossils of modern man date from about 375,000 years ago. At that time most human communities obtained their food by **hunting animals** and by gathering edible **wild plants** from the surrounding countryside. Because of their simple **lifestyle** and sparse population, these early hunter-gathers had a **negligible effect** on the environment. With the development of primitive technology — the use of fire and the production of clothing — they were able to migrate from the warm areas of Africa, southern Europe, and southern Asia to colder regions farther north. They managed to **penetrate** the American continent by crossing the land bridge across what is now the Bering Strait.

The next stage in the development of human civilization was **the adoption** of a nomadic way of life. In areas with large seasonal climatic variations, the animal on which the hunting tribes relied for food migrated to avoid the worst extremes of climate. And the tribes followed the animals to ensure a continuing food supply. Like the hunter-gathers, nomadic hunters had a minimal effect on the environment.

The first change that had a major and lasting **environmental effect** was the development of agriculture some 10,000 to 12,000 years ago. Initially, this involved collecting wild plants from the surrounding **countryside** and replanting them close to the human settlements. As agriculture became established, crops were grown from seeds obtained from the previous season's yield. The development of farming as the main **source of food** was accompanied by the establishment of the first permanent settlements.

ACTIVITY 2. Answer the questions.

1. Whom have the most significant landscape modifications been produced by?
2. Why do humans modify the environment?
3. What part of the earth's land surface remains in a virgin state?
4. What time do the earliest known fossils of modern man date from?

5. What effect on the environment did the hunter-gathers and nomadic hunters have?

ACTIVITY 3. Fill in the gaps in the text below with one of the words given in the box.



The earliest agriculture took place in river valleys where frequent flooding ensured that ____1____ remained fertile — the Nile, Tigris, Euphrates. The overall result of ____2____ of agriculture was to ensure a relatively reliable source of

food that was easy and safe to gather.

The most dramatic changes to the landscape have been caused by ____3____, which has had by far the greatest effect in Western Europe since the Industrial Revolution of the mid-nineteenth century.

Primitive industry began in areas where there was a natural resource suitable for ____4____. Such a resource — a deposit of flint from which Stone-Age people could make arrowheads — was worked by the local ____5____, which could then trade its surplus for commodities it lacked.

Later, with the development of effective transport and communications, trade was eventually possible between places anywhere in ____6____. Good communications affected the environment not only directly but also indirectly by stimulating industrialization throughout the world.

Hence our agricultural and industrial civilization has altered almost all of ____7____ landscape. Forests have been cut down, and the land used for crops. Mountains have been quarried for valuable minerals. Animals and plant commodities have been changed irrevocably, and the communications ____8____ extend across the globe. Even if civilization suddenly disappeared from the face of the earth, the results of its

environmental ____9____ would be long-lasting, and it would probably take thousands of years for a truly natural ____10____ to reestablish itself.

exploitation, landscape, networks, the world, the development, the soil, modifications, the natural, community, industrialization

ACTIVITY 4. Fill in the gaps with necessary words and translate the following sentences.

1. Most natural processes tend to take a long time to _____ noticeable alterations.
2. Human beings are unique because of their _____ and technological ability.
3. The population will probably double in the _____ 40 years.



4. Like the hunter-gathers, nomadic hunters had a minimal effect on the _____.

5. The development of farming as the main source of food was accompanied by the establishment of the first _____ settlements.

6. The earliest agriculture _____ in river valleys where frequent flooding ensured that

the soil remained fertile — the Nile, Tigris, Euphrates.

7. Primitive industry began in areas where there was a natural resource suitable for exploitation.

8. Good communications affected the environment not only directly but also indirectly by stimulating _____ throughout the world.

9. Forests have been _____, and the land used for crops.

10. Even if civilization suddenly disappeared from the face of the earth, the results of its environmental modifications would be long-lasting, and it would probably take thousands of years for a truly natural _____ to reestablish itself.

11. The landscape is the visible result of various natural geographical processes — the formation of rocks, their uplift into mountains, _____ of the mountains, distribution and deposition of eroded sediments, movements of the continents, and the modification of coastlines by the action of the sea.

12. Humans are less restricted by the constraints of ecology and evolution than the other species that inhabit the earth.

ACTIVITY 5. Read and complete the text with the missing parts (A - E)

Human society and the global economy are inextricably linked to forests. More than 1 billion people depend ____1____. And forest ecosystems play a critical role in stabilizing the climate; providing food, water, wood products, and vital medicines; and supporting much of the world's biodiversity.

Despite decreased deforestation rates in some regions, forest ecosystems ____2____. 30 percent of global forest cover has been cleared, while another 20 percent has been degraded. Most of the rest has been fragmented, leaving only about 15 percent intact.

Forests and trees make vital contributions ____3____, bolstering livelihoods, providing clean air and water, conserving biodiversity and responding to climate change.

Forests act as a source of food, ____4____ for more than a billion people. In addition to helping to respond to climate change and protect soils and water, forests hold more than three-quarters of the world's terrestrial biodiversity, provide many products and services that contribute to socio-economic development and are particularly important for hundreds of millions ____5____, including many of the world's poorest.

- A – to both people and the planet
- B – medicine and fuel
- C – on forests for their livelihoods
- D – of people in rural areas
- E – are still under great threat

ACTIVITY 6. Read the text below. Match choices (A - G) to (1 - 4).
There are three choices you don't need to use.



1) _____

Trees have always fascinated people. They are the biggest living things on our planet, and ones of the most beautiful nature. Trees appear in many religions and have inspired artists for thousands of years.

2) _____

Trees are also the most ancient living organisms on the Earth. They are a direct link with thousands of years of history. The great age of trees makes them useful for all sorts of scientific research. The rings inside a tree are particularly useful for telling scientists about changes in the climate that happened many thousands of

years ago before written records were kept.

3) _____

Trees may have a lot to teach us about being part of a community and how co-operation is better for a society than competition. Scientists are only just beginning to understand how it all works, but now we know that a community of trees growing together share all of the available resources with each other. So, strong trees in a good position will share food and water with weaker trees that receive less sunlight. They do this

through their roots, through the soil, and also through the networks of tiny mushrooms that grow in the soil between them.

4) _____

It is true that trees absorb enormous amounts of energy from the sun – more than any other living thing. And some people believe that you can feel this energy if you choose a tree that you feel attracted to, put your arms around it and stay there holding it for a while.

Spiritual and religious teachers for many years have been telling their students to learn from trees, notice their stillness and strength and try to imitate it.

It has been proved that patients in hospital get better faster, feel less pain and go home quicker if there are trees outside the windows of their rooms.

«Tree-hugging» is believed to be good for stress relief, this makes you sleep better, and helps you feel more positive and calm. And more and more people are doing this.

We all know that trees are essential for the environment and the survival of our planet. Perhaps they have even more to offer us in the future.

- A The Energy of Trees
- B The Oldest trees
- C Studying Trees
- D The community of Trees
- E The interest to the Trees
- F Trees in Prose and Poetry
- G Trees and People's Health

ACTIVITY 7. Decide whether the following statements are TRUE or FALSE:

- 1) The earliest known fossils of modern man date from about 275,000 years ago.
- 2) The first change that had a major and lasting environmental effect was the development of agriculture some 100,000 to 120.000 years ago.

- 3) The development of farming as the main source of food was accompanied by the establishment of the first permanent cities.
- 4) During the past few thousand years, by far the most significant landscape modifications have been produced by man.
- 5) Instead of adapting to their surroundings, humans can modify the environment to provide for many of their needs.
- 6) Today, very little of the earth's land surface remains in a virgin state.
- 7) Human finishes are unique because of their intelligence and technological ability.

ACTIVITY 8. Match the following words in THE LEFT-HAND COLUMN with their definitions in THE RIGHT- HAND COLUMN:

1. Conservation movement	a. – is the science of protection and management of biodiversity
2. Conservation organization	b. – is the political, environmental, or social movement that seeks to protect natural resources, including biodiversity and habitat
3. Conservation biology	c. – is an organization dedicated to protection and management of the environment or natural resources

ACTIVITY 9. Read and translate the text.

CONSERVATION AND RECLAMATION

The number of plant species considered to be in danger of extinction is roughly estimated to be about one-tenth of the total number of plant species in the world. It is not just the extinctions that are a cause of concern, but the time scale within which they are occurring. Plants cannot evolve fast enough to withstand habitat destruction by, for example, bulldozing, overgrazing, or damage by pollutants. Indeed, the

problem is growing ever more critical as the human population on earth increases.

The plant world is essential to all animal life, including humans, as a vital stage in the food chain. All our food, from cereal crops to grazing livestock, is directly or indirectly a plant product. In addition, plants protect soil from erosion and, frequently, nourish it. They also play a major role in the world's climate.



The three major arguments for conservation are economic, climatic, and esthetic. Of them all, the economic one has the greatest immediate impact. This argument is also the strongest in justifying land reclamation. If species are to be conserved in their original habitats, then more land must be developed to cope with human population expansion and the consequent agricultural needs.

Many plant species that are potential sources of drugs are in danger of becoming extinct before we learn to exploit their special properties. Plants provide many products other than drugs, including rubber and gums, tanning agents, dyes, fibers, insecticides, perfumes, waxes, cosmetics, preservatives, turpentine, and oils.

Forests, being the richest sources of timber, are being exploited everywhere. For example, the equivalent of several square miles of forest is cut down in Malaysia every day for export. In 1950, 35 percent of the earth's land surface was covered in forest. Today it is about 30 per cent. Wood is still a major source of fuel — it provides 31 per cent of the world's fuel needs and plays a large role as a source of energy, mainly in developing countries.

Yet another economic need is that of soil conservation. The removal of plant cover almost inevitably results in soil erosion to some degree. Food must also take its place in any economic consideration of conservation. There are about 3,000 plant species that have been

recorded as providing humans with food, but the greater part of present day agriculture is based on fewer than 30 species. About half of all arable land in the world is taken up with their cultivation.

ACTIVITY 10. Arrange the sentences in logical order according to the text. Then use them as a plan to retell it.

1. The three major arguments for conservation are economic, climatic, and esthetic.
2. Forests, being the richest sources of timber, are being exploited everywhere.
3. All our food, from cereal crops to grazing livestock, is directly or indirectly a plant product.
4. Plants cannot evolve fast enough to withstand habitat destruction by, for example, bulldozing, overgrazing, or damage by pollutants.
5. There are about 3,000 plant species that have been recorded as providing humans with food, but the greater part of present day agriculture is based on fewer than 30 species.
6. Many plant species that are potential sources of drugs are in danger of becoming extinct before we learn to exploit their special properties.

ACTIVITY 11. Answer the questions.

1. Why is the plant world essential to all animal life?
2. What are the three major arguments for conservation?
3. What do plants provide?
4. Where are forests, being the richest sources of timber, being exploited?
5. How many plant species have been recorded as providing humans with food?

ACTIVITY 12. Scan the article and answer the questions given after it.

CONSERVATION SUCCESSES

Despite the number of animal species that have become extinct, the conservation movement has had many successes. One achievement has

been the establishment of national parks and reserves. An international conference in Paris in 1968 established that such parks should be at least 800 hectares in extent, with strict prohibitions on mining, cultivation, stock raising, hunting, and fishing. There are now about 1,200 reserves in the world, covering a total of 2,800,000 hectares. Protection is also given to animals in their natural environments.



One success story involving a natural environment is the preservation of the polar bear. In 1955, the International Union for the Conservation of Nature recommended that all Arctic countries should stop the hunting of **polar bears**. In 1965 the Soviet Union banned the killing of bears and established

a special reserve for them on Wrangle Island. Norway has set up a similar sanctuary. In Canada, only license holders and Eskimos are permitted to hunt bears. Despite safari hunts outside territorial waters, the population of the animals is now increasing.

Successful treaties and special reserves have also insured the survival of the northern fur seal, a species that lives and breeds around the islands of the Bering Sea. During the nineteenth century, the seal population was reduced to a minimal level to obtain skins for clothing industry. Protected by law, the population of seals is currently multiplying.

Some species of deer are now ensured survival, some after a dramatic rescue. **Pere David's deer** is named after the French missionary Armand David who, in 1865, discovered 120 of the animals living in a walled royal park in China and took some to



European zoos. Successful breeding brought about a slight increase in numbers. But because of wars this success was mitigated so that by 1920 the only specimens survived at Woburn Abbey, England. Postwar breeding has swelled their numbers and deer are now in zoos throughout the world — to reduce the risk of one disease destroying them all — and more have been released in national parks.

Captive breeding programs are successful also in ensuring the survival of a variety of rhinoceroses. The white rhinoceros of Uganda has been saved when only 50 remained.

European national parks and wilderness guarantee the conservation of several varieties of eagles and owls, the peregrine falcon, and other birds, such as the rose flamingo.

From a small beginning, it is hoped that such successes will eventually lead to species being taken off the endangered list and add extra momentum to the movement that preserves wildlife. And will the saving of wildlife ultimately mean the saving of humankind?

1. How many reserves are there in the world now?
2. When did the International Union for the Conservation of Nature recommend that all Arctic countries should stop the hunting of polar bears?
3. Where does the northern fur seal live and breed?
4. How has Pere David's deer survived?
5. What programs are used in ensuring the survival of a variety of rhinoceroses?
6. Will the saving of wildlife ultimately mean the saving of humankind?

ACTIVITY 13. Choose the necessary word and put it in the sentences:

1) The plant world is essential to all animal life, including humans, as a vital stage in the food chain.

2) The number of plant species considered to be in danger of extinction is roughly estimated to be about one-tenth of the total number of plant species in the world.

3) About half of all arable land in the world is taken up with their cultivation.

4) Forests, being the richest sources of timber, are being exploited everywhere.

5) Plants cannot evolve fast enough to withstand habitat destruction by, for example, bulldozing, overgrazing, or damage by pollutants.

6) The removal of plant cover almost inevitably results in soil erosion to some degree.

7) All our food, from cereal crops to grazing livestock, is directly or indirectly a plant product.

ACTIVITY 14. Try to match the adjectives in COLUMN A with the nouns in COLUMN B to form meaningful phrases:

A	B
to reduce	white rhinoceros
during	the risk
to save	the population of the animals
to preserve	century
increasing	wildlife
preservation	national parks
establishment	the polar bear
protection	animals
natural environments	environment

EXTENSIVE READING

CONSERVATION BIOLOGY



Conservation biology is the management of nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions. It is an interdisciplinary subject drawing on natural and social sciences, and the practice of natural resource management.

The conservation ethic is based on the findings of conservation biology.

Systematic conservation planning is an effective way to seek and identify efficient and effective types of reserve design to capture or sustain the highest priority biodiversity values and to work with communities in support of local ecosystems. Margules and Pressey identify six interlinked stages in the systematic planning approach:

1. Compile data on the biodiversity of the planning region
2. Identify conservation goals for the planning region
3. Review existing conservation areas
4. Select additional conservation areas
5. Implement conservation actions
6. Maintain the required values of conservation areas

Conservation biologists regularly prepare detailed conservation plans for grant proposals or to effectively coordinate their plan of action and to identify best management practices (e.g.). Systematic strategies generally employ the services of Geographic Information Systems to assist in the decision making process.

AFTER-READING ACTIVITY



PROJECT WORK. Aim: to design a poster, make a brochure or presentation about conservation successes.

UNIT 5. FOREST MANAGEMENT

ACTIVITY 1. Match the following words in THE LEFT-HAND COLUMN with their definitions in THE RIGHT- HAND COLUMN:

1. Forestry	a. - is the act of making something exit or happen again.
2. Forest management	b. - is the trees that are grown so that the wood from them can be used for building.
3. Forest farming	c. - is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources for human and environmental benefits.
4. Recreation	d. - is the variety of life on the Earth.
5. Biological diversity	e. - is the protection of plants and animals, natural areas, and interesting and important structures and buildings, especially from the damaging effects of human activity.
6. Conservation	f. - is a branch of forestry concerned with overall administrative, economic, legal, and social aspects, as well as scientific and technical aspects, such as silviculture, protection, and forest regulation.
7. Timber	g. - is the cultivation of high-value specialty crops under a forest canopy that is intentionally modified or maintained to provide shade levels and habitat that favor growth and enhance production levels.

ACTIVITY 2. Find the meaning of the words given in bold print in the dictionary and translate the following article.



The forest is a **natural system** that can supply different products and services. The working of this system **is influenced** by the **natural environment**: climate, topography, **soil**, etc., and also by **human activity**. The actions of humans in forests constitute **forest management**. In developed societies, this management tends to be elaborate and planned in order to achieve the objectives that are considered desirable.

Some forests have been and are managed to obtain traditional forest products such as **firewood**, fiber for paper, and **timber**, with little thinking for other products and services. Nevertheless, as a result of the progression of **environmental awareness**, management of forests for multiple uses is becoming more common.

There has been increased **public awareness** of **natural resource policy**, including forest management. Public concern regarding forest management may have shifted from the extraction of timber for earning money for the economy, to the **preservation** of additional forest resources, including **wildlife** and old growth forest, **protecting biodiversity**, watershed management, and **recreation**.

Increased environmental awareness may contribute to an increased public mistrust of forest management professionals. But it can also lead to greater understanding about what professionals do for forests for **nature conservation** and ecological services. The importance of taking care of the forests for ecological as well as **economical sustainable reasons** has been shown in the TV show *Ax Men*.

Many tools like GIS and photogrammetry modelling have been developed to improve forest inventory and management planning. Since 1953, the volumes of **standing trees** in the United States have increased by 90% due to sustainable forest management.

ACTIVITY 3. Fill in the gaps with necessary words and translate the following sentences.

1. Some forests have been and are managed to obtain traditional _____ such as firewood, fiber for paper, and timber, with little thinking for other products and services.
2. The actions of _____ in forests constitute forest management.
3. Increased environmental awareness may contribute to an increased public mistrust of forest _____ professionals.
4. The forest is a _____ that can supply different products and services.
5. Many tools like GIS and _____ have been developed to improve forest inventory and management planning.

ACTIVITY 4. Answer the questions before reading the text.



1. What is forest management?
2. What is timber?
3. What is forest farming?
4. What is forestry?
5. Who is a forester?
6. What is a forest?
7. What kinds of forest do you know?

Forest management is a branch of forestry concerned with overall administrative, economic, legal, and social aspects, as well as scientific and technical aspects, such as silviculture, protection, and forest

regulation. This includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, forest genetic resources, and other forest resource values. Management can be based on conservation, economics, or a mixture of the two. Techniques include timber extraction, planting and replanting of various species, cutting roads and pathways through forests, and preventing fire.

Forest farming is the cultivation of high-value specialty crops under a forest canopy that is intentionally modified or maintained to provide shade levels and habitat that favor growth and enhance production levels. Forest farming encompasses a range of cultivated systems from introducing plants into the understory of a timber stand to modifying forest stands to enhance the marketability and sustainable production of existing plants.

Forest farming is a type of agroforestry practice characterized by the "four I's": intentional, integrated, intensive and interactive. Agroforestry is a land management system that combines trees with crops or livestock, or both, on the same piece of land. It focuses on increasing benefits to the landowner as well as maintaining forest integrity and environmental health.



ACTIVITY 5. Match the words to their Ukrainian equivalents.

a) timber	1) лісовпорядкування
b) woodland	2) сплавляти ліс
c) forestry	3) лісопромисловість
d) deforestation	4) листяний ліс
e) to conserve forests	5) лісоматеріал
f) to devastate forests	6) валити ліс
g) to float timber	7) лісоочистка
h) to cut down trees	8) лісопосадка
i) leaf-bearding forest	9) лісовоз
j) coniferous forest	10) лісовідновлення
k) timber industry	11) лісиста місцевість
l) timber truck	12) знищувати ліси
m) forest cover, plantation	13) лісогосподарство, лісництво
n) reforestation, forest regeneration	14) хвойний ліс
o) forest management	15) охороняти ліси

ACTIVITY 6. Read and complete the text with the missing parts (A - E).

Forests _____ **1** _____ in different ways and to different degrees of specificity. One such way is in terms of the biome in which they exist, combined with leaf longevity of the dominant species (whether they are evergreen or deciduous). Another distinction is whether the forests are composed predominantly of broadleaf trees, coniferous (needle-leaved) trees, or mixed.

Physiognomy classifies forests based on _____ **2** _____ (e.g. old growth vs. second growth).

Forests can be classified more specifically based on the climate and the dominant tree species present, resulting in numerous different forest types.

Forests can also be classified according to the amount of human alteration. Old-growth forest contains mainly _____3_____ in established seral patterns, and they contain mainly species native to the region and habitat. In contrast, secondary forest is regrowing forest following timber harvest and may contain species originally from other regions or habitats.

Different global forest classification systems have been proposed, but none has gained universal acceptance. UNEP-WCMC's forest category classification system is a simplification of other more complex systems (e.g. UNESCO's forest and woodland 'sub formations'). This system divides the world's forests into 26 major types, which reflect climatic zones as well as the principal types of trees. These 26 major types can be reclassified into 6 broader categories: temperate needleleaf; temperate broadleaf and mixed; tropical moist; tropical dry; sparse trees and parkland; and forest plantations.

Boreal forests occupy the subarctic zone and _____4_____ and coniferous.

Temperate zones support both broadleaf deciduous forests (e.g., temperate deciduous forest) and evergreen coniferous forests (e.g., temperate coniferous forests and temperate rainforests). Warm temperate zones support broadleaf evergreen forests, including laurel forests.

Tropical and subtropical forests include tropical and subtropical moist forests, tropical and subtropical dry forests, and tropical and subtropical coniferous forests.

Forest plantations are _____5_____ and pulpwood. Commonly mono-specific and/or composed of introduced tree species, these ecosystems are not generally important as habitat for native biodiversity. However, they can be managed in ways that enhance their biodiversity protection functions and they can provide ecosystem services such as maintaining nutrient capital, protecting watersheds and soil structure, and storing carbon.

- A. can be classified
- B. their overall physical structure or developmental stage
- C. natural patterns of biodiversity
- D. are generally evergreen
- E. generally intended for the production of timber

ACTIVITY 7. Complete the following sentences with the correct words.

MANAGEMENT OF FORESTS

There are many **1** _____ to actively manage your forest land, regardless of what goals and interests you may have for your land. Most small private forest **2** _____ are more interested in wildlife, recreation, and the aesthetic value of their land than timber production, but there are many things you can do to **3** _____ the benefits your forest provides to you now while safeguarding it for the future. You may also wish to explore other income **4** _____ — for example, from non-timber forest products — that can be achieved by actively managing your forest. Here are several reasons why should consider managing your forest – starting with the history of **5** _____ in the eastern U.S.

1	A	reasons	B	causes	C	motives	D	understanding
2	A	property	B	owners	C	freehold	D	ownership
3	A	upgrade	B	develop	C	improve	D	update
4	A	possibilities	B	chances	C	options	D	opportunities
5	A	nature	B	woods	C	forests	D	world

ACTIVITY 8. Try to match the adjectives in COLUMN A with the nouns in COLUMN B to form meaningful phrases.

A	B
to stretch	more wood
to require	trees
to permit	ash trees
to remove	to comply
to kill	to be extracted
to change	in danger
to be	climate
to spread	to reports
to according	the forest
to visit	by the wind

ACTIVITY 9. Translate the following words into Ukrainian and remember them:

elm trees –
oak –
beech –
birch –
coniferous trees –
fir tree –
pine –
elm disease –
to damage –
to kill –
to turn –
to attack –
new danger –
air pollution –
acid rain –
root –
trunk –
water vapour –

Sulphuric acid –
nitric acid –
great rain forests –

ACTIVITY 10. Scan the article and answer the questions given after it.

ENVIRONMENTAL MANAGEMENT AND FORESTRY OF UKRAINE

PART 1

Ukraine is a state located in the central part of Europe, one of the largest in the continent. Its area is 603.7 thousand square km.

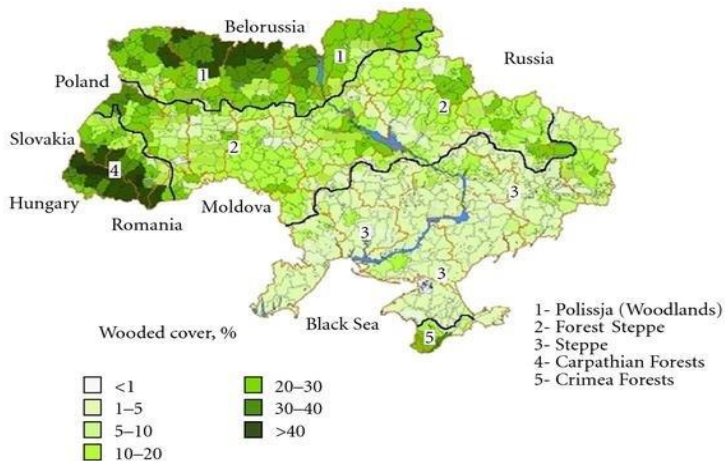
The area of the forest fund of Ukraine is almost 11 million thousand hectares, the area covered by forest is in average 14% of all territory. Three quarters of the forest area has a high-yield tree stand. Coniferous forests account for 54% of the stock of wood, including the pine forest, which is the most widespread in Polissya - 35%. Almost 40% of timber stocks are hardwood (oak, beech, hornbeam). Among the hardwoods are birch, aspen, alder, linden, poplar.

Forests of Ukraine, according to their purpose and location, perform predominantly water protection, protective, sanitary-hygienic, wellness and other important functions and provide the needs of society in forest resources.

The peculiarities of forests and forestry in Ukraine include:

- relatively low average forest level of the country;
- growth of forests in different natural zones (Polissya, Forest-steppe, Steppe, Ukrainian Carpathians and mountainous Crimea), which have significant differences with regard to forest vegetation conditions, methods of forest management, use of forest resources and useful properties of forests;
- mainly the ecological significance of forests and their high share (up to 50%) with the regime of limited forest use;
- high percentage of protected forests (14.3%), which has a stable tendency to increase;

- historically formed situation with the consolidation of forests at numerous permanent forest users (for forest management, forests are provided to the permanent use of enterprises, institutions and organizations of several dozens of ministries and departments);
- have been created forest area is increasing in the area of radioactive contamination;
- half of Ukraine's forests are artificially created and require intensive care.



Forests on the territory of Ukraine are spread very uneven. They are concentrated mainly in Polissya and the Ukrainian Carpathians. Forests in different natural zones have significant differences and do not reach the optimal level, where forests most strongly influence the climate, soils and water resources, mitigate the effects of erosion processes, and also obtain more wood.

Forests of Ukraine are formed by more than 30 wood species, dominated by pine (*Pinus silvestris*), oak (*Quercus robur*), beech (*Fagus silvatica*), spruce (*Picea abies*), birch (*Betula pendula*), alder (*Alnus glutinosa*), gum (*Fraxinus excelsior*), hornbeam (*Carpinus betulus*), fir (*Abies alba*). Conifer plantations occupy 42% of the total area, including pine - 33%. Hardwood stands are 43%, including oak and beech - 32%.

Ukraine occupies the eighth place in Europe in terms of forest area and reserves (excluding the Russian Federation).

1. Where is Ukraine situated?
2. What is the area of the forest fund of Ukraine?
3. What do forests of Ukraine perform according to their purpose and location?
4. What do the peculiarities of forests and forestry in Ukraine include?
5. How are forests on the territory of Ukraine spread?
6. How many wood species are the forests of Ukraine formed by?
7. What place does Ukraine occupy in Europe in terms of forest area and reserves?

ACTIVITY 11. Fill in the gaps in the text below with one of the words given in the box.

ENVIRONMENTAL MANAGEMENT AND FORESTRY OF UKRAINE

Part 2



The State Forestry Agency of Ukraine, under the jurisdiction of which is 68% of Ukrainian forests, is the central body of executive power in the field of forestry and hunting.

The main tasks of the State Agency of Forest Resources of Ukraine are:

- ensuring the implementation of state 1 in the field of forestry and hunting, as well as protection, rational use and reproduction of forest

resources, hunting fauna, and improving the efficiency of forestry and hunting facilities;

- implementation of state management, regulation and control in the field of ___2___ and hunting economy;

- development and organization of implementation of national, intergovernmental and regional ___3___ in the field of protection, productivity, rational use and reproduction of forests, as well as participation in the development and implementation of programs on the use and reproduction of hunting fauna, development of hunting economy, organization of forest management.

The State Forestry Agency of Ukraine has a three-level ___4___ system:

- state forest enterprises;
- regional forestry and hunting management in 24 regions of forestry and hunting economy;
- apparatus of the State Agency for Forest Resources. State forestry enterprises are responsible for the entire complex of forest operations - from planting the forest to the cutting of the main use.

In addition, individual plants have the capacity for primary wood ___5___. In addition to state forestry enterprises, scientific, educational organizations, national reserves and natural parks, as well as other organizations of direct subordination, are under the jurisdiction of the Forestry Board.

The current ___6___ structure of forestry management enables the industry to fulfill its obligations to the national economy of Ukraine in restoring, protecting and protecting forests, providing the necessary timber.

Total volumes of harvesting of liquid wood from all felling in recent years amounted to more than 15 million m³. Annually ___7___ from the cutting of the main in total volumes of procurement is 43%. The potential reserves and opportunities of Ukrainian forests are large and, according to experts and international experts, are not fully utilized. The use of annual growth is in the range of 50-60%, while in Europe the use of annual growth is 60-80.

In Ukraine, 0.9% of the stock is cut down in the course of the year, while in Switzerland the annual felling amounts to 1.9% of the stock, the Czech Republic - 2.4%, Finland - 2.8%, the United Kingdom and Belgium - 3 and 3.1% in accordance. Taking into



account the increase of the area of ripe and overpopulated plantings in the forests of Ukraine, in the coming years the objective increase of ___8___ logging standards is objective. Every year measures for the formation and rehabilitation of forests (carvings, sanitary, forest-related, reconstructive, etc.) are carried out on an area of 383 thousand hectares, including forestry care for young ___9___ on an area of 54 thousand hectares.

To achieve the optimal number of ____10____ of Ukraine (20%) it is necessary to create more than 2 million hectares of new forests. This is potentially possible at the expense of land withdrawn from agricultural circulation. The issue of forest fostering of the state is included in the priority directions of forestry development.



For the implementation of tasks on large-scale forestry, an appropriate production base has been created. 4,600 hectares of forest seedlings, 16.8 hectares of greenhouse complexes, where over 400 million units are grown in recent years, operate on the

enterprises under forestry under the State Forestry Agency standard planting material. 16,300 hectares of permanent forest seedlings and plantations have been created for obtaining quality forest seed.

**programs, processing, timber, animals, forestry, management,
commercial, policy, forests, organization**

ACTIVITY 12. Read and translate the text.

**ENVIRONMENTAL MANAGEMENT
AND FORESTRY OF UKRAINE**

PART 3

Basic forest management should remain the basis for the development of long-term projects for the organization and development of forestry for 10 years. The main task of continuous forest management is maintaining in the updated state information about the forest fund.

In recent years, the number of users of hunting grounds has considerably increased in Ukraine, and according to the latest data, there are 932. They are hunting in an area of 46 million. One of the main priorities of the hunting economy of Ukraine for the coming years is the reproduction, protection and rational use of hunting fauna, which involves investing considerable funds in the implementation of a complex of biotechnical measures, the fight against poaching and predators, artificial breeding of animals in semi-free environment with subsequent release in the site, conducting high-quality records of hunting animals.

Poaching in Ukraine remains a very serious problem and continues to restrain the growth of the number of major species of hunting animals.

The issue of conducting a qualitative record of wild hunting animals continues to stand on the agenda in a significant part of users of hunting grounds in Ukraine. The quality of this event depends on the issue of non-exhaustive use and further growth of the stock of hunting animals in the near future.



The order, culture, honesty, festive of the hunting as well as the care of wildlife will be the best form of hunting propaganda as a method of inexhaustible use of living natural resources among the population, including, and even involving schoolchildren, young people to the care of animals. Local and regional exhibitions of the whole complex of hunting economy - dog breeding, methods and devices for breeding hunting animals and birds, cooking dishes from wildfowl, hunting trophies, musical, poetic and artistic works devoted to hunting - the way to the transformation of hunting into one of the strata of culture of the people. Public hunting organizations to protect the interests of hunters and users of hunting grounds should play a role in this.

ACTIVITY 13. Arrange the sentences in logical order according to the text. Then use them as a plan to retell it.

1. Poaching in Ukraine remains a very serious problem and continues to restrain the growth of the number of major species of hunting animals.
2. The order, culture, honesty, festive of the hunting as well as the care of wildlife will be the best form of hunting propaganda as a method of inexhaustible use of living natural resources among the population, including, and even involving schoolchildren, young people to the care of animals.

3. The main task of continuous forest management is maintaining in the updated state information about the forest fund.

4. One of the main priorities of the hunting economy of Ukraine for the coming years is the reproduction, protection and rational use of hunting fauna, which involves investing considerable funds in the implementation of a complex of biotechnical measures.



EXTENSIVE READING

TEXT 1. INDUSTRIAL PLANTATIONS



Industrial plantations are actively managed for the commercial production of forest products. Industrial plantations are usually large-scale. Individual blocks are usually even-aged and often consist of just one or two species. These species can be exotic or indigenous. The plants used for the plantation are often genetically altered for desired traits

such as growth and resistance to pests and diseases in general and specific traits, for example in the case of timber species, volume wood production and stem straightness. Forest genetic resources are the basis for genetic alteration. Selected individuals grown in seed orchards are a good source for seeds to develop adequate planting material.

Industrial plantations are established to produce a high volume of wood in a short period of time. Plantations are grown by state forestry authorities (for example, the Forestry Commission in Britain) and/or the paper and wood industries and other private landowners (such as Weyerhaeuser, Rayonier and Sierra Pacific Industries in the United States, Asia Pulp & Paper in Indonesia). Christmas trees are often grown on plantations as well. In southern and southeastern Asia, teak plantations have recently replaced the natural forest.

TEXT 2. AN OLD-GROWTH FOREST

An old-growth forest — also termed primary forest — is a forest that has attained great age without significant disturbance and thereby exhibits unique ecological features and might be classified as a climax community. Old-growth features include diverse tree-related structures



that provide diverse wildlife habitat that increases the biodiversity of the forested ecosystem. The concept of diverse tree structure includes multi-layered canopies and canopy gaps, greatly varying tree heights and diameters, and diverse tree species and classes and sizes of woody debris.

Old-growth forests are valuable for economic reasons and for the ecosystem services they provide. This can be a point of contention when some in the logging industry may desire to cut down the forests to obtain valuable timber, while environmentalists seek to preserve the forests for benefits such as maintenance of biodiversity, water regulation, and nutrient cycling.

TEXT 3. HUNTING



Hunting is the seeking, pursuance and capture or destruction of game and wild animals for subsistence, profit or sport. Most governments establish "open" and "closed" hunting seasons and require hunters to be licensed. However, in

some parts of the world the number of individuals wishing to hunt as a sport and who take advantage of the open season is increasing to such an extent that problems are being created. Numbers of people are shot every year in hunting accidents. However, uncontrolled hunting is clearly most destructive of wildlife and may severely endanger rare species. Depending on the animals hunted, certain methods of hunting may be

either cruel or wantonly destructive. Examples are the use of automatic weapons, nets, hand grenades, dynamite (in rivers and lakes), certain types of poison, or use of dogs. Despite claims by hunters that shooting an animal is more humane than death by starvation, many game animals are left wounded by unskilled hunters and many others are claimed to have been killed by error. Untended traps are a possible source of injury to humans, as is the possibility of bites from trapped animals. A major reason for the overpopulation of certain animals is the destruction of their natural predators by man. This upsets a delicate ecological balance in nature.

It is estimated that there are some 15 million hunters in the USA alone. In North America it is estimated that some 175 million animals are killed annually by hunters and trappers, including: 24,000 bear, 55,000 caribou, 67,000 moose, 84,000 antelope, 100,000 elk, 2.6 million deer, 21 million waterfowl, 27 million rabbits, 32 million squirrels, and 94 million upland birds. Game herds in Botswana have been decimated by illegal hunters. In many Muslim countries where pork is taboo, warthog and wild boar are hunted and killed as a threat to crops but the meat is wasted (in some cases thousands of pigs are left to rot). In Italy, hunting *la caccia* usually means shooting birds, mainly small ones like finches and thrushes; populations of migrating birds, protected in the countries where they breed and over-winter, can be decimated as they cross parts of southern Europe.

AFTER-READING ACTIVITY



PROJECT WORK. Aim: to design a poster, make a brochure or presentation about forest management in different countries.

UNIT 6. ENVIRONMENT, ITS PROBLEMS AND PROTECTION



ACTIVITY 1. Translate the following words into Ukrainian and make up sentences with them:

Environment -
Protection –
Waste –
Pollution -
Damage –
Threat –
(to) depend –
(to) use filter –
Purifying installations –
Defense of nature -
Defense of land (fields) –

ACTIVITY 2. Choose the necessary word and put it in the sentences:

1. Ecology is a _____ common for all mankind. (problem, question, point, object)
2. All people actively _____ in international cooperation on the protection of the natural habitat. (participate, take part, concern)

3. Environmental problems _____ their relatively short history, have already been object of a number of international discussions (despite, in spite of, notwithstanding)

4. They have done a great deal of _____ two man and they are still doing so for profit and gain (harm, hurt, damage)

5. They _____ about mineral resources, flowing rivers, forests, meadows and fields. (have a talk, speak, say, tell)

ACTIVITY 3. Complete the following sentences:

1. Environmental protection occupies _____
2. All people would raise their voice _____
3. What are people doing in defense _____
4. We must move chemical enterprises beyond _____
5. Industrial waste influences people's _____

ACTIVITY 4. Read and translate the text below and do exercises after it:

NATURAL ENVIRONMENT



An environment is the set of surrounding conditions that acts on a place or person and gives it a certain character. A body of air, for example, receives energy from the sun and Earth's surface and water from the oceans, lakes, soils, and plants over which it passes. Bodies of

air from contrasting environments have different characteristics of temperature and moisture.

Earth's natural environment is the set of physical and biologic conditions that surround human beings at Earth's surface.

Issues that arise from human activities in the natural environment occur at a range of spatial scales and change rapidly over time. Because physical geographers understand the complex processes that link together Earth's major environments, they can contribute to current political and scientific debates about environmental issues.

Earth's natural environment can be divided into four major parts. Each major Earth environment has unique characteristics, but they all overlap and interact to create dynamic and living systems at all geographic scales.

In the atmosphere and oceans are inextricably linked by exchanges of heat and materials. The atmosphere is a thin blanket that both traps energy from the sun's rays and protects Earth, particularly plants and animals, from the harmful elements of those rays. The oceans act as a giant store of water and heat. Exchanges between the atmosphere and oceans help to maintain the composition of the atmosphere. The atmosphere-ocean environment transports energy from the sun around the globe and creates weather and climate.

The solid-earth environment is very different. It consists of rocks that are hot and fluid near Earth's center and relatively cool and rigid near the surface. Gravity and the heat that keeps rocks melted inside our planet are the sources of energy for moving surface rocks. Activity in the solid-earth environment is most apparent in volcanic eruptions and earthquakes. Such sporadic surface events are a powerful reminder of continuous activity deep within Earth.

The atmosphere-ocean environment interacts on the surfaces of continents to form the hills, plains, and valleys – or land forms – of the surface-relief environment. The solid-earth environment forms the broad features of continents and mountain chains, while the reactions of different rocks to atmospheric agent such as wind, ice, and running water control the detailed appearance of land surfaces.

The living-organism environment is shaped by the other three Earth environments. Plants and animals need water and the sun's energy from the atmosphere-ocean environment; plant nutrients come from the rock minerals of the solid-earth environment. The distribution of plants and animals around the world depends on how water and nutrients are delivered to the organisms by processes in the surface-relief environment.

These four major Earth environments create a dynamic and living planet as they constantly interact and adjust to each other.

A) Complete the following sentences with the correct words:

An environment is the set of surrounding **1)** _____ that acts on a place or person and gives it a certain character.

Farmers are partly **2)** _____ in choosing their crops by the farm's environment: the temperature and humidity of the **3)** _____ air, the amount of rain or snow that falls, the character of the underlying soil, and the steepness of the terrain.

Earth's natural environment is the set of physical and biologic conditions that surround human beings at Earth's **4)** _____.

1	A	surroundings	B	circumstances	C	situations	D	conditions
2	A	affected	B	operated	C	influenced	D	manipulated
3	A	superficies	B	surrounding	C	neighbor	D	outward
4	A	surface	B	superficies	C	position	D	upside

B) Complete the sentences with the missing words:

Earth, surfaces, environment, living-organism, atmosphere

1) Earth's natural _____ is the set of physical and biologic conditions that surround human beings at Earth's surface.

2) The atmosphere-ocean environment interacts on the _____ of continents to form the hills, plains, and valleys – or land forms – of the surface-relief environment.

3) In the _____ and oceans are inextricably linked by exchanges of heat and materials.

4) The _____ environment is shaped by the other three Earth environments.

5) The atmosphere is a thin blanket that both traps energy from the sun's rays and protects _____.

C) Decide whether the following statements are TRUE or FALSE

1. Four major Earth environments don't create a dynamic and living planet as they constantly interact and adjust to each other.

2. The living-organism environment is shaped by the other five Earth environments.

3. The oceans act as a giant store of water and cold.

4. Earth's natural environment can be divided into four major parts.

5. Plants and animals need water and the sun's energy from the air-ocean environment

ACTIVITY 5. Read and give a summary of the text.

SCIENCE AND TECHNOLOGY

Technology means the use of people's inventions and discoveries to satisfy their needs. Since people have appeared on the earth, they have had to get food, clothes, and shelter. Through the ages, people have invented tools, machines, and materials to make work easier.

Nowadays, when people speak of technology, they generally mean industrial technology. Industrial technology began about 200 years ago with the development of the steam engine, the growth of factories, and the mass production of goods. It influenced different aspects of

people's lives. The development of the car influenced where people lived and worked. Radio and television changed their leisure time. The telephone revolutionized communication.

Science has contributed much into modern technology. Science attempts to explain how and why things happen. Technology makes things happen. But not all technology is based on science. For example, people had made different objects from iron for centuries before they learnt the structure of the metal. But some modern technologies, such as nuclear power production and space travel, depend heavily on science.



ACTIVITY 6. Complete the sentences with the missing words:

science, means, technology, makes, modern

1. When people speak of technology, they generally mean industrial _____.
2. Technology _____ the use of people's inventions and discoveries to satisfy their needs.
3. _____ attempts to explain how and why things happen.
4. Technology _____ things happen.
5. Some _____ technologies, such as nuclear power production and space travel, depend _____ heavily on science.

ACTIVITY 7. Scan the text 'SCIENCE AND TECHNOLOGY' again and answer the following questions:

1. Which things are technologies based on?
2. When did industrial technology begin?
3. What does technology mean?

ACTIVITY 8. Read the text, try to focus on its essential facts and choose the most suitable heading below for each paragraph.

1. The Fields of Scientific Research
2. Different Groups of Sciences
3. The Importance of Science
4. What is Science?
5. Methods of Scientific Research

SCIENCE AND SCIENTISTS



The world ‘science’ comes from the Latin word ‘scientia’, which means ‘knowledge’. Science covers the broad field of knowledge that deals facts and the relationship among these facts.

Scientists study a wide variety of subjects. Some scientists search for clues to the origin of the universe and examine the structure of the cells of living plants and animals. Other researchers investigate why we act the way we do, or try to solve complicated mathematical problems.

Scientists use systematic methods of study to make observations and collect facts. They develop theories that help them order and unity facts. Scientific theories consist of general principles or laws that

attempt to explain how and why something happens or has happened. A theory is considered to become a part of scientific knowledge if it has been tested experimentally and proved to be true.

Scientific study can be divided into three major groups: the natural, social, and technical sciences. As scientific knowledge has grown and become more complicated, many new fields of science have appeared. At the same time, the boundaries between scientific fields have become less and less clear. Numerous areas of science overlap each other and it is often hard to tell where one science ends and other begins. All sciences are closely interconnected.

Science has great influence on our lives. It provides the basis of modern technology – the tools and machines that make our life and work easier. The discoveries and inventions of scientists also help shape our view about ourselves and our place in the universe.

ACTIVITY 9. Divide the following words into three groups, those which describe A) science, B) technology, C) computers



ACTIVITY 10. Answer the following questions about science and technology

1. What is science?
2. What is technology?
3. Are they interconnected?
4. Is all technology based on science?
5. What modern technologies depend heavily on science?

6. When did industrial technology begin?
7. When was a steam engine invented?
8. Who invented a steam engine?
9. When was radio invented?
10. Who invented the radio?
11. When was the television invented?
12. Who invented the television?
13. When was the telephone invented?
14. Who invented the telephone?
15. When was the first car invented?
16. When was the first digital computer invented?
17. Who invented the first digital computer?
18. What famous scientists do you know?
19. What famous inventors do you know?
20. What scientific field are you interested in? Why?

ACTIVITY 11. Read the text below. Match choices (A – F) to (1 – 8). There are two choices you do not need to use.

ENERGY PRODUCTION: PROSPECTS AND PROBLEMS



The nation's need for reliable energy supplies has helped move forward a major new farm policy objective: conversion of biomass from the nation's farms and forests to liquid fuels.

The most promising application of biomass technologies is the production of ethyl alcohol (ethanol) from corn. When mixed with gasoline in a 1:9 ethanol to gasoline ratio, this product yields the popular new fuel, gasohol. Although attention is focused on farm crops as major

biomass feedstocks, any plant material—crops, trees, water plants, even algae and seaweed — could be used in biomass conversion.

1 _____ A coalition of farmers, citizens and politicians advocates rapid expansion of the nation's gasohol production capacity as farmers perceive several advantages in gasohol production: by production energy directly from grain, crop residues, or animal wastes, gasohol offers rural communities a degree of independence from the spiralling costs and unreliable supply of gasoline (also contributing positively to national efforts to solve serious energy supply problems), and, once gasohol production capacity expands, it is a potential positive influence on farm income. The wait for expansion may be relatively short.

2 _____ Many observers question the economic and environmental effects of a massive and rapid change in the use of major farm crops. An important environmental problem associated with energy production from crop residues is that of maintaining soil fertility and preventing excessive soil loss. World nutrition may also be affected if the food needs of the hungry compete with the demand for liquid fuels derived from grain crops.

3 _____ The full costs of maintaining soil fertility when crop residues are removed for ethanol production are poorly understood and quantified. Nutrients removed by and contained in the crop, including any residues (such as corn stocks or grain straw) removed from the farm, must be supplied again by some means if soil productivity is to be maintained. The quantity of nutrients removed in the grain and residue of major crops is large. The amount of nitrogen in crop residues alone is about 1 per cent of the nitrogen applied in commercial fertilizer to primary crops in Illinois, a major farm state.

The biological process by which crop residues decompose in the soil, providing nutrients to a growing crop, is complex. It is also highly sensitive to a number of natural and human factors.

Although the exact exchange between residue removal and use of fertilizers can be determined only under specific conditions, farmers would have to increase fertilizer applications greatly in order to maintain

soil fertility if crop residues are removed regularly.

4 _____ Removal of crop residues alters the plant nutrient cycle through a second, less direct mechanism. In nearly all regions, removal of crop residues would aggravate soil erosion by exposing the soil surface which would then be more easily affected by wind and water erosion. Scientists have demonstrated that, when crop residues cover one-half the soil surface, the annual rate of erosion on most soils is about 32 per cent less than when the soil is bare. Many widely used conservation tillage practices reach or exceed this degree of soil cover. For common midwestern soils, researchers have demonstrated that no-tillage practices maintain up to 95 per cent of the soil covered from harvest to corn-planting time the following spring. It has been estimated that, when optimal conservation practices are applied an average 58 per cent of agricultural residues can be removed without causing erosion over 5 tons per cent.

The nutrient loss through erosion is difficult to quantify precisely. Many factors affect the amounts of nutrients lost from a given field. The timing and methods of fertilizer application affect the portion of applied nutrients that are either used by the crop or carried off the field by eroding sediment or runoff. Soil scientists believe that, on the average, a pound of nutrients lost through erosion or residue removal must fundamentally be replaced by a pound from commercial or other sources if production levels are to be maintained.

5 _____ The factors which determine how much residue could be made available for biomass conversion are the same as those which determine the rate of erosion — degree and length of slope, soil texture and the intensity of rainfall. Natural soil erodibility in turn determines the importance of crop residue management to the control of erosion, except perhaps where other conservation measures (terracing, for example) are in place. More extreme alternative to control erosion — generally less intensive cropping patterns or reduction in length or steepness of the slope through land reformation — are economically workable choices for only a small portion of the cultivated land base subject to serious erosion.

- A** – Loss through erosion
- B** – Nation’s gasohol production
- C** – Biomass conversion
- D** – The economic and environmental effects
- E** – Nutrients
- F** – Removal of crop residues
- G** – Capacity and organic content

ACTIVITY 12. Complete the following sentences with the correct words.

Biomass 1) _____ using crop residues would aggravate nonpoint water pollution stemming from agriculture and could aggravate nutrient loss and soil erosion. Streams, rivers, canals, reservoirs, and lakes could be subject to 2) _____ sediment loads. Beneficial 3) _____ characteristics such as tilt, water holding capacity and organic content could also be damaged. Yet, because the environmental 4) _____ of biomass conversion are not concentrated, are indirect, and occur over time, it is 5) _____ to place a monetary value on them.

1	A	conversion	B	exposition	C	transformation	D	turning
2	A	elevated	B	increased	C	upraised	D	overhead
3	A	property	B	land	C	soil	D	earth
4	A	realizes	B	exercises	C	performs	D	effects
5	A	heavy	B	serious	C	difficult	D	hard



ACTIVITY 13. Answer the following questions about energy production:

1. How do farmers contribute to energy production?
2. What are the economic effects of the nation's gasohol production?
3. What are the environmental effects of the nation's gasohol production?
4. How does removal of crops residues alter the plant nutrients cycle?
5. What are the factors which determine the amount of residue possibly available for biomass conversion?

ACTIVITY 14. Read and translate the text and answer the comprehension questions after it:

ENVIRONMENTAL PROBLEMS

Our environment is constantly changing. There is no denying that. However, as our environment changes, so does the need to become increasingly aware of the problems that surround it. With a massive influx of natural disasters, warming and cooling periods, different types of weather patterns and much more, people need to be aware of what types of environmental problems our planet is facing.

Global warming has become an undisputed fact about our current livelihoods; our planet is warming up and we are definitely part of the problem. However, this isn't the only environmental problem that we should be concerned about. All across the world, people are facing a wealth of new and challenging environmental problems every day. Some of them are small and only affect a few ecosystems, but others are drastically changing the landscape of what we already know.

Our planet is poised at the brink of a severe environmental crisis. Current environmental problems make us vulnerable to disasters and tragedies, now and in the future. We are in a state of planetary emergency, with environmental problems piling up high around us. Unless we address the various issues prudently and seriously we are

surely doomed for disaster. Current environmental problems require urgent attention.

1. Does our environment change?
2. What has global warming become about?
3. Are people facing a wealth of new environmental problems?
4. What do current environmental problems make us?
5. What do current environmental problems require?

ACTIVITY 15. Choose the necessary word and put in the sentences:

**attention, warming, problem, environment, environmental,
wealth, emergency**

- 1) As our **1)** _____ changes, so does the need to become increasingly aware of the problems that surround it.
- 2) Global **2)** _____ has become an undisputed fact about our current livelihoods.
- 3) Our planet is warming up and we are definitely part of the **3)**_____.
- 4) All across the world, people are facing a **4)** _____ of new and challenging environmental problems every day.
- 5) Our planet is poised at the brink of a severe **5)** _____ crisis.
- 6) We are in a state of planetary **6)** _____, with environmental problems piling up high around us.
- 7) Current environmental problems require urgent **7)**_____.

ACTIVITY 16. Read and translate the text below; complete it with the verbs in brackets in the correct form.

GLOBAL WARMING



Global warming (to be) the term used to describe the rising of the average temperature on Earth. It (to have) to do with the overall climate of the Earth rather than the weather on any

given day.

The Earth (to go) through changes in temperature before. The Earth has even gone through several ice ages, when the temperature dropped significantly and a lot of the world was covered in ice glaciers. Each time the planet eventually (to warm) up and (to melt) the ice.

Even small variations of the planet's average temperature can have a large impact on the environment. For example, the ice ages that occurred generally (to involve) a reduction in the global temperature of around 5°C.

Here (to be) few of the things that scientists think may happen as the temperature rises. Some of them (to be) already happening:

Glaciers melting - Many glaciers are already melting and shrinking throughout the world. If the temperature (to increase) they (to continue) to melt.

Ocean levels will rise - As the glaciers melt, the ocean levels will rise. This could cause flooding in cities located near the coast.

Migration of animals - Animals (to migrate) to cooler spots as their old habitats (to get) too warm. This could (to upset) the food chain and put some species in danger of extinction.

Extreme weather - Some scientists (to think) that warming will fuel more powerful hurricanes as well as more droughts and flooding in different areas of the world.

Change in ecosystems - cold weather biomes such as the tundra will shrink, while deserts (to continue) to expand. Greenhouse gases like CO₂ heat the Earth

Global warming (to be) a very complex subject. Some scientists disagree as to what caused the rise in temperatures that occurred during the end of the 20th century. Things that can (to have) an impact on global warming include the natural temperature fluctuations of the planet, greenhouse gases such as carbon dioxide, volcanic eruptions, and increased solar activity.

ACTIVITY 17. Read and translate the text below and answer the questions after it:

NATURAL FLUCTUATIONS



The average temperature of the Earth has changed throughout history. Some of this is due to natural changes in temperature that occur over time due to a large number of variables. Even slight changes in nutrient cycles such as the carbon cycle, the oxygen cycle, and the water cycle likely have an impact on the climate over time.

Some scientists think that the current warming trend is just a part of the Earth's natural changes in temperature and it will eventually start to cool again.

The reason the Earth isn't a ball of frozen ice is because of greenhouse gases. Greenhouse gases act like insulation to keep the Earth warm. However, as more and more greenhouse gases get into the atmosphere, the Earth will start to grow warmer. The main greenhouse

gases that keep the Earth warm are water vapor, carbon dioxide, and methane.

In the past 100 years humans have been the cause of a significant increase in greenhouse gases in the atmosphere, especially carbon dioxide. Every time we drive our cars or use electricity, more carbon dioxide is released into the air.

Since all the energy and heat on the Earth comes from the sun, it follows that the sun's activity will have some effect on the temperature of the Earth. The activity of the sun is actually different over time, which can change how much energy actually hits the Earth.

When volcanoes erupt they can change the temperature of the entire Earth for a short period of time. This is because their eruptions send large amounts of ash and particles into the atmosphere. This blocks some of the sun's rays from hitting the Earth and can cause the Earth to cool. At the same time, volcanic eruptions emit large amounts of carbon dioxide into the atmosphere.

We can't do much about the Earth's natural fluctuations, volcanic eruptions, or the sun's activity, but we can impact the amount of greenhouse gases that are emitted into the air. Many of our everyday activities cause more carbon dioxide to be released into the atmosphere including driving cars and using electricity. You can help by trying to cut down on the amount of electricity you use as well as how much driving you (or your parents) do. Things like carpooling to events and planting trees can help.

1. What is global warming?
2. What does cause global warming?
3. How greenhouse gases do heat the Earth?
4. What is the history of Global Temperatures?
5. Why is global warming important?
6. What is the natural Fluctuations?
7. What does keep the Earth warm?
8. What is the Sun Activity?
9. What do the volcanic eruptions emit?

10. What can we do about the Earth's natural fluctuations?

ACTIVITY 18. Decide whether the following statements are TRUE or FALSE

1. The average temperature of the Earth has changed throughout history.
2. Warming will fuel more powerful hurricanes as well as more droughts and flooding in different areas of the world.
3. Greenhouse gases act like insulation to keep the Earth warm.
4. The ice ages that occurred generally involved a reduction in the global temperature of around 15°C.
5. Large variations of the planet's average temperature can have a small impact on the environment.
6. The Earth has not even gone through several ice ages
7. Animals will migrate to cooler spots as their old habitats get too warm.

ACTIVITY 19. Complete the following sentences with the correct words.

CARBON FOOTPRINT



One way to 1 _____ how much carbon dioxide you contribute to the atmosphere is by calculating your carbon footprint. There are a lot of variables to 2 _____ including the gas mileage of your family's car and how your local power plant generates its 3 _____.

A lot of the same activities that 4 _____ carbon dioxide also cause air pollution, so by lowering your carbon footprint you can help the 5 _____ in many ways.

1	A	mark off	B	take	C	distribute	D	measure
2	A	believe	B	divide	C	consider	D	suppose
3	A	supply	B	electricity	C	resource	D	energy
4	A	produce	B	manufacture	C	elaborate	D	shape
5	A	setting	B	element	C	subdivision	D	environment

ACTIVITY 20. Read the facts and make up your own reports about global warming:

FACTS ABOUT GLOBAL WARMING

It takes lots of data and many years to determine how the average temperature of the Earth is changing. Even then, many scientists disagree on how to interpret the data.

Since 1990, worldwide carbon dioxide emissions have risen by over 20 percent.

The United Nations formed a group called the International Panel on Climate Change to investigate global warming.

One way to reduce carbon dioxide is to use clean renewable energy sources such as solar energy and wind energy. These sources produce much less pollution as well.

ACTIVITY 21. Read and translate the text

GREENHOUSE EFFECT

The Greenhouse effect is the warming effect of the sun on greenhouse gases like CO₂ that act to trap this heat in our atmosphere.

Greenhouse gases in the Earth's atmosphere release heat absorbed from the sun's infrared radiation (IR). Some of the heat released reaches the earth, along with heat from the sun that has penetrated the atmosphere. Both the solar heat and the radiated heat are absorbed by the



earth and released; some is reabsorbed by greenhouse gases to perpetuate the cycle. The more of these gases that exists, the more heat is prevented from escaping into space and, consequently, the more the earth heats.

Some degree of greenhouse gases in our environment is only natural without the greenhouse effect our ecosystem would not be possible. Since the dawn of the industrial age in the 1750s, however, carbon dioxide alone has increased by 40%. Concerns about the greenhouse effect's contribution to global warming have prompted agreements between various governments on targets for reduction of greenhouse gas emissions.

While the same principle technically applies to an actual greenhouse, the effect is a small contributor to the structure's total heat when compared with its prevention of heat loss through convection. In contrast, it is estimated that the greenhouse effect, both natural and man-made, raise the average temperature of the earth by thirty-three degrees Celsius.

ACTIVITY 22. Fill in the gaps with necessary words:

- 1) The Greenhouse effect is the _____ effect of the sun on greenhouse gases like CO₂.
- 2) Greenhouse gases in the Earth's _____ release heat absorbed from the sun's infrared radiation.
- 3) The solar heat and the radiated heat are absorbed by the _____.
- 4) Some degree of greenhouse gases in our environment is only _____.
- 5) The effect of the _____ is a small contributor to the structure's total heat.

ACTIVITY 23. Read and translate the text below and do exercises after it:

WEATHER AND CLIMATE: THE GREENHOUSE EFFECT AND AGRICULTURE

Agricultural yields are very dependent on weather. Recent examples are frost and drought damage to Soviet grain crops, the recent drought in the USA and frost damage to Brazilian coffee. There are indications that extreme weather conditions now occur more frequently than in the past. If true, this instability will influence agriculture and increase the need for food reserves. Unfortunately, accurate long-term weather forecasts are probably impossible. Some compensation for weather vagaries is possible by irrigation, but apart from this little else can be done with weather.



One aspect of the climate now attracting political attention is the problem increase in the earth's average surface temperature due to the "greenhouse effect". The heat balance of the atmosphere is influenced by some of the components

of the air that are present in only small amounts: carbon dioxide, methane, nitrous oxide and the chlorofluorocarbons. These gases absorb infra-red (heat) radiation from the earth. The concentration of these gases in the air is increasing and thus the capacity of the atmosphere to retain heat. It is feared that this will give a global temperature rise and thus influence climate.

The increasing atmospheric concentration of these gases is due to human, domestic and industrial activities. The increase appears to have

started with industrialization and became especially noticeable after the Second World War.

The influence of these gases on global temperature and climate is very complex. Other factors are also involved, such as regional pollutants (e.g., ozone), water vapour and clouds, and changes in the earth surface reflectance due to deforestation and other land use changes.

There is a growing consensus that the increase in the concentration of greenhouse gases gives cause for concern. The observed trends must eventually change the global surface temperature or the atmospheric circulation pattern, or both, but the size and timing of any effects are a matter for current debate.

In principle the emissions of chlorofluorocarbons should be those easiest to reduce or eliminate. These are man-made industrial chemicals. There is now international agreement that their use should be greatly reduced and preferably eliminated.

The main concern is increasing concentration of carbon dioxide. Burning of fossil fuel emits carbon dioxide to air.

Forests contain carbon. When trees are replaced by grassland or crops with less standing biomass, carbon is liberated as carbon dioxide. The present rate of decline in forest area results in a substantial input of carbon dioxide to the atmosphere, though somewhat less in magnitude than the burning of fossil fuels.

Soil also contain much carbon as humus. Increased conversion of grasslands to croplands liberates some carbon from this source too.

The main contribution of agriculture to abating the carbon dioxide problem must be to maintain soil humus and to increase the productivity of arable land and thus reduce the need for using forested areas for crop production.

Agricultural practices mainly water management and animal husbandry, are believed to be major factors in the current noticeable increase in methane production.

Sources of methane are mostly anaerobic fermentation of organic matter by ruminant cattle, and also in wetlands such as rice fields. Increasing rice-paddy areas could be a major cause for the increased

emissions. Much of atmospheric methane seems to be derived from fossil sources.

Nitrous oxide comes mainly from the soil. Nitrous oxide is a greenhouse gas and also reacts with ozone in the ozone layer, where it is decomposed.

Higher fertile cultivated land in temperate and tropical regions together with tropical forests and grasslands are regarded as the major sources of nitrous oxide, but the relative importance of the individual sources and processes is largely unknown. Combustion was believed to be a major source, but this contribution seems to have been overestimated.

Nitrous oxide is formed in the soil during the natural biological processes of nitrification and denitrification. The end-product of denitrification is usually nitrogen gas but under some conditions nitrous oxide is also formed.

The emission of nitrous oxide from the fields is uneven, it depends on competing reactions and varies with the conditions.



Agricultural practices such as tillage, fertilization, manuring, crop residue management and drainage all influence nitrogen transformation processes in the soil and may therefore influence nitrous oxide emissions. Knowledge required to give guidelines on how to minimize such emissions is largely lacking. Nitrate application on excessively wet or waterlogged fields can increase nitrous oxide emissions from the soil, but it is not usual to fertilize under such conditions. Research on the influence of agriculture on nitrous oxide formation is now being

undertaken in many institutions, but improved measurement methods for field emissions are needed.

A) Scan the text again and answer the following questions:

- 1) What indications are there that extreme weather conditions?
- 2) How does the production of fertilizers influence the global warming?
- 3) Which components affect the heat balance of the atmosphere?
- 4) Does soil contain carbon? What is its name?
- 5) What do agricultural practices management and drainage?

B) Match the following words and word combinations with their Ukrainian equivalents

1) soil	a) вміщувати, містити в собі
2) to contain	b) тваринництво
3) international agreement	c) джерело
4) to reduce	d) сільськогосподарський
5) industrial	e) зменшувати, знижувати
6) agricultural	f) міжнародні угоди
7) source	g) промисловий
8) crop production	h) виробництво сільськогосподарської продукції
9) animal husbandry	i) територія, площа лісу
10) forest area	j) ґрунт

C) Answer these multiple-choice questions about environmental pollution:

1. What does the term “environmental pollution” mean?

- A** polluted air
 - B** all the ways of polluting surroundings
 - C** rubbish and litter
2. Why is environmental pollution a serious problem?
- A** because it can cause disastrous processes
 - B** because people dirty the air with gases and smoke
 - C** because motor vehicles fill the air with the noise
3. Why is environmental pollution a complicated problem?
- A** because people ruin naturally beautiful world
 - B** because much pollution is caused by things that benefit people
 - C** because exhaust from cars causes a large percentage of all air pollution
4. How can we reduce environmental pollution?
- A** Governments should enforce laws which ban the pollution of the environment
 - B** We should work hard
 - C** We should stop using many things that benefit us

D) Refer to the text once again and find out new information about the ways of rejecting the greenhouse effect.

ACTIVITY 24. Choose the proper words and fill them in the blanks:

1. Agricultural yields are very dependent on _____.
A weather **B** processes
C sculpture **D** disintegration
2. There are indications that extreme weather _____ now occur more frequently than in the past.
A circumstances **B** conditions
C considerations **D** occasions
3. The increasing atmospheric concentration of gases is due to _____, domestic and industrial activities.
A personage **B** individual

C human

D person

4. The main concern is increasing _____ of carbon dioxide.

A consistence

B thickness

C density

D concentration

5. Nitrous oxide comes mainly from the _____.

A soil

B property

C land

D stead

ACTIVITY 25. Read the text below. Match choices (A – G) to (1 – 5). There are two choices you do not need to use.

POLLUTION

Pollution is **1)** _____ by external substances introduced directly or indirectly. Human health, ecosystem quality and aquatic and terrestrial biodiversity may be affected and altered permanently by pollution. Pollution occurs when ecosystems can not get rid of **2)** _____. The critical threshold of its ability to naturally eliminate substances is compromised and the balance of the ecosystem is broken.

The sources of pollution are numerous. The identification of these different pollutants and their effects on ecosystems is complex. They can come from natural disasters or **3)** _____, such as oil spills, chemical spills, nuclear accidents ... These can have **4)** _____ where they live: destruction of the biodiversity, increased mortality of the human and animal species, destruction of natural habitat, damage caused to the quality of soil, water and air ...

Preventing pollution and protecting the environment necessitate the application of the principles of sustainable development. We have to consider to satisfy the needs of today without

5) _____.

A – the degradation of natural environment

B – compromising the ability of future generations to meet their needs

C – substances introduced into the environment

- D – the result of human activity
- E – terrible consequences on people and the planet
- F – inside the ecosystem
- G – by helping plants and animals

ACTIVITY 26. Read and complete the text with the missing parts (A – F):

ENVIRONMENTAL POLLUTION

Environmental pollution is _____.(1). People dirty the air with gases and smoke, poison the water with chemicals and other substances, and damage the soil with too many fertilizers and pesticides. People also pollute _____.(2). They ruin natural beauty by scattering rubbish and litter on the land and in the water. They operate motor vehicles that fill the air with the noise.

Environmental pollution is one of the most serious problems facing humanity today. It causes global warming, destruction of the ozone layer, and other disastrous processes. Air, water, and soil — all harmed by pollution — are necessary to the survival of all living things. Badly polluted air can _____.(3). Polluted water kills fish and other marine life. Pollution of soil reduces the amount of land available for growing crops. Environmental pollution also brings ugliness to our naturally beautiful world.

The pollution problem is as complicated as it is serious. It is complicated

because much pollution is caused by things that benefit people. Exhaust from cars causes a large percentage of all air pollution, but the car _____.(4). Factories discharge much of the material that pollutes air and water, but factories provide jobs for people and produce goods that people want. Too many



fertilizers or pesticides can _____(5). Thus, to end or greatly reduce pollution immediately, people would have to stop using many things that benefit them. But pollution can be gradually reduced. Scientists and engineers should work hard _____(6). Governments should enforce laws that require enterprises or individuals to stop or to reduce certain polluting activities.

A – provides transportation for millions of people.

B – cause illness, and even death.

C – a term that refers to all the ways by which people pollute their surroundings.

D – to find the ways to lessen the amount of pollution that such things as cars and factories cause.

E – their surroundings in various other ways.

F – ruin soil, but they are important aids for the growing of crops.

ACTIVITY 27. Match the following words and word combinations with their Ukrainian equivalents.

1) weapons	a) виживання
2) nuclear weapons	b) одорант, духмянний
3) to determine	c) зловживати
4) to influence	d) сприйняття
5) exposure	e) окрім, за винятком
6) a cell	f) присвячувати
7) to ban	g) знищувати, очищати, виділяти
8) to eliminate	h) ядерна зброя
9) to devote	i) забороняти
10) except	j) зброя
11) perception	k) визначати
12) abuse	l) впливати
13) odorant	m) клітина
14) the survival	n) піддавання зовнішньому впливу

ACTIVITY 28. Read the text and answer the question on it below:

ENVIRONMENTAL EFFECTS

CO₂ emissions

Natural gas is often described as the cleanest fossil fuel, producing less carbon dioxide per joule delivered than either coal or oil and far fewer pollutants than other hydrocarbon fuels. However, in absolute terms, it does contribute substantially to global carbon emissions, and this contribution is projected to grow. According to the IPCC Fourth Assessment Report (Working Group III Report, chapter 4), in 2004, natural gas produced about 5.3 billion tons a year of CO₂ emissions, while coal and oil produced 10.6 and 10.2 billion tons respectively.

According to an updated version of the SRES B2 emissions scenario, however, by the year 2030, natural gas would be the source of 11 billion tons a year, with coal and oil now 8.4 and 17.2 billion respectively because demand is increasing 1.9% a year (Total global emissions for 2004 were estimated at over 27,200 million tons)

In addition, natural gas itself is a greenhouse gas more potent than carbon dioxide when released into the atmosphere, although natural gas is released in much smaller quantities. However, methane is oxidized in the atmosphere, and hence natural gas has a residence lifetime in the atmosphere for approximately 12 years, compared to CO₂, which is already oxidized, and has an effect for 100 to 500 years.



Natural gas is mainly composed of methane, which has a radioactive forcing twenty times greater than carbon dioxide. Based on such composition, a ton of methane in the atmosphere traps in as much radiation as 20 tons of carbon dioxide; however, it remains in the atmosphere for a 8–40 times

shorter time. Carbon dioxide still receives the lion's share of attention

over greenhouse gases because it is released in much larger amounts. Still, it is inevitable when natural gas is used on a large scale that some of it will leak into the atmosphere. (Coal methane not captured by coal bed methane extraction techniques is simply lost into the atmosphere; however, most methane in the atmosphere is currently from animals and bacteria, not from industrial leaks.) Current estimates by the EPA place global emissions of methane at 3 trillion cubic feet (85 km³) annually, or 3.2% of global production. Direct emissions of methane represented 14.3% of all global anthropogenic greenhouse gas emissions in 2004.

- 1) Is natural gas the cleanest fossil fuel?
- 2) How many tons of gas a year would be extracted by the 2030?
- 3) What is done with methane in the atmosphere?
- 4) What is natural gas composed of?
- 5) Why does the carbon dioxide receive the lion's share of attention?

ACTIVITY 29. Try to match the adjectives in COLUMN A with the nouns in COLUMN B to form meaningful phrases:

A	B
to pollute	the soil
to poison	the vehicle
to damage	pollution
to kill	the air
to ruin	the water
to cause	crops
to grow	the distraction
to operate	fish
to provide	jobs
to reduce	the beauty

ACTIVITY 30. Read the text. Five sentences have been taken out of it. Complete the text with appropriate sentences (A – G) given

below. An example (0) has been done for you at the beginning. There are two extra sentences which you don't need.

POLLUTANTS

In any form, a minute amount of odorant such as t-butyl mercaptan, with a rotting-cabbage-like smell, is added to the otherwise colorless and almost odorless gas, so that leaks can be detected before a fire or explosion occurs. (0)_____. Sometimes a related compound, theophany is used, with a rotten-egg smell. Adding odorant to natural gas began in the United States after the 1937 New London School explosion. (1) _____. Odorants are considered non-toxic in the extremely low concentrations occurring in natural gas delivered to the end user. (2) _____.

Explosions caused by natural gas leaks occur a few times each year. Individual homes, small businesses and boats are most frequently affected when an internal leak builds up gas inside the structure.



(3)_____. In these cases, the people inside tend to have minor to moderate injuries. Occasionally, the gas can collect in high enough quantities to cause a deadly explosion, disintegrating one or more buildings in the process. The gas usually dissipates readily outdoors,

but can sometimes collect in dangerous quantities if weather conditions are right.

(4) _____. Some gas fields yield sour gas containing hydrogen sulfide (H_2S). This untreated gas is toxic. Amine gas treating, an industrial scale process which removes acidic gaseous components, is often used to remove hydrogen sulfide from natural gas.

Extraction of natural gas (or oil) leads to decrease in pressure in the reservoir. (5) _____. Natural gas heating systems are a minor source of carbon monoxide deaths in the United States. According to the US Consumer Product Safety Commission (2008), 56% of unintentional deaths from non-fire CO poisoning were associated with engine-driven tools like gas-powered generators and lawn mowers. Natural gas heating systems accounted for 4% of these deaths. Improvements in natural gas furnace designs have greatly reduced CO poisoning concerns. Detectors are also available that warn of carbon monoxide and/or explosive gas (methane, propane, etc.)

A Carbon dioxide produced is 117,000 ppm vs. 208,000 for burning coal.

B Frequently, the blast will be enough to significantly damage a building but leave it standing.

C In mines, where methane seeping from rock formations has no odor, sensors are used.

D However, considering the tens of millions of structures that use the fuel, the individual risk of using natural gas is very low.

E Such decrease in pressure in turn may result in subsidence, sinking of the ground above.

F This in turn may lead to subsidence at ground level. Subsidence may affect ecosystems, waterways, sewer and water supply systems, foundations, etc.

G The buildup of gas in the school went unnoticed, killing three hundred students and faculty when it ignited.

ACTIVITY 31. Read and give the summery of the text.

RADIATION

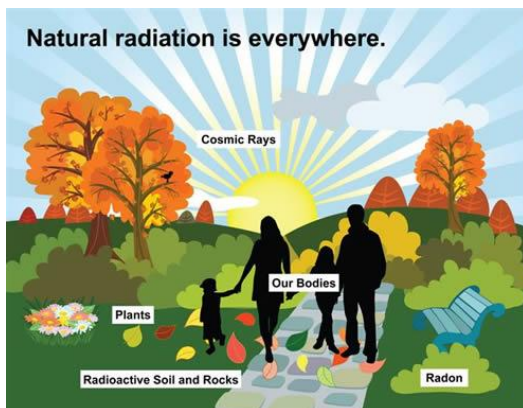
Radiation is an invisible pollutant that can be highly dangerous. Nuclear radiation comes from radioactive substances, including waste from nuclear weapons testing and from nuclear power plants. Small amounts of electromagnetic radiation are produced by a variety of

electronic devices including computers, lasers, microwave ovens, TV-sets and X-ray machines.



Scientists have not determined exactly what effects small amounts of radiation influence people. But exposure to large amounts can cause cancer and harmful changes in reproductive cells.

International agreements ban most testing of nuclear weapons in the atmosphere. Such regulations have helped to eliminate the major sources of radiation. However, the amount of radioactive waste is constantly increasing. Scientists are studying the ways to eliminate these wastes safely and permanently.



ACTIVITY 32. Read the text below and decide whether the following statements after the text are TRUE or FALSE

EIGHT FACTS ABOUT EUROPE'S FOREST ECOSYSTEMS

Europe is one of the few regions of the world where forest cover has increased over the last century. The European Environment Agency (EEA) takes a look at Europe's valuable forest ecosystems.

- In Europe, forests cover around 35% of the land area (190 million ha), making Europe one of the most forest-rich regions in the world. The

recent increase in European forest cover is a result of national legislation, afforestation and natural expansion over the last 200 years.

- Forests are an economic resource. Forests generate income for more than 16 million private forest owners, and forest activities have a turnover of almost € 500 billion, employing approximately 3.5 million people.

- Forests provide unseen services: Alongside wood and other products, forests are also valuable for their ‘ecosystem services’. For example, more than 20 % of European forests are managed to protect water and soils, mainly in mountainous areas. Other services include preventing floods and filtering air.



- Forests help mitigate climate change impacts. European forests absorb approximately 10% of Europe’s annual greenhouse gas emissions, according to the latest State of Europe’s forests report.

- Forest structures in the EU are becoming more uniform, as the variety of tree species is reduced. This means forest biodiversity is lost, making these ecosystems less resilient to pests, disease and a changing climate. Natural forest once covered most of Europe, but only a very small proportion remains untouched, mostly in isolated pockets.

- But many forest ecosystems are in poor health. The effects of poor forest management can be seen in the population of woodland birds, which declined more than 30% in some regions of Europe between 1980 and 2005. The IUCN estimated in 2009 that 27 % of mammal species, 10 % of reptiles and 8 % of amphibians related to forests are threatened with extinction in the EU.

- Invasive alien species are increasingly a problem for European forests. There are around 1 800 species in Europe's forests which are invasive and alien to the natural environment. For example, European forests have been devastated by Dutch elm disease caused by fungi introduced from Asia, and grey squirrels are outcompeting red squirrels. Globally, invasive alien species are one of the largest causes of biodiversity loss.

- Climate change is very likely to harm forest ecosystems. One area which may change is the pattern of forest fires. On average, around 400 000 ha of forest currently burns down every year, mostly in the Mediterranean region. Some habitats, such as forest wetlands, are particularly sensitive to climate change.

Decide whether the following statements are TRUE or FALSE:

- 1) In Europe, forests cover around 55% of the land area.
- 2) Forests generate income for more than 16 million private forest owners.
- 3) There are around 1 800 species in Europe's forests which are non-aggressive.
- 4) European forests have been devastated by Dutch elm disease caused by fungi introduced from Asia.
- 5) Some habitats, such as forest wetlands, are not sensitive to climate change.
- 6) Globally, invasive alien species are one of the largest causes of biodiversity loss.
- 7) Forest structures in the EU are becoming more uniform, as the variety of tree species is increased.

ACTIVITY 33. Choose the proper words and fill them in the blanks:

1. Forests are an economic _____.
- | | |
|-------------------|---------------------|
| A resource | B ecosystems |
| C people | D emissions |

2. Forests help mitigate climate _____ impacts.
A devastate **B** change
C cause **D** relate
3. Natural _____ once covered most of Europe.
A world **B** nature
C forest **D** wood
4. The effects of poor forest _____ can be seen in the population of woodland birds.
A direction **B** operation
C legislation **D** management
5. Climate _____ is very likely to harm forest ecosystems.
A change **B** alteration
C variation **D** deflection

ACTIVITY 34. Translate the following words into Ukrainian and make up sentences with them:

To cover –
 To generate –
 To devastate –
 To absorb –
 To provide –
 To prevent flood –
 National legislation –
 Afforestation –
 Natural expansion –
 Disease –
 Woodland birds –

ACTIVITY 35. Read the text below. Match choices (A – G) to (1 – 5). There are two choices you do not need to use.

AIR POLLUTION

So far we have been mainly concerned with 1) _____. But 2) _____ affects our atmosphere too. Air pollution from cars and factories is

making 3) _____ layer bigger and bigger, thus allowing too many dangerous rays through and subjecting people to health hazards and influencing our climate. Emissions of gases blamed 4) _____. It's high time that 5) _____ introduced emission controls on all vehicles and approved tough rules on smog and soot, setting a limit on the size of tiny soot particles, cutting the limit for smog-forming elements, etc. Such rules would benefit millions of people, adults and children with respiratory illnesses, and would reduce 6) _____.



- A – medical costs for treating them
- B – ecological problems on land
- C – Green solution
- D – the hole in the ozone
- E – chemical pesticides and herbicides use
- F – government bodies all over the world
- G – human activity

ACTIVITY 36. Try to match the words in COLUMN A with their equivalents in COLUMN B and form meaningful phrases with them.

A	B
4) Ozone layer	a) емісія, викидання
5) Hole	b) транспортний засіб
6) Emission	c) жлрсткі правила
4) Vehicle	d) отвір, дупло, діра
5) Tough rules	e) озоновий шар
6) Soot particles	f) приносити користь
7) Treat	g) часточки сажі
8) Benefit	h) лікувати, пригощати, частувати
9) It's high time	i) промені
10) Blame	j) небезпека для здоров'я
11) Rays	k) Давно пора, давно час
12) Health hazard	l) винити, дорікати, засуджувати

ACTIVITY 37. Read and translate the text below and do exercises after it:

WATER AND SOIL

The level of pollution of arable land often exceeds acceptable standards, besides, sometimes chemicals are simply stored in the open, mixing with rain and spring water. So maximum permissible levels of pesticides in water also exceed normative figures. The amount of ground water containing high concentrations of toxins is constantly increasing. Poison penetrates even into milk of domestic animals, so checks show that in some regions it breast milk. Such are ecological consequences of chemical pesticides and herbicides use.

Very often dangerous chemicals are allowed to escape into a sewerage system which runs into rivers and their tributaries. Moving downstream, cocktail hits tap supplies. Where it is possible people hit by the pollution scare wait in queues to fill containers with water from natural springs or buy bottled water. The quality of tap water leaves much to be desired.

A) Answer these multiple-choice questions:

1) What is the standard level of pollution of arable land?

a) The level of pollution of arable land exceeds acceptable standards, besides, sometimes chemicals are simply stored in the open, mixing with rain and spring water.

b) The level of pollution of arable land exceeds acceptable standards, sometimes chemicals are not stored in the open water.

c) The level of pollution of arable land exceeds acceptable standards besides, always are stored in the spring water.

2) What is the chemicals stored in the open mixing with?

a) Soil is stored in the rain water.

b) Chemicals are simply stored in the open, mixing with rain and spring water.

c) Spring water are simply stored in the chemicals/

3) Where does poison penetrate into grass and water with?

a) Poison penetrates always in wild animals.

b) Poison penetrates even in the nature.

c) Poison penetrates even into milk of domestic animals

4) What are ecological consequences of chemical pesticides and herbicides use?

a) The level of pollution of arable land exceeds acceptable standards; the amount of ground water containing high concentrations of toxins is constantly increasing; poison penetrates into milk of domestic animals;

b) The level of pollution of arable land exceeds acceptable standards; poison penetrates into milk of domestic animals

c) The amount of ground water containing high concentrations of toxins is constantly increasing; the level of pollution of arable land exceeds acceptable standards; the amount of ground water containing high concentrations of toxins is constantly increasing;

B) Make a choice and connect two parts of the sentence

1) Very often dangerous chemicals are allowed to escape	a) of domestic animals
2) The quality of tap water leaves	b) into a sewerage system which runs into rivers
3) Poison penetrates even into milk	c) much to be desired.
4) The level of pollution of arable land	d) to fill containers with water from natural springs or buy bottled water
5) It is possible people hit by the pollution scare wait in queues	e) often exceeds acceptable standards

C) Find the Ukrainian equivalents of the English words and word combination:

1) permissible levels	
2) pesticides	
3) exceed	
4) figures	
5) ground water	
6) penetrate	
7) domestic animals	
8) traces	
9) breast milk	
10) herbicides	
11) escape	
12) sewerage	

13) tributary	
14) downstream	
15) pollution scare	
16) queue	
17) natural spring	
18) tap water	



ACTIVITY 38. Complete the following sentences with the correct words.

ACID RAIN



One of the most 1 _____ pollution problems is acid rain. What happened is this. First, factories send gases and chemicals into the 2 _____. There they 3 _____ and are carried for hundreds of miles by the wind. Finally, they 4 _____ back to earth when it rains. Chemicals 5 _____ rain, acid rain kills fish

and trees. It slowly destroys buildings too.

The Green solution: industrial countries should 6 _____ their levels of pollution. This is already happening in some parts of Europe. There, several countries («The 30% Club») have 7 _____ their acid rain pollution by 30%.

1	A	serious	B	important	C	considerable	D	busy
2	A	atmosphere	B	air	C	situation	D	climate
3	A	blend	B	combine	C	mix	D	confuse
4	A	descend	B	drop	C	precipitate	D	fall
5	A	acidify	B	acidulate	C	oxidize	D	oxygenate
6	A	operate	B	control	C	monitor	D	command
7	A	strike	B	shave	C	cut	D	barb

ACTIVITY 39. Read the text below. Match choices (A – G) TO (1 – 5). There are two choices you do not need to use.

LARGE OLD TREES IN RAPID GLOBAL DECLINE



Ecosystems worldwide are in danger of 1) _____ , without more research and policy changes to better protect them, warns a new study published in Science.

Lead author of the paper, Professor David Lindenmayer from the Fenner School of Environment and Society in the ANU College of Medicine, Biology and Environment, says the threats these trees face are manifold and 2)_____ are rapidly declining.

“Just as large-bodied animals such as elephants, tigers, and cetaceans have declined drastically in many parts of the world, a growing body of evidence suggests that large old trees could be equally imperiled,” said Professor Lindenmayer.

“Targeted research is urgently needed to better understand the key threats to their existence and to devise strategies to counter them.

Without such initiatives, these iconic organisms and the many species dependent on them could be greatly diminished or lost altogether.”

The study outlines 3)_____ large old trees play, roles that younger and smaller trees cannot fulfill.

“Large old trees in Mountain Ash forests of mainland Australia, for example, provide irreplaceable shelter and nesting sites for over 40 species, therefore their decline could have 4)_____ integrity and biodiversity,” said Professor Lindenmayer.

“They also store large quantities of carbon and play significant roles in local hydrological regimes, disruptions to which are of global concern.

“These trees are among the biggest organisms on Earth, and their importance can continue for decades or even centuries after tree death when they become standing dead trees or large logs.”

The paper cites examples of locations in Europe, North America, Africa, Asia, South America, Latin America and Australia where the loss of large old trees has been identified as a

5) _____.

“In certain locations we are seeing multiple drivers of large old tree loss interacting to create ecosystem-specific threats,” said Professor Lindenmayer.

“In agricultural landscapes, for example, chronic livestock over-grazing, excessive nutrients from fertilizers, and deliberate removal for firewood and land clearing combine to severely reduce large old trees.



“If we are to ensure the perpetual supply of large old trees, policies and management practices must be put in place that intentionally grow such trees and reduce their mortality rates.”

A – serious implications for ecosystem

B – losing large, old trees forever

C – policies and management practices

- D** – populations around the world
- E** – they become standing dead trees
- F** – the unique ecological roles
- G** – major ecological problem

ACTIVITY 40. Arrange the sentences in logical order according to the text. Then use them as a plan to retell it.

- a)** They also store large quantities of carbon and play significant roles in local hydrological regimes.
- b)** Ecosystems worldwide are in danger of losing large, old trees forever, without more research.
- c)** In certain locations we are seeing multiple drivers of large old tree loss interacting to create ecosystem-specific threats,
- d)** Large old trees in Mountain Ash forests of mainland Australia, for example, provide irreplaceable shelter and nesting sites for over 40 species.
- e)** If we are to ensure the perpetual supply of large old trees, policies and management practices must be put in place that intentionally grow such trees and reduce their mortality rates.

1)	2)	3)	4)	5)
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ACTIVITY 41. Read and translate the text below and do exercises after it:

TREES IN DANGER

Millions of years before animals lived on land; there were trees on the Earth. But today trees are in serious danger. In the 1970-es, many of the elm trees in Europe were killed by Dutch elm disease. Now an even greater danger is threatening the forests and woods of Europe from northern Sweden to southern Italy. This new danger attacks all trees like oak, beech and birch as well as coniferous trees like fir tree and pine.

First, the branches turn yellow and brown. Then the trees' needles or leaves fall. The roots and the trunk shrink. Finally, the trees die. In the Black Forest in southern Germany 75 % of the trees have been damaged or killed.



But what is killing the trees? Nobody knows exactly, but it is probably air pollution or acid rain. Factories power stations and cars emit tons of smoke into the air, this smoke contains Sulphur dioxide and nitrogen oxidants. These substances mix with water vapour in the atmosphere and from Sulphuric acid and nitric acid. Sunlight turns these acids into poisonous oxidants which fall in rain or snow into the trees.

What can be done about acid rain? Why don't governments do anything to save the trees? Unfortunately, acid rain doesn't always fall on the countries which produce the poisonous substances from one country to another. Why should the people of the country pay to save another country trees?

In other parts of the world trees are threatened by people, not by pollution. The great rain forests of Asia and South America are being destroyed for firewood and building material. Something must be done. Trees are important because they provide a home for many other plants and animals too.

They protect the flowers on the forest floor. They provide food for insects, reptiles, birds and mammals. They protect the soil from the wind and the rain. Most important of all, the forests are the lungs of the planet. Trees produce the oxygen which we breathe. If the trees die, we will too.

A) Choose the correct items to complete the sentences. Translate the following sentences into Ukrainian:

1) It is probably air _____ or acid rain are killing the trees. (firewood, pollution, substances)

2) The world trees are threatened by _____, not by pollution. (people, governments, oxidants)

3) Trees are important because they _____ a home for many other plants and animals too. (destroy, provide, produce)

4) Trees protect the _____ from the wind and the rain. (land, country, soil)

5) Factories power stations and cars emit tons of _____ into the air. (pollution, smoke, anything)

B) Find the meaning of the words given in bold print in the dictionary and translate the following sentences:

1) A great **danger** is threatening the forests and woods of Europe from northern Sweden to southern Italy.

2) Most important of all, the forests are **the lungs** of the planet.

3) Trees **produce** the oxygen which we breathe.

4) Unfortunately, acid rain doesn't always fall on the countries which produce the **poisonous substances** from one country to another.

5) First, the branches **turn** yellow and brown.



ACTIVITY 42. Scan the article and say what is a programme of forest management

EUROPE'S TREES IN DANGER

Forestry experts have called on the European Union to use its powers in order to protect the continent's woodlands. This follows the publication of a recent report showing that one quarter of Europe's trees showed signs of severe damage. The experts are asking for wide-ranging action as it now seems clear that Europe's forests are reaching crisis point.



The study examined trees across the whole of Europe and found that they were being damaged throughout the continent. Twenty-six per cent of Europe's trees had lost significant numbers of leaves, while more than ten per cent showed signs of discoloration.

The report also put forward factors such as air pollution and climate change as causes of this environmental problem. Responding to the report, a European spokesman said it was too early to be certain about what was causing the widespread damage. The European Commission has now begun a more detailed 20-year study which will hopefully produce clearer answers.

Although Europe is quick to condemn tropical countries over their forestry policies, it has been ignoring the crisis in its own backyard. Europe now has fewer forests than any other continent except Antarctica, and has less protected woodland than any other region in the world.

Less than one per cent of ancient forests remain. If this is allowed to continue, the damage to Europe's forest systems will result in a reduction in water quality and will cause a crisis in the fishing, tourist and timber industries, as well as threatening the ecological balance in Europe.

The forestry industry has made substantial progress in organizing a programme of forest management, but European governments have not been acting quickly enough. There is a need for further European action on commitments made at the Rio Earth Summit in 1992.

Soon the World Wildlife Fund for nature (WWF) will be reporting on how well governments around the world have kept their Rio summit promises. Most governments are expected to get poor results. The situation in Europe may, however, be about to improve as the European Parliament is to begin investigating forest protection and may ask for new safeguards to protect the health of Europe's trees.

ACTIVITY 43. Match the following words and word combinations with their Ukrainian equivalents:

4) to destroy	a) залишатись, протриматись
5) to emit	b) знищувати, ламати
6) management	c) виділяти, викидати
4) to remain	d) захист, охорона, гарантія
5) safeguard	e) рідколісся, лісистої місцевості
6) to examine	f) керівництво, управління
7) quality	g) захищати, охороняти
8) to reach	h) досліджувати, перевіряти
9) woodland	i) ігнорувати, відхиляти
10) to ignore	j) якість, особливість
11) to keep	k) покращувати, удосконалювати
12) to protect	l) досягати, добиватися
13) to improve	m) забруднення
14) pollution	n) тримати, утримувати, зберігати

ACTIVITY 44. Make up sentences about Europe's trees in danger, using next words and word-combinations:

- 1) for wide-ranging action, the experts are asking, as it now seems clear, are reaching crisis point, that Europe's forests.
- 2) the whole of Europe, the study, examined trees, across.
- 3) had lost, twenty-six per cent of, significant numbers of leaves, Europe's trees.
- 4) showed signs of, ten per cent, discoloration, more than.
- 5) put forward, air pollution and climate, factors such as, the report, change.
- 6) now, Europe, has fewer forests, continent, than any other, except Antarctica.
- 7) one per cent of, less than, ancient forests, remain.

ACTIVITY 45. Read, translate and discuss the article.

ASH TREES IN DANGER OF EXTINCTION IN EUROPE



Europe may be looking at the end of the economically and ecologically valuable ash tree, according to news reports. The prized tree is under attack from invasive insects and fungus.

Ash trees across Europe are facing massive dieback, according to a new report released on Saturday.

According to German news agency DPA, researchers admitted that there was no way to stop the spread of disease.

Gertrude Nachtigall of the Julius Kuehn Institute in the German city of Braunschweig said that the deadly *Hymeno scyphus pseudoalbidus*

fungus, an invasive species native to Asia, was spread by the wind and therefore impossible to contain.

Ash trees are also under another threat around the world – from the emerald ash borer beetle, another invasive species. Originally found only in parts of Russia, China, Japan and the Korean peninsula, the beetle has so far killed tens of millions of ash trees in North America and threatens to destroy the continent's entire population of the valuable trees.

A recent paper in the Journal of Ecology warned about ‘large-scale mortality events’ of ash trees in Europe and the United Kingdom, saying that the ‘ecologically important’ species has been threatened by dieback for at least two decades. The ash tree is now in danger of extinction in Europe, the paper concluded.

The extremely durable but elastic wood is prized for its use in making musical instruments, such as guitars and violin bows, tool handles and baseball bats. Its leaves are also commonly used to feed livestock animals such as cows and goats in winter months. Ash trees are also favored as food by cocooning butterflies and moths.

ACTIVITY 46. Make up sentences matching two parts of the sentences:

1) Ash trees are also under a threat around the world	a) from invasive insects and fungus.
2) The prized tree is under attack	b) are facing massive dieback.
3) The beetle has so far killed tens of	c) by cocooning butterflies and moths.
4) Ash trees are also favored as food	d) – from the emerald ash borer beetle.
5) The ‘ecologically important’ species has been threatened	e) of extinction in Europe.
6) The ash tree is now in danger	f) millions of ash trees in North America.
7) Ash trees across Europe	g) by dieback for at least two decades.

ACTIVITY 47. Order the paragraphs (A – F) to build a text. Then read and translate it:

EUROPE'S PRIMEVAL TREES IN DANGER

A) Białowieża forest, home to a dense population of trees, insects and birds alike, stretches from the East of Poland to Belarus. The forest branching on the Polish side of the border is a Unesco World Heritage Site, and is therefore required to comply with European Union Environment directives.

B) Naturalists say increased logging defeats its purpose as a World Heritage Site, whilst foresters argue they need to remove more wood if they are to make a decent living. Foresters also feel that removing the dead trees will improve tourist's experience of the site, as the dead trees blight the beauty of the forest.

C) However, the primeval forest may be threatened by commercial logging. The government in Warsaw has more than tripled the quantity of timber that they will permit to be extracted from this unique place which has caused controversy.

D) The future of Europe's last significant stretch of Primeval trees, located in the Białowieża Forest, is now growing in uncertainty as threat from commercial logging and the bark beetle increases.

E) Unesco inspectors recently visited the forest to arbitrate between loggers and naturalists, and are expected to reveal their findings in July.

F) In addition to the commercial logging of Białowieża forest, the growing infestation of a spruce bark-beetle is placing the forest under threat. A public meeting in Białowieża village revealed strong local feelings on the matter, with locals complaining about 'outsiders' interfering in traditional forest culture. Forest rangers claim that beetles have attacked about a fifth of the healthy spruce trees in the forest, and that they could infect more.



1)	2)	3)	4)	5)
----	----	----	----	----

ACTIVITY 48. Read the text below. Match choices (A – G) to (1 – 5). There are two choices you do not need to use.

FOREST FIRES

Forest fires are large uncontrolled fires that take place in the forest. Some of the fiercest fires occur in the forest because there is so much fuel (trees) to burn. Forest fires are a type of wildfire. Other types of wildfires include grass fires, brush fires, and hill fires.

1) _____ The major cause of forest fires in the United States is human activities. This can be carelessness such as not putting out a campfire or dropping a lit cigarette. It may also be arson, which is setting a fire on purpose and is against the law. Around 80% of forest fires in the United States are caused by humans.

Most fires that are started by natural causes are started by lightning. Other natural causes include volcanic eruptions and sparks from falling rocks.

2) _____ There are many factors that contribute to how a forest fire will spread and how intense the fire will be. They include:



Weather – The weather has a large impact on how a fire will spread. Fires are much more likely to start and spread during droughts when the grass and plants are dry. A strong wind can help a fire to spread and move quickly.

The temperature (how hot it is) and humidity (how dry the air is) will also impact how well the fire will spread.

Fuel – Fires need fuel to burn. The type of fuel will impact how quickly the fire will spread as well as how intense it will be. In a forest there can be plenty of fuel including trees, leaves, needles, shrubs, and grasses growing beneath the trees.

Topography – The topography is the shape and features of the land where the fire is burning. Fire tends to move faster uphill. Fires may spread quickly up steep slopes on the sides of mountains and hills.

3) _____ Forest fires can be extremely difficult to put out or control. Forest fires can be enormous in size and may quickly change directions. They can move over 6 miles per hour and can jump over natural gaps such as rivers and roads. That being said, modern firefighters are well trained and know how to control forest fires.

Two of the main techniques used in controlling forest fires are the firebreak and the air drop.

Firebreak - One of the best ways to stop a fire is to get rid of the fuel (trees, grass, etc.) that is helping it to burn. Firefighters will often remove the fuel in a long line ahead of the where the fire is advancing. This line is called a firebreak. When the fire reaches the firebreak it runs out of fuel and stops spreading.

Air drop - Sometimes firefighters will use airplanes and helicopters to drop water or special firefighting chemicals on fires from the air. These aircraft can carry thousands of gallons of liquid or gel to drop on hard to reach areas of the fire.

Are some forest fires good? Yes, some forest fires are helpful to the forest. They can clean out debris that has accumulated below the trees. By burning debris, fires help to enrich the soil and make room for new trees to grow.

4) _____ Whenever you go camping you should be very careful when building and extinguishing your campfire. To keep safe you need to build your campfire in a safe location, you should have a proper campfire pit, and you should make sure that the fire is completely put out. You can learn more about this on Smokey Bear's website at <http://www.smokeybear.com/campfire-safety.asp>.

5) _____ A crown fire is a fire that spreads quickly by burning across the tops of trees. Wildfires in the United States typically burn between 4 million and 9 million acres each year. Billions of dollars is spent every year fighting fires in the United States. Many fires in southern California are spread by dry hot winds called the Santa Ana winds. Sometimes the winds around a fire can begin to spin causing a fire tornado to form.

If you live near an area that is known for wildfires, it is good to have a plan in place on what you will do in the case of a wildfire.

Human society and forests influence each other in both positive and negative ways. Forests provide ecosystem services to humans and serve as tourist attractions. Forests can also affect people's health. Human activities, including harvesting forest resources, can negatively affect forest ecosystems.

- A – Human activities
- B – Forest ecosystems
- C – Large uncontrolled fires
- D – How do forest fires spread?
- E – Major Causes of Forest Fires
- F – Campfire Safety
- G – Interesting Facts about Forest Fires

ACTIVITY 49. Look through the text ‘FOREST FIRES’ again and answer the questions:

1. How do forest fires spread?
2. How do firefighters put them out?
3. How do firefighters put them out?
4. What do the fires need to burn?
5. What is the topography?

ACTIVITY 50. Read, translate and discuss the article.

FIRE AND TODAY’S FORESTS

Fire exclusion (largely a result of fire suppression, but also the elimination of tribal burning), past and ongoing harvesting practices, and livestock grazing have changed forest structure and species composition in many western U.S. coniferous forests. The effects of these activities have been most pronounced in seasonally dry, low- and mid-elevation coniferous forests that once experienced regimes of frequent, low- to moderate-intensity fire.

Altered fire regimes have increased the density of trees (stand density), made stands more structurally homogeneous, decreased overall tree size, and increased surface fuel loads for many forests of this type. These changes concern fire managers because many forests are now vulnerable to more severe fire than we observed previously.

Changing climates in the next several decades may further complicate fire management by increasing temperatures and fire season length. Currently over 10 million hectares (nearly 25 million acres) of coniferous forests in the western United States face moderate or high fire hazards, posing a significant problem for management.

Managing today’s forests

Because of these hazardous conditions, current management strategies often focus on modifying potential fire behavior. Several recent fire policies and initiatives, such as the U.S. National Fire Plan,

National Cohesive Wildland Fire Management Strategy, and Healthy Forest Restoration Act guide fire management across the nation.

Forest managers seek to modify fire behavior by reducing fuels through thinning or prescribed burning. More research is needed to understand the extent to which mechanical thinning might mimic natural ecological processes as well as the precise effects of these fuel reduction practices on potential wildfire severity under different fire weather scenarios and forest stand conditions.

Creating forest structures that can reduce fire severity across a large landscape may decrease the need for aggressive firefighting strategies and could eventually reduce the costs of wildfire suppression. The efficacy of treatments that alter vegetation structure and fuel loads to modify fire behavior is still not well understood at local, state, and national levels.

Recent research shows that treatments, including both mechanical thinning and wider-use of prescribed fire, are needed to reduce the density of trees and fuels in many of today's forests. Scientific findings consistently reveal that low-intensity, frequent fire is a keystone process in these forests, so the best mechanical treatments appear to be those that mimic the conditions resulting from these fires. Prescribed fire or managed wildfire, aimed at creating/restoring the inherent patchy landscape that historically occurred in drier coniferous forests might be used to fully restore forest resilience.



ACTIVITY 51. Choose the necessary word and put it in the sentences:

- 1) Recent research shows that treatments are needed to _____ the density of trees and fuels in many of today's forests. (**treat, reduce, modify**)
- 2) Fire exclusion and livestock grazing have changed forest _____. (**structure, severity, moderate**)
- 3) The efficacy of treatments that alter vegetation structure and fuel loads to modify fire behavior is still not well understood at local, state, and national _____. (**experiences, levels, results**)
- 4) Forest _____ seek to modify fire behavior by reducing fuels through thinning or prescribed burning. (**mechanics, managers, conditions**)
- 5) Current management strategies often focus on modifying potential fire _____. (**behavior, research, harvest**)

ACTIVITY 52. Complete the following sentences:

- 1) Currently over 10 million hectares of coniferous forests in the western United States face moderate or high fire hazards, posing a _____.
- 2) Several recent fire policies and initiatives guide _____.
- 3) Creating forest structures that can reduce fire severity across a large landscape may decrease the need _____.
- 4) Scientific findings consistently reveal that low-intensity, frequent fire is a _____.
- 5) The best mechanical treatments appear to be those _____.

ACTIVITY 53. Read the facts forest fires and make up your own reports about forest fires:

FACTS ABOUT FOREST FIRES

A crown fire is a fire that spreads quickly by burning across the tops of trees.

Wildfires in the United States typically burn between 4 million and 9 million acres each year.

Billions of dollars is spent every year fighting fires in the United States.

Many fires in southern California are spread by dry hot winds called the Santa Ana winds.

Sometimes the winds around a fire can begin to spin causing a fire tornado to form.

If you live near an area that is known for wildfires, it is good to have a plan in place on what you will do in the case of a wildfire.

ACTIVITY 54. Read and discuss the following text.

ENVIRONMENTAL PROTECTION IN UKRAINE



For many centuries the people who lived on our planet before us had been trying to make their life easier and more comfortable. They thought that resources of the Earth were endless. They used those resources without thinking about the generations that would come after them. Our ancestors chopped down the forests, killed animals that lived there and invented machines and instruments that polluted the water, the air and the soil.

In the 19th century the word «ecology» was born, but the idea of environmental protection was not clear yet, and did not seem urgent for either the majority of the governments or common people. People still

considered themselves «lords and kings of nature» and used its riches only as consumers.

In the 20th century, the rapid growth of science and technology resulted in an increasing negative effect on the biosphere of the Earth. Huge industrial enterprises pollute the air we breathe, the water we drink and the land which gives us bread, vegetables and fruit. Their discharge of dust and gas into the atmosphere returns to the Earth in the form of acid rains. It also destroys the ozone layer of the Earth and causes «greenhouse effect». It affects forests, rivers, crops and people's health. This leads to the reduction of the life-span of man. People die younger because of cancer, AIDS and other diseases which are directly connected with the polluted environment they live in. Many species of animals and birds face extinction due to the pollution of the biosphere.

The world's oceans are in danger too. They are filled with poisonous industrial and nuclear waste, chemical fertilizers and pesticides. The Aral Sea in Russia is already dead, the Mediterranean and the North Sea are slowly dying.

The worst situation with air pollution is in big overpopulated cities. In Cairo and Mexico City, for example, breathing is equivalent to smoking 2 packs of cigarettes a day. The big industrial cities in Ukraine like Zaporizhiya, Donetsk, Kharkiv and some others have the same situation.

Another threat for the environment is nuclear power stations like Chernobyl. In April 1986 that nuclear power plant just north-west of Kyiv suffered the worst nuclear accident in history: dozens died immediately, tens of thousands were evacuated, while the long-term effects to human life are difficult to calculate. A large part of Ukraine, Russia and Byelorussia was polluted by radioactive substances. Great damage was done to their economy, nature and people's health. The problem of Chernobyl has not been solved yet because of the economic difficulties that Ukraine is having now. The power plant was closed on December 15, 2000.

Nowadays people of Ukraine, like most people in developed countries, realize that without solving environmental problems, the life

of the future generations will be in real danger. Many people join the Green Party of Ukraine to unite their efforts to save the planet where we live, to make our world healthier and more beautiful.

ACTIVITY 55. Read the article again and decide whether the statements are TRUE (T) or FALSE (F).

1. People thought that resources of the Earth were endless.
2. In the 19th century the word «ecology» was born, but the idea of environmental protection was clear.
3. The world's oceans are not in danger.
4. In Cairo and Mexico City breathing is equivalent to smoking 4 packs of cigarettes a day.
5. Nowadays people of Ukraine realize that without solving environmental problems, the life of the future generations will be in real danger.



EXTENSIVE READING

TEXT 1. 15 MAJOR CURRENT ENVIRONMENTAL PROBLEMS



1. Pollution: Pollution of air, water and soil require millions of years to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution. While water pollution is caused by oil spill, acid rain, urban runoff; air

pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that deprives soil from essential nutrients.

2. Global Warming: Climate changes like global warming is the result of human practices like emission of Greenhouse gases. Global warming leads to rising temperatures of the oceans and the earth's surface causing melting of polar ice caps, rise in sea levels and also unnatural patterns of precipitation such as flash floods, excessive snow or desertification.

3. Overpopulation: The population of the planet is reaching unsustainable levels as it faces shortage of resources like water, fuel and food. Population explosion in less developed and developing countries is straining the already scarce resources. Intensive agriculture practiced to produce food damages the environment through use of chemical fertilizer, pesticides and insecticides. Overpopulation is one of the crucial current environmental problem.

4. Natural Resource Depletion: Natural resource depletion is another crucial current environmental problems. Fossil fuel consumption results in emission of Greenhouse gases, which is responsible for global

warming and climate change. Globally, people are taking efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy. The cost of installing the infrastructure and maintaining these sources has plummeted in the recent years.

5. Waste Disposal: The over consumption of resources and creation of plastics are creating a global crisis of waste disposal. Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and, less developed countries. Nuclear waste disposal has tremendous health hazards associated with it. Plastic, fast food, packaging and cheap electronic wastes threaten the well being of humans. Waste disposal is one of urgent current environmental problem.

6. Climate Change: Climate change is yet another environmental problem that has surfaced in last couple of decades. It occurs due to rise in global warming which occurs due to increase in temperature of atmosphere by burning of fossil fuels and release of harmful gases by industries. Climate change has various harmful effects but not limited to melting of polar ice, change in seasons, occurrence of new diseases, frequent occurrence of floods and change in overall weather scenario.

7. Loss of Biodiversity: Human activity is leading to the extinction of species and habitats and and loss of bio-diversity. Eco systems, which took millions of years to perfect, are in danger when any species population is decimating. Balance of natural processes like pollination is crucial to the survival of the eco-system and human activity threatens the same. Another example is the destruction of coral reefs in the various oceans, which support the rich marine life.

8. Deforestation: Our forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall. At present forests cover 30% of the land but every year tree cover is lost amounting to the country of Panama due to growing population demand for more food, shelter and cloth. Deforestation simply means clearing of green cover and make that land available for residential, industrial or commercial purpose.

9. Ocean Acidification: It is a direct impact of excessive production of CO₂. 25% of CO₂ produced by humans. The ocean acidity has increased by the last 250 years but by 2100, it may shoot up by 150%. The main impact is on shellfish and plankton in the same way as human osteoporosis.

10. Ozone Layer Depletion: The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful rays. Depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chlorine and Bromide found in Chloro-floro carbons (CFC's). Once these toxic gases reach the upper atmosphere, they cause



a hole in the ozone layer, the biggest of which is above the Antarctic. The CFC's are banned in many industries and consumer products. Ozone layer is valuable because it prevents harmful UV radiation from reaching the earth. This is one of the most

important current environmental problem.

11. Acid Rain: Acid rain occurs due to the presence of certain pollutants in the atmosphere. Acid rain can be caused due to combustion of fossil fuels or erupting volcanoes or rotting vegetation which release sulfur dioxide and nitrogen oxides into the atmosphere. Acid rain is a known environmental problem that can have serious effect on human health, wildlife and aquatic species.

12. Water Pollution: Clean drinking water is becoming a rare commodity. Water is becoming an economic and political issue as the human population fights for this resource. One of the options suggested is using the process of desalinization. Industrial development is filling our rivers seas and oceans with toxic pollutants which are a major threat to human health.

13. Urban Sprawl: Urban sprawl refers to migration of population from high density urban areas to low density rural areas which results in

spreading of city over more and more rural land. Urban sprawl results in land degradation, increased traffic, environmental issues and health issues. The ever growing demand of land displaces natural environment consisting of flora and fauna instead of being replaced.

14: Public Health Issues: The current environmental problems pose a lot of risk to health of humans, and animals. Dirty water is the biggest health risk of the world and poses threat to the quality of life and public health. Run-off to rivers carries along toxins, chemicals and disease carrying organisms. Pollutants cause respiratory disease like Asthma and cardiac-vascular problems. High temperatures encourage the spread of infectious diseases like Dengue.

15. Genetic Engineering: Genetic modification of food using biotechnology is called genetic engineering. Genetic modification of food results in increased toxins and diseases as genes from an allergic plant can transfer to target plant. Genetically modified crops can cause serious environmental problems as an engineered gene may prove toxic to wildlife. Another drawback is that increased use of toxins to make insect resistant plant can cause resultant organisms to become resistant to antibiotics.

The need for change in our daily lives and the movements of our government is growing. Because so many different factors come into play; voting, governmental issues, the desire to stick to routine, many people don't consider that what they do will affect future generations. If humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. Although it's true that we cannot physically stop our ozone layer from thinning (and scientists are still having trouble figuring out what is causing it exactly,) there are still so many things we can do to try and put a dent in what we already know. By raising awareness in your local community and within your families about these issues, you can help contribute to a more environmentally conscious and friendly place for you to live.

TEXT 2. THE GREENHOUSE EFFECT

The term 'Greenhouse Effect' is commonly used to describe the increase in the Earth's average temperature that has been recorded over the past 100 years. However, without the 'natural greenhouse effect', life on Earth would be very different to that seen today.

The 'natural greenhouse effect'

The Earth receives its life sustaining warmth from the Sun. On its way to the Earth's surface most of the heat energy passes through the Earth's atmosphere, while a smaller proportion is reflected back into space.

The energy warms the Earth's surface, and as the temperature increases, the Earth radiates heat energy (infrared energy) back into the atmosphere. As this energy has a different wavelength to that coming from the sun, some is absorbed by gases in the atmosphere.

There are four main naturally occurring gases that are responsible for the Greenhouse Effect; water vapour, carbon dioxide, methane and nitrous oxide. Of these gases, water vapour has the largest effect. Once these gases absorb energy, the gas particles begin to vibrate and they radiate energy in all directions, including approximately 30% of it back towards Earth.

The other two important greenhouse gases are ozone and halocarbons. Although Although most of the greenhouse gases occur naturally in the atmosphere, some are man-made and the most well-known of these are fluorocarbons. Since the industrial revolution, human activities have also resulted in an increase in natural greenhouse gases, especially carbon dioxide. An increase in these gases in the atmosphere enhances the atmosphere's ability to trap heat, which leads to an increase in the average surface temperature of the Earth.

As a result, greenhouse gas emissions the Earth's average surface temperature is kept at about 15C by the blanket of atmosphere that surrounds it. Without this, the temperature would be about minus 18C – too cold for life. The gases keep the Earth warm in a similar (but not identical) way as a greenhouse keeps plants warm.

TEXT 3. GLOBAL FINANCIAL ARCHITECTURE AND THE ENVIRONMENT

In light of the role that foreign capital flight played in precipitating the Asian and Russian economic crises, an increasing number of people have begun to question the dominant global economic prescription offered by the IMF and the World Bank. This prescription has long been promoted by the U.S. Department of Treasury as a critical component of U.S. foreign economic policy aimed primarily at maintaining stability on Wall Street by protecting foreign (i.e. U.S.) capital investments in developing countries. As these capital investments have increasingly become short-term and speculative, the social utility of protecting capital flows is increasingly questionable. Speculative, “hot flows” of capital are not intended for long-term productive investments. Protecting the rights of countries to impose capital controls, particularly on short-term investments, may be critical for ensuring both long-term stability and increased benefits from natural resources for local people.



Over the past decade, environmentalists have also shown that the IFIs frequently saddle developing countries with loan conditions that increase the pressures on natural resource exploitation with devastating environmental consequences. Among other things, these structural adjustment policies (SAPs) significantly increase the rate of forest harvesting, mining, and fishery harvests. While these SAPs are increasing natural resource exploitation, many governments are also being directed to reduce public spending, including funds for environmental protection and natural resource management.

To make matters worse, large structural adjustment loan packages heap additional debt onto already heavily indebted countries. Due in large part to civil society pressure in the past few years, some limited

debt relief may be on the way for the world's poorest countries. But the United States must take a much greater leadership role in prodding the World Bank and the IMF to make broader and deeper cuts in developing country debt. Such a step could help alleviate the pressures on low-income countries to exploit their environments in order to service their foreign debts.

TEXT 4. THE ENVIRONMENTAL PROBLEMS OF THE WESTERN NATIONS

Western Europe has the same basic environmental problems, but they take different forms in each country.

Already if you catch a fish in the Seine near Paris it may be blind and without scales, a victim of pollution. In the Rhine you will catch no fish at all.

The Mediterranean is actually dying from pollution.

It is fair to say, that a considerable effort has been made in Britain with regard to Thames. By 1949 it was being described as a stinking black mess with no fish and almost no oxygen. There was an outcry and something had to be done. Legislation stopped the flow of industrial waste into the river, and nearly all the sewage is treated before it gets to water. Fish have come back and one salmon has been caught.

One of Britain's environmental successes has been the control of air pollution especially in London. Thirty years ago hundreds of people died every year from the dreadful London smogs. Since then London and many other cities have become smokeless zones, areas where no coal fires are allowed. But now the increase in traffic is threatening serious air pollution problems in cities once again.

The most common form of air pollution comes from cigarette smoke which pollutes many public places like cinemas, pubs, and restaurants.

Traffic and aircraft can cause serious noise pollution.

Friends of the Earth suggest that the bicycle is the best way to travel because it's cheap, quiet and a good form of exercise.

TEXT 5. THE REALITIES OF REPLACING LOST ENVIRONMENTS



With up to a billion hectares of wilderness likely to be cleared to feed the world in the coming half century and an area the size of China devoured by cities, leading environmental scientists are urging caution over the extent to which lost ecosystems can be replaced or restored.

In a major scientific article, a team including Australian researchers from the ARC Centre of Excellence for Environmental Decisions (CEED) has advised governments worldwide to think twice before assuming an environment lost to development can easily be replaced elsewhere.

“There’s been a lot of talk among policymakers about ‘offsets’, meaning that if you damage or lose the environment in one place you compensate by restoring or protecting an equivalent area somewhere else,” explains Professor Richard Hobbs of CEED and The University of Western Australia.

Currently there are more than 64 such programs under way around the world and policy support for the solution is gathering steam, “But the science to date suggests it is very hard to replace a lost environment in another locality so there is no net loss of species,” he adds.

Also “When habitat is re-created on a highly degraded site through revegetation, the revegetated site rarely resembles the target ecosystem,” the paper states.

“Current conservation policies talk glibly about offsets and seem to promise much – but it isn’t clear they really appreciate how difficult and expensive it can be to translocate a whole ecosystem with all its species and their relationships. Or even to restore one that has been damaged to

full vitality. You can't simply go and plonk species somewhere else and feel you have conserved them," says Prof. Hobbs.

Lead author Dr Martine Maron from The University of Queensland says "In some cases, we are trying to use offsets to replace centuries-old trees. For some species, the long wait before newly-planted trees can provide food or nesting hollows for fauna means that offsetting is a very high-risk strategy."

Professor Hobbs says the purpose of the article was to inject a bit of realism into the current conservation policy debate about how much was genuinely achievable with 'offsets'.

Prof. Hobbs says there are outstanding examples where environments have been very well protected or restored, instancing Perth's famous King's Park native bushland, and the jarrah forest restoration work of aluminium producer Alcoa on WA's Darling Escarpment. "But these kinds of restoration are very expensive and, even then, it isn't always clear that you have fully restored everything."

At a less costly level, promising work has been undertaken to restore native vegetation in the Gondwanalink project across WA's Great Southern region, by reconnecting islands of bush, use of carbon offsets and sandalwood plantations to regenerate land once cleared for agriculture. "This is a much lower budget project, and appears to be working well in the woodland areas – it is the heathlands, with their remarkable biodiversity, that are the real challenge," he says

The team's work brings together the issues of how you measure biodiversity, how long it takes to re-establish and the risks of not achieving the goal.

"Confidence in the ability of restoration to deliver genuine biodiversity offsets is undermined by the problems of defining and measuring the biodiversity values that are lost and gained, considerable uncertainty surrounding the effectiveness of restoration techniques, and long time-lags," the scientists say.

"The rapidly-increasing reach of biodiversity offsetting into many areas of environmental policy— including threatened species protection, environmental impact assessment and protected area investment—makes

closer collaboration between policy makers and restoration scientists and practitioners an urgent priority.”

TEXT 6. AUSTRALIA’S CLEAN ENERGY FUTURE

America Can Learn From Australia’s New Clean Energy Future Package



Australia, one of world’s most carbon-intensive countries, recently began implementing a comprehensive national policy to address climate change and transition to a clean-energy economy. Recently, WRI had the pleasure of hosting Mark Dreyfus, Australian Parliamentary Secretary for Climate Change and Energy Efficiency, who outlined his country’s plans to a group of business, congressional, and NGO representatives.

One point that came through at the event is that Australia’s recent energy and climate choices can be very instructive to the United States. This post provides a quick look at Australia’s new policy and explores how it can inform and inspire U.S. efforts to move toward a low-carbon future.

Why Did Australia Adopt a National Climate and Energy Policy?

Australia faces a high level of climate risk, with significant vulnerability to sea level rise as well as to extreme weather events like drought, heat waves, and wildfires. At the same time, the country is heavily dependent on carbon-intensive resources. Australia has the highest per capita greenhouse gas emissions of any country in the developed world, and it’s the 15th largest emitter overall.

Recognizing the major environmental and economic risks of continuing with business as usual, as well as the opportunities involved

in shifting to clean energy, Australia decided to transform its economy toward a more sustainable path. The policy change involved a long and at times acrimonious political debate, but the country's leaders decided that they could no longer afford not to act.

What Does the Country's New Climate Policy Look Like?

The Clean Energy Future Package, in effect since July, includes a national emissions reduction target of 5 percent below 2000 levels by 2020 and 80 percent below 2000 levels by 2050. To meet these targets, the Package features a range of policy instruments that will put a price on carbon, promote renewable energy (setting a target of 20 percent of Australia's electricity coming from renewables by 2020), encourage energy efficiency, and reduce pollution.

The centerpiece of the policy is the carbon price, starting at \$23 AUD/ton until July 2015. After that, a flexible phase will begin where the market will set the price. Around 500 businesses – large emitters spanning sectors that cover 68 percent of Australia's emissions – will be required to pay for their pollution under the carbon pricing mechanism.

Australia has also created institutions to ensure that the system works effectively. A Climate Change Authority will monitor and advise on the level of pollution caps, operation of the carbon price and other initiatives, and progress toward meeting targets. A Clean Energy Regulator will administer the carbon price mechanism, the Renewable



Energy Target, a Carbon Farming Initiative, and the National Greenhouse and Energy Reporting Program. A Productivity Commission will monitor and report on what kinds of climate change policies other countries are implementing, as well as focus the effects of the program on jobs and competitiveness. In addition, a Clean Energy Finance Corporation is being created to invest in renewables and energy efficiency. Australia hopes that these elements, as well as others, will help the country meet its

emissions and pollution-reduction targets.

Australia has also paid close attention to the issue of fairness across the economy. In particular, the government thought about how to ensure that poorer households were protected from potentially higher energy costs. The country also put in a program to shield energy-intensive industries from the carbon price.

What Is Particularly Relevant for the United States?

As Secretary Dreyfus pointed out at the WRI event, there are many similarities between Australia and the United States in the context of climate and energy policy. For example, the countries share similar emissions profiles, are extremely fossil-fuel dependent, and face highly partisan policy environments in which climate change is a divisive issue. While there are many lessons America can learn from the Australian experience, four key ones jump out:

It's clear that a mix of policy instruments is needed across the economy. A carbon price is very important, but it's not enough to actually create the needed transformation. Policies and incentives around renewable energy and energy efficiency are also needed, and creating a specific finance corporation to invest in clean technologies can be an effective part of an overall package.

"Fairness" is a vital component of any policy deal. Australia had a long discussion nationally about how to create a fair approach. The country utilized various tools such as carbon policy and tax policy to protect households from any higher energy costs and shield energy-intensive industries from competitiveness concerns. Like Australia, the United States has a wide divergence of economic circumstances, both in households and on the industry side. The Australian plan shows that with political leadership and time, effective solutions can be found.

We must not lose sight of the science when creating policies. Australia recognized its own vulnerability to climate change and shared that risk analysis with its citizens through town hall meetings across the country. It also created an independent commission to monitor these risks and make recommendations. The United States also faces significant climate risks, from sea-level rise in Florida to forest die-back

in the West. It's very instructive for the United States to understand how Australia assessed its own risk and built institutions to forge a strong link between science and policymaking.

Persistence is essential. The Australian government had been trying to implement a comprehensive climate package for many years, and on the fourth try – despite intense opposition – it finally succeeded. It's important for the United States to not give up, to learn from past debates, and to keep working to develop an effective approach that can meet the joint goals of economic growth and reduced emissions.

In the end, every country has to find its own way to address climate change risks and position itself in the clean-energy economy. The United States is currently a step behind Australia in determining its own pathway. Hopefully some inspiration from Down Under will motivate U.S. business and government to join the growing number of countries that are tackling climate change one step at a time.

TEXT 7. REDUCING TROPICAL DEFORESTATION IS KEY TO CURBING CLIMATE CHANGE



New studies show how easy it could be to curb one driving force of climate change, and the devastating consequences if we don't

Without drastic efforts to reduce deforestation, rising greenhouse gases, and unsustainable global agriculture, the planet is on track to lose a massive quantity of its tropical forests—a crucial element in the fight against irreversible climate change—in just 35 years.

Absent aggressive conservation policies, the world will lose 2.9 million square kilometers of its tropical forests by 2050, according to a new working paper published Monday by Center for Global Development (CGD) environmental expert Jonah Busch and research assistant Jens Engelmann. That's a chunk the size of India, or one-third of U.S. land mass.

And if no changes are made to the world's "business-as-usual" approach to agriculture, logging, and other such forces, tropical deforestation will account for more than one-sixth of the remaining carbon that can be emitted if the world is to limit global warming to 2 degrees Celsius.

The carbon emissions that would occur during that process would add up to 169 billion tons—the equivalent of running 44,000 typical coal plants per year, Busch explained in a blog post accompanying the report, entitled *The Future of Forests: Emissions from Tropical Deforestation with and without a Carbon Price, 2016–2050* (pdf).

According to a separate study published earlier this year by NASA, tropical forests are absorbing carbon dioxide at a far higher rate than previously thought, making them an invaluable resource in curbing global warming.

That's the bad news. The good news, Busch writes, is that there are many solutions available.

"Avoiding dangerous climate change while expanding economic prosperity is perhaps the defining challenge of the 21st century," Busch writes. "Achieving both goals requires reducing greenhouse gas emissions where doing so has the lowest unit cost."

Carbon pricing is one example. Applying a global fee of \$20 per ton of carbon dioxide between 2016 and 2050 would keep 41 gigatons of emissions from being discharged, the researchers found.

Another option is to follow Brazil's model of targeting greenhouse gases, which involves "satellite monitoring, law enforcement, new protected areas and indigenous territories, restrictions on rural credit, and moratoriums on unsustainable soy and cattle production," Busch writes. "As a result of these restrictive measures, Amazon deforestation fell by

nearly 80 percent since 2004 even while Brazil's soy and cattle production increased."

CGD's study comes as another report from the University of Leeds, published Friday in *Science*, warns of a devastating future for forests, which will exist only in a "simplified" state by 2100 if climate change is not aggressively addressed.

"Earth has lost 100 million hectares of tropical forest over the last 30 years, mostly to agricultural developments," lead researcher Dr. Simon Lewis said last week. "Few people think about how intertwined with tropical forests we all are."

Lewis, a forest expert and professor at the University of Leeds and University College London, found that a new and more dangerous phase of human environmental impact threatens to deteriorate much of the world's remaining tropical forests until they exist in a fragmented, "living dead" state. That's a fate that can only be avoided through a shift to low-carbon energy or embracing policies that promote "development without destruction."

"Unfortunately, most of the benefits from logging, mining and intensive agriculture flow away from local people," Lewis wrote in an article accompanying the report. "Giving forest-dwellers long-term collective legal rights over their land would mean benefits flow to them."

As world leaders prepare for the upcoming climate conference in Paris and the growing call to prevent full-scale destruction of natural resources continues to build, 2015 is becoming "a big year for climate," Busch writes.



TEXT 8. IN BLOWN-DOWN FORESTS, A STORY OF SURVIVAL

To Preserve Forest Health, the Best Management Decision May be to do Nothing

In 1990, this part of NSF's Harvard Forest LTER site was a jumble of downed trees. Credit: Marcheterre Fluet

In newscasts after intense wind and ice storms, damaged trees stand out: snapped limbs, uprooted trunks, entire forests blown nearly flat.

In a storm's wake, landowners, municipalities and state agencies are faced with important financial and environmental decisions.



*Sassafras comes to life after significant storm damage.
Credit: Bill Byrne*

A study by Harvard University researchers, supported by the National Science Foundation (NSF) and published in the journal *Ecology*, yields a surprising result: when it comes to the health of forests, native plants and wildlife, the best management decision may be to do nothing.

Salvage logging is a common response to modern storm events in large woodlands. Acres of downed, leaning and broken trees are cut and hauled away. Landowners and towns financially recoup with a sale of the damaged timber. But in a salvaged woodland landscape, the forest's original growth and biodiversity, on which many animals and ecological processes depend, is stripped away. A thickly growing, early-

successional forest made up of a few light-loving tree species develops in its place.

But what happens when wind-blown forests are left to their own devices?

The Ecology paper reports results of a 20-year study at NSF's Harvard Forest Long-Term Ecological Research (LTER) site in Massachusetts. Harvard Forest is one of 26 such NSF LTER sites around the world in ecosystems from coral reefs to deserts, grasslands to the polar regions.

"To manage sustainable ecosystems, we must understand how they recover from extreme, natural events, such as hurricanes, fires and floods," says Matt Kane, a program director at NSF for LTER. "This process can take decades. The NSF LTER program is uniquely able to support important experiments at the time scales needed."

At Harvard Forest in 1990, a team of scientists recreated a major hurricane in a two-acre patch of mature oak forest. Eighty percent of the trees were flattened with a large winch and cable. Half the trees died within three years, and the scientists left the dead and damaged wood on the ground.

In the 20 years since, the researchers have monitored everything from soil chemistry to the density of leaves on the trees.

What they found is a remarkable story of recovery.

Nine years into the Harvard Forest hurricane re-creation experiment, trees were everywhere. Credit: David Foster

Initially, the site was a nearly impassable jumble of downed trees. But surviving, sprouting trees, along with many new seedlings of black birch and red maple—species original to the forest—thrived amid the dead wood. Although weedy invasive plants initially tried to colonize the area, few persisted for long.

"Leaving a damaged forest intact means the original conditions recover more readily," says David Foster, co-author of the paper and director of the NSF Harvard Forest LTER site.

"Forests have been recovering from natural processes like windstorms, fire and ice for millions of years. What appears to us as

devastation is actually, to a forest, a natural and important state of affairs.”

After severe tornadoes in Massachusetts in June 2011, the Commonwealth of Massachusetts’ Division of Fisheries and Wildlife pursued a watch-and-wait policy at a site in Southbridge, Mass. There, salvage work is limited to providing access routes for public safety.



Broken and snapped-off trees at a tornado impact area in Southbridge, Mass., in 2011.

Credit: Bill Byrne

The area is quickly regaining lush, native vegetation. It supports everything from invertebrates to salamanders, and black bears that winter in thick brush piles and forage for insects in rotting logs.

While a range of economic, public safety and aesthetic reasons seems to compel landowners to salvage storm-damaged trees, paper co-author Audrey Barker-Plotkin of the Harvard Forest site suggests that improving forest health should not be one of them.

“Although a blown-down forest appears chaotic,” she says, “it is functioning as a forest and doesn’t need us to clean it up.”

TEXT 9. WHY SHOULD I MANAGE MY FOREST?



There are many reasons to actively manage your forest land, regardless of what goals and interests you may have for your land. Most small private forest owners are more interested in wildlife, recreation, and the aesthetic value of their

land than timber production, but there are many things you can do to improve the benefits your forest provides to you now while safeguarding it for the future. You may also wish to explore other income opportunities—for example, from non-timber forest products—that can be achieved by actively managing your forest. Here are several reasons why should consider managing your forest – starting with the history of forests in the eastern U.S.

Much of today's forests in the upper Delaware River basin are not as valuable as they once were (commercially and in other ways). They were transformed by the intensive harvesting that accompanied colonialization and industrialization prior to 1900, followed by fire, disease, and erosion problems in the early 20th century. Forests are in better shape now, but are under stress from a variety of new threats, such as exotic insects, invasive plants, disease, deer overpopulation, and poor management decisions. These threats have reduced native species biodiversity and changed the overall composition of forests in many places. Left unmanaged, nature will likely continue on this new path of reduced diversity, weakened resilience against threats, and diminished economic and ecological value.

Common problems in the Upper Delaware River watershed today include the lack of forest regeneration, particularly of some oak species, caused in part by high populations of white-tailed deer. In areas with high deer density, regeneration of desirable species is impeded by “deer

browse” on accessible vegetation (typically under six feet tall). In addition to destruction of young desirable trees, deer browse can lead to reduced native plant and wildlife diversity and change the overall composition of the forest. Browsing must be curbed through strategic fencing, tree shelter use, or hunting to enable the reestablishment of desirable species in affected areas.

Another problem is the proliferation of invasive native and exotic plant species. These plants tend to form dense, single-species stands that prevent new seedlings from being established. They are often of little value to humans and wildlife. Targeted removal of these plants, followed by monitoring and treatment of regrowth, is usually required to triumph over the invasive species. Many methods can be used, from manual, mechanical, or chemical removal to prescribed fire or targeted grazing. Often you will need to seed and/or plant the area after treatment to prevent erosion and help your desired tree species get started. Together you can work with your forester to determine the best approaches for your land.

The lingering effects of poor timber management decisions are visible in many forests today. In general, poorly planned harvests that focus on maximizing profit in the short term often lead to degraded, less valuable resources over the long term. The practice of high-grading in particular has degraded the value of many forest lands. High-grading is a method of timber harvesting in which the biggest and most valuable trees are removed from a stand (“take the best and leave the rest”) with little regard for the quality, quantity, or distribution of trees left on the site. This leaves weak and less valuable trees behind to regenerate the stand in the future. If your forest has been poorly managed in the past, active management (possibly including stand improvement, below) will help restore its health and function to meet your needs.

Even if you are not interested in timber production, there are various thinning and cutting treatments that can help you achieve a variety of objectives on your land. These treatments are called Timber or Forest Stand Improvement (TSI or FSI), and they help landowners achieve their management objectives by improving forest health, wildlife habitat, and

future timber values. TSI aims to increase the growth of desirable trees and other forest products by removing trees that block sunlight, are in poor health, or are otherwise undesirable. Although TSI is frequently prescribed in management plans and generates long-term benefits, landowners often fall behind on these treatments. This is especially a problem in the Upper Delaware Basin, where timber management is not a priority for an increasing number of forest landowners. In addition, decades of over-harvesting and high-grading have left many landowners with small, low-value timber, for which there are no strong local markets. Working with a forester to plan and carry out TSI activities can help you achieve long-term goals for your forest.

Another forest problem that is commonly overlooked is poorly planned or improperly maintained access roads and trails. These not only cause water quality problems but can impede access to and enjoyment of your land. Access roads, stream crossings, skid trails, log landings, and ATV trails are the most common sources of sediment in forests. These features can erode and contribute sediment to nearby water bodies if they were not designed with water quality in mind, if the installed BMPs were inadequate or not maintained regularly, or if they were not properly treated at the end of their life span. These features can be corrected and stabilized to reestablish natural drainage patterns, control erosion, and restore the function of existing roads and trails.

Although the Upper Delaware River watershed is heavily forested and natural regeneration is the preferred method for establishing new trees, some sites may require assistance to establish desirable tree species. This may be due to a combination of the reasons discussed above, or because you wish to convert an old agricultural field or pasture to forest. Steps you may take include site preparation to enable natural regeneration or supplemental planting to help attain the desired species composition. Riparian planting is also beneficial if you have streams on their property without forested buffers, or if you wish to widen an existing buffer between non-forested land and water.



TEXT 10. WILDFIRES SEEM UNSTOPPABLE, BUT THEY CAN BE PREVENTED. HERE'S HOW.

The flames of the Ferguson Fire in California have become the latest symbols of a seemingly perennial challenge of fighting fires in the West. I just returned from the Ferguson Fire camp, where I met with firefighters who are working to combat the fire as it bears down on Yosemite National Park and its visitors, workers and nearby residents.

President Donald Trump has taken decisive action, issuing an emergency disaster declaration for California as dozens of wildfires rip through the forests and communities that populate the area.

There are currently about 100 wildfires burning across the west, forcing tens of thousands of people to evacuate. Many have lost all but the clothes on their backs. We are just now hitting the peak of a traditional fire season and already this year we have seen about 5 million acres of land and thousands of structures destroyed. We've lost friends and neighbors, including firefighters who dropped everything to respond to the call to duty. Their service and sacrifice will never be forgotten.

The fires are burning hotter and more intense, due in part to hot and dry weather and in part to the fuels that overload our forests. These fuels fill forests from the floor, where highly-combustible, dry pine needles act as kindling to jump-start the tiniest spot fire, all the way up to the crown where beetle-killed trees dot the mountains like matches. In between the floor and the crown, there are years' worth of dead logs, overgrown

shrubs and snags, which many firefighters call "widow makers" because they are so deadly. The buildup of fuels is the condition we can and must reverse through active forest management like prescribed burns, mechanical thinning and timber harvests.

WHY WE NEED TO MANAGE OUR FORESTS

There are three reasons for active forest management:

First, it is better for the environment to manage the forests. Wildfires produce smoke and emissions. The release of gases and particles can negatively affect air quality. Fires also damage watersheds, and as we see fires burning hotter and longer, the soil is actually becoming scorched and sterilized, preventing regrowth. In addition, while many of the frivolous lawsuits waged to stop timber harvests cite habitat as a concern, environmental litigants are little concerned when an entire forest burns to the ground and the habitat and wildlife are lost.

More: It's hard to see Hurricane Maria through all this smoke

We worked for Bush & Obama: Here's a bipartisan solution to America's wildfire problem

Trump's cuts to renewable energy put us on the ropes in the fight against climate change.

Second, active forest management is good for the economy. Logs come out of the forest in one of two ways: They are either harvested sustainably to improve the health and resilience of the forest (while creating jobs), or they are burned to the ground. Jobs matter, and logging has long been a cornerstone of rural economies. Fortunately for all, these economic benefits go hand-in-hand with our goal of healthy forests.

Third, and most important, the active management of our forests will save lives. The Carr Fire in northern California has already claimed half a dozen lives, and the Ferguson Fire has taken the lives of two firefighters. Sadly, these are not the only wildfire casualties this year.

Every year we watch our forests burn, and every year there is a call for action. Yet, when action comes, and we try to thin forests of dead and dying timber, or we try to sustainably harvest timber from dense and fire-prone areas, we are attacked with frivolous litigation from radical

environmentalists who would rather see forests and communities burn than see a logger in the woods.

TAKING ACTION TO FIGHT AND PREVENT WILDFIRES

The Department of the Interior and the Department of Agriculture, through the Forest Service, fight wildfires together. This year, U.S. Secretary of Agriculture Sonny Perdue secured a bipartisan fix to the way firefighting is funded. The fix helps ensure we have necessary resources to maintain forests and helps ease the recurrence and severity of wildfires.

At the Department of the Interior, which manages one-fifth of the nation's land through the National Park Service, Bureau of Land Management and other agencies, we are taking a hands-on approach to managing our forests and preventing wildfire. Last year, I signed a Secretarial Order mandating aggressive fuels management and protecting structures that lie within the wildland-urban interface. We are also using drones like never before to monitor and contain fires.

As we saw in the case of the Sperry Chalet in Glacier National Park, all it takes is one stray ember to burn an entire building down. We have learned from our mistakes. I saw how the new superintendent of Yosemite National Park, Michael Reynolds, is leading the way and cleaning up much of the overgrown forest floor, getting rid of the fuels that would cause the park to go up in smoke.

Radical environmentalists would have you believe forest management means clear cutting forests and national parks. But their rhetoric could not be further from the truth. They make outdated and unscientific arguments, void of facts, because they cannot defend the merits of their policy preferences year after year as our forests and homes burn to the ground.

I've visited too many fire camps and spoken with too many experts to know that those who perished fighting these fires could have been saved. We owe it to the firefighters we have lost, like Cal Fire bulldozer operator Braden Varney and National Park Service Arrowhead Interagency Hotshot Captain Brian Hughes, to work harder to improve

the health of our forests so their brothers and sisters on the fire line no longer face the same dangers and do not have to pay the same price to keep our families safe.

TEXT 11. TREES ARE COVERING MORE OF THE LAND IN RICH COUNTRIES



Colm Stenson drives around County Leitrim, pointing out new tree plantations. In this corner of Ireland, close to the border with Northern Ireland, conifers seem to be springing up all around. The encroachment is not just visual. Mr Stenson, who is a police officer as

well as a cattle farmer, recently received a bill from his feed supplier. It came with a brochure advertising easy returns from converting farmland into woods. Forestry companies tout for business in the local livestock market. The forest is “closing in”, he says.

In the 1920s, when Ireland became independent, it was thought to have just 220,000 acres (90,000 hectares) of woods, covering about 1% of the land. Once-extensive forests had been shrinking for centuries. Farmers had cut trees for firewood and to clear space for animals and crops since at least the fourth millennium BC; some tree species were wiped out by disease. Beginning in the 17th century, most of the trees that remained were felled to build ships or fed into charcoal kilns to fire the Industrial Revolution.

TEXT 12. GREENING INTERNATIONAL TRADE

Shortly after the 1992 Earth Summit, the United States, Canada, and Mexico signed the North American Free Trade Agreement (NAFTA). Negotiated by the outgoing Bush administration, NAFTA originally avoided addressing the environmental or labor aspects of free trade. Pressure from environmentalists ultimately led to negotiation of an environmental side agreement, which ostensibly reflected the Clinton administration's increased commitment to integrating the goals of environmental protection and trade liberalization. Following closely on NAFTA, the Clinton administration also promised to green the WTO in a 1993 speech by Vice President Al Gore. Unfortunately, this would later prove to be the high-water mark of the Clinton administration's commitment to integrating trade and the environment.

Despite occasional promises to the contrary, free trade has become the paramount value driving most U.S. international relations under the Clinton administration. Lost is the balanced goal of integrating environment and trade as pronounced at the Earth Summit and subsequently in the environmental side agreement to NAFTA. A case in point is the administration's effort to railroad the so-called fast-track trade bill through Congress in 1997. The president's proposal largely ignored environmental issues and was thus universally opposed by all environmental groups (even those who had previously supported NAFTA). Nor has the United States shown any leadership in promoting sound environmental policies at the WTO. Although the WTO did create a Committee on Trade and the Environment shortly after Vice President Gore's 1993 speech, that committee has been largely ineffectual in catalyzing any meaningful trade and environment policy.

Ultimately, the problem may be that liberalizing trade and investment is too often viewed as a positive goal in its own right. Lost is any critical analysis of whether such liberalization always leads to improvements in human welfare and quality of life. Goals such as environmental protection, human rights, and social equity—which are arguably more closely linked to human welfare than is liberalized

trade—have been relegated to the back seat during the drive toward free trade. Only by honestly evaluating the environmental and social impact of liberalizing trade and investment, sector by sector, can we determine whether expansion or contraction of the world trade system is more likely to lead to a sustainable future. Thus the United States should support calls by environmentalists for a thorough analysis of the impacts of current trade policies on environmental sustainability before supporting any expansion of liberalized trade and investment policies.

Respecting Global Environment Agreements. IFIs and trade institutions also need to do a better job of mainstreaming concerns about the environment into their day-to-day operations. This general issue is highlighted by the way in which these institutions relate to the multilateral environmental agreements (for example, the climate change regime or the Montreal Protocol with respect to ozone depletion). The IFIs have yet to prohibit funding projects that exacerbate the very same problems that these global environmental regimes are meant to address.

The U.S. Overseas Private Investment Corporation (OPIC) has recently adopted a hopeful approach, announcing that it would not finance any projects that are inconsistent with certain international environmental obligations—for example, projects that use ozone-depleting substances controlled by the Montreal Protocol, projects that manufacture certain toxic chemicals, or projects affecting sites listed under the UNESCO World Heritage Convention. Yet OPIC continues to finance projects that have a significant negative impact on the climate system. Similarly, the WTO still struggles with how to dovetail international trade law with international environmental agreements—although in a recent decision, a WTO dispute panel did agree that international environmental agreements should be taken into account when deciding an international trade dispute.

Balancing Investment Rights with Privileges. In promoting broad investment agreements, such as the proposed Multilateral Agreement on Investment (MAI), the United States and other Organization for Economic Cooperation and Development (OECD) countries are trying to formalize into international law a reduction in the power of national

and local governments to control the environmental and social impacts of foreign investment. Adoption of “free trade” in investment capital would mean that companies would enjoy all of the benefits of free capital flow and repatriation of profits while accepting none of the environmental and social responsibility inherent in the goal of sustainable development. Sovereign nations should be able to retain the right to regulate how foreign investors operate in their territory and to determine the extent to which local people should be given preferential treatment with respect to local resources. Although this may in some cases lead to reduced environmental protection, ensuring that local people benefit from natural resource exploitation is not only fair but, in the long run, will likely lead to more sustainable development.

Although transnational corporations often operate in developing countries with higher environmental standards than do local companies, transnationals typically follow lower standards than they practice at home. Adhering to lower standards in developing countries raises serious questions of equity and competitiveness. To minimize the impact of lower standards abroad, the United States should ban the export of domestically prohibited technologies and goods and should impose minimum environmental standards on U.S. corporations operating abroad. The United States should also provide fair and equal judicial access to foreign citizens and communities harmed by environmental damage caused by U.S. corporate activities.

Greening Technology Transfers. The markets for environmental investments are large and increasing; for example, investments for global pollution control are expected to reach \$300-600 billion per year by 2000; investments in energy efficiency projects are expected to total another \$250 billion in the next 20 years. Many of these opportunities for environmental investments are being created or stimulated by international and domestic law. For example, the Kyoto Protocol under the climate change regime now requires a reduction in net greenhouse gas emissions in industrial countries, which may in turn create a massive new market for renewable and efficient energy technologies. Transferring these green technologies to developing countries should be

a priority of both U.S. and international finance lending. Such lending should be earmarked for shifting societies to appropriate, nonpolluting technologies and not simply for improving the efficiencies of fundamentally unsustainable technologies, such as coal-fired power plants or nuclear reactors.

TEXT 13. PROTECTING THE ENVIRONMENT AT THE WORLD TRADE ORGANIZATION: THE EVENTUAL 'GREENING' OF TRADE?

This post is the result of work conducted for the ILA Committee on Sustainable Development and the Green Economy in International Trade Law.



In a recent post, Diane Desierto discussed the Port State Measures Agreement ('PSMA') and its role in attempting to combat illegal, unregulated, and unreported ('IUU') fishing. Aside from the numerous interesting aspects of the PSMA

identified in that post, the Agreement is also expected to play a key role in regulating IUU fishing beyond the law of the sea. At the World Trade Organization ('WTO'), members are currently in negotiations to prohibit the use of subsidies which contribute to IUU fishing, as well as those that contribute to overfishing or overcapacity. While the elimination of fisheries subsidies which contribute to IUU fishing have been on the agenda of WTO members since the Doha Declaration in 2001, little progress has been made. The adoption of Agenda 2030 and its 17 Sustainable Development Goals ('SDGs') in 2015 has changed this, giving new energy to the international community to achieve a specific set targets. Of most relevance here is SDG 14.6 which requires 'by 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to

IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation.’

The objectives of SDG14.6 extend beyond subsidies that contribute to IUU fishing to include those that contribute to overcapacity and overfishing. Disciplining such subsidies raises a number of challenges for the WTO. While the regulation of subsidies is a standard feature of world trade law, fisheries subsidies present unique challenges. For example, where a member considers a subsidy to harm their interests, they have two options under the Agreement on Subsidies and Countervailing Measures (ASCM): through direct challenge under the WTO’s dispute settlement system, or through the imposition of countervailing duties as a self-help remedy which seeks to counteract the effect of the subsidy. In each instance, the rules on subsidies seek to avoid harm to members’ interests, understood (*inter alia*) as injury to domestic industry, lost opportunities in third markets, or nullification or impairments of benefits.

Fisheries subsidies, however, have a different effect. While they are covered by the ASCM, those rules are ineffective in disciplining them as, in most instances, fisheries subsidies do not cause negative *trade* effects. Instead, the negative impact of the fishery subsidy is the effect it has on fish stocks and the environment more broadly. As the principal remedy for subsidies (countervailing duties) are linked to the injury they cause to industry, which does not have an equivalent in this instance, the question arises – what form countermeasures should take? Further, how should the ‘contribution’ of the subsidy to such fishing practices be calculated? And how far should the disciplines extend – to a specific vessel, or all vessels owned by a single operator?

The Negotiating Group on Rules (‘NGR’) has been trying to tackle these challenges, and has made progress in presenting definitions, framing the scope of the new disciplines on fisheries subsidies, and their operation, as well ensuring that special and differentiated treatment (‘SDT’) is embedded in the process (as mandated by SDG 14.6). This

final point raises a number of issues, as some members consider the problem of overfishing as the result of developed members' large fishing fleets travelling to overfish stocks across the globe, rather than fishing practices in developing countries. While the evidence that such fishing is still common practice is lacking, the affiliated concerns of developing members to ensure that local small-scale artisanal fishing or subsistence fishing are protected has been central to the discussions.

To date there exist a number of proposals from the EU, New Zealand and others, Argentina and others, Indonesia, the ACP group, and the LDC group. Key has been the use of other legal regimes, particularly from the law of the sea, on which to build the WTO disciplines. For example, the definition of IUU fishing is to be taken from the 2001 FAO International Plan of Action on IUU fishing, which once incorporated into the new disciplines will become the reference point for WTO law. Similarly, regional fisheries maritime organizations ('RFMOs') are expected to play a core role as it is their lists of vessels engaged in IUU fishing that are to be presumed to be valid, as well as determining which stocks are overfished, while members' own national authorities will also be able to make equivalent determinations on the basis of the best evidence available to them. The New Zealand and others proposal (at Article 1.1.2) would go further, classifying as prohibited subsidies those that contribute to *any* fishing for stocks in waters where the member is not a party to the relevant RFMO, an approach which chimes with the assumption that international fishing fleets are the primary causes of injury in this field.

The PSMA model whereby access to ports by vessels engaged in IUU fishing is denied (Article 9.4 PSMA) has been suggested as an approach under the disciplines on fisheries subsidies (see the New Zealand and others proposal, para 3.8). The exact mechanics of this under WTO law is unclear, in particular considering the obligations under Article V GATT on freedom of transit. Further, whether this will be the sole approach is not settled: direct challenge of a subsidies programme under the dispute settlement system would be comparatively straightforward but arguably less effective than the adaption of a form of

CVD, perhaps calculated to the value of the subsidy irrespective of its impact on local fishing industries. Further, the extent to which countermeasures target not only vessels engaged in IUU fishing but also their operators is contentious. Note, that while most proposals identify vessels as including their owners, the Argentina & others proposal (in footnote 7) explicitly restricts responses to those vessels specifically engaged in IUU fishing. While the limitation of scope may be reasonable, there would be a considerable deterrent effect were all vessels of an owner or operator targeted on the basis of one vessel engaging in IUU fishing.

Beyond the question of IUU fishing, subsidies which contribute to overfishing or overcapacity present a further set of challenges. One of the most difficult arises from the jurisdictional scope of the disciplines. Some members have proposed an exclusion of the exclusive economy zone ('EEZ') from the application of the disciplines for developing members and LDCs (put forward in both the APC and LDC proposals). Indeed, it is here that some of the greatest difficulties lie: for members to consider their right to fish within their EEZ as unhindered by restrictions on subsidies is deeply problematic and would run counter to the objectives of SDG14.6 which does not contain limitations on the elimination of harmful subsidies to those that only affect stocks outside of a State's territorial waters or EEZ.

From a broader perspective, it is interesting to note how the proposals would tie the WTO into fisheries management systems in a novel manner. A common thread throughout the proposals is their dependence on a legal network of fishing obligations (such as the PSMA), as well as relying on RFMOs to fulfil the monitoring or evaluation of fish stocks. While standard setting bodies have become integral to questions arising in technical barriers to trade and sanitary and phytosanitary measures, to *rely* on RFMOs and the structures of fisheries management will offer a new dynamic between the WTO and other international organizations. Given the limited ability of RFMOs to manage the high seas, and their their variable effectiveness more generally, this may well create substantial challenges. Yet, when

confronted with limited alternatives, this may be a case of innovation to achieve the good rather than the best.

Should WTO members agree to disciplines to meet SDG 14.6 within the time scale required (it is hoped that substantial progress will be made at the Ministerial Conference this year in Buenos Aires), it would mark an extraordinary achievement. The WTO, which has long been maligned for its insensitivity to ‘non-trade’ concerns such as the environment, will have accomplished something that the FAO, UNEP, and UNCTAD have thus far failed to achieve among themselves, in spite of their enthusiastic lobbying. This is especially notable when one considers that the regulation of fisheries subsidies is not clearly a trade matter at all, but a genuinely environmental concern. It may well be that the long debates over the greening of trade law has unexpectedly found an outlet.

AFTER-READING ACTIVITY



PROJECT WORK. Aim: to design a poster, make a brochure or presentation about the realities of replacing lost environments in different countries.

UNIT 7. EVERYTHING ABOUT PLANTS

ACTIVITY 1. Find the meaning of the words given in bold print in the dictionary and translate the following article.

LANDSCAPE ARCHITECT



A **landscape architect** designs and develops land for people's use and enjoyment. A landscape architect may design a small garden a city plaza, a playground, a shopping mall, or part of a national park.

A landscape architect designing a city plaza may include a fountain, seating areas, and various kinds of **ornamental plants**. The landscape architect needs to know the kinds of plants that grow best in different climates and the kinds, of plants that look best in different environments. He or she also needs to study the environment the plants will inhabit — is it windy? Sunny? Shaded? Damp?

A landscape architect needs to know much about plants, as well as about **water supply**, climate, **soil**, and **landforms**. Most jobs as a landscape architect require college degree. Classes in botany (the study of plants), geology, and landscape art and design are required for a college degree in landscape architecture.

Do some plants live longer than others? A landscape architect needs to know **the life span** of many kinds of plants.

Annual plants grow, reproduce, and die within one **growing season**. Can you name any annual plants that you may have planted in a garden? **Biennial plants** produce leaves and food in one year and **reproduce** and die in the second year. Cabbage and carrot plants are biennial plants you may have seen.

Perennial plants live from one growing season to another. **Woody-stemmed plants** are perennial. Each year as the thickness of the stem increases, a circle of wood (xylem tissue) called a **growth ring** is added. In wet years, growth rings are wide. In dry years, growth rings are narrow. The age of some woody-stemmed plants can be found by counting the annual growth rings.

ACTIVITY 2. Answer the questions.

1. What does a landscape architect do?
2. What does a landscape architect need to know?
3. What should you study to become a good landscape architect?
4. How do annual plants differ from perennial plants?
5. How can the age of woody-stemmed plants be found?



ACTIVITY 3. Use the information from the text about a landscape architect and complete the following sentences with the correct words.

1. Most jobs as a landscape architect require _____ degree.
2. A landscape architect designing a city plaza may include _____.
3. A landscape architect designs and develops _____ for people's use and enjoyment.
4. The landscape architect needs to know the kinds of _____ that grow best in different climates.

5. Annual plants grow, reproduce, and die within one _____ season.
6. Perennial plants live from one growing _____ to another.
7. In wet years, growth rings are _____.
8. The age of _____ plants can be found by counting the annual growth rings.

ACTIVITY 4. Match the beginnings and the ends of the sentences.

5. Perennial plants live from	a. different kinds of plants.
6. Annual plants grow, reproduce, and die	b. design a part of a national park.
7. The landscape architect needs to know	c. one growing season to another.
8. A landscape architect may	d. within one growing season.

ACTIVITY 5. Read and complete the text about basic types of root systems. Fill in the missing parts (A – E).



There are two basic types of root systems – taproots and fibrous roots. If the primary root continues to grow and becomes 1, it's called a taproot. **A** taproot is a large single

root with smaller side roots. Food is stored in the taproots of many plants. These taproots become larger as they store food. Some of this stored food is used by root cells, and some of it is later moved back up to be used by the above-ground plant parts. Some of the taproots that humans and animals eat are carrots, radishes, turnips, and beets. Pine

trees also ____2____ that can grow 6 meters (about 20 feet) or more down into the soil.

Fibrous roots are made up of many small branching roots that grow in clusters near the top of the soil. They spread over a large area. There is no main root. Grasses have fibrous root systems. Some maple trees and beech trees have ____3____. Maple and beech trees blow over easily in strong windstorms. Why do you think this can happen?

The root systems of woody-stemmed trees often consist of a taproot with many side-branching roots. These ____4____ help to anchor the tree in the soil so that it can stand upright and compete successfully for the sunlight it needs to make food.

The roots of most plants grow into the soil 50 centimeters to 10 meters (about 1.5-30 feet) deep. The measure of the sideways growth of root systems is often greater than the plant's height. For example, one oak tree 12 meters (about 66 feet) from the base of the tree.

Sometimes plants form roots on the plant parts that are aboveground. **Aerial roots** are roots that grow ____5____ of plants. Many climbing vines form aerial roots that attach the climbing stems to the surface on which they are climbing. Some tropical plants form aerial roots that store dew and rainwater. **Prop roots** are aerial roots that help to support a plant.



- A** – fibrous roots
- B** – side-branching roots
- C** – have a taproot system
- D** – aboveground from the stems
- E** – the plant's main root system

ACTIVITY 6. Match the following words in the left column with their definitions in the right column.

3. Fibrous roots	a. - are aerial roots that help to support a plant.
4. Aerial roots	b. - is a large area dominated by trees.
3. A taproot	c. - are made up of many small branching roots that grow in clusters near the top of the soil.
4. Prop roots	d. - are roots that grow aboveground from the stems of plants.
5. A forest	e. - is a large single root with smaller side roots.

ACTIVITY 7. Fill in the gaps in the text below with one of the words given in the box.

All living ___1___ are made of cells. Cells are the basic units of structure and function in living organisms. A cell's hereditary information is located in the nucleus of the cell. The nucleus of a cell ___2___ by the process of mitosis. The two nuclei that result from this division have the same hereditary information as the nucleus in the original cell. The rest of the cell also divides and is the same as the original cell. This is how roots grow – they add more cells at the apical moisten by the process of mitosis.

You've seen how roots can grow very deep and wide into the soil. Roots can help prevent soil erosion, make ___3___ more fertile, and even help make new soil by breaking up rocks. Most grasses have fibrous root systems that are made up of a network of many small roots spreading out in all directions. Roots like this aren't strong enough

___4___ large, tall plants, but they are good at absorbing ___5___ and dissolved nutrients in dry or sandy soils. Large nets of fibrous roots slow erosion by holding the soil in place. This ___6___ the soil from blowing away during high winds or washing into streams and rivers when it rains.

Have you ever seen a plant growing in a crack in a rock or pushing through a concrete sidewalk? The roots of some plants can ___7___ into tiny cracks slightly and let water into the rocks. The force from growing ___8___ and the action of freezing and melting water further breaks down the rocks. Dead roots decay and add decaying matter to the rock fragments. As a year goes by, the ___9___ of breaking solid rocks into smaller and smaller pieces and mixing the rock fragments with decayed plant matter forms ___10___ soil.

soil, to support, roots, organisms, grow, water, new, divides, process, prevents
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ACTIVITY 8. Read the text from ACTIVITY 7 again and discuss the following questions.

1. How do roots grow?
2. How can root systems affect the soil in which they are growing?

ACTIVITY 9. Do you know what causes the different colors of leaves? Read and translate the text about this. Complete the following sentences with the correct words.



Do you live in a climate where some leaves ___1___ color in autumn? What are some colors of autumn leaves? During autumn, there are fewer hours of daylight—there is less time that the sun shines. Less available sunlight ___2___ changes in plant hormones (chemical messengers).

These changing plant hormones can cause chlorophyll to break down. When chlorophyll is ___3___ down, the plant leaves will no longer appear green. Chlorophyll must be present in plant leaves for photosynthesis to occur. The energy from the light wavelengths absorbed by chlorophyll is necessary for carbon dioxide and water to combine to form food. However, the other pigments ___4___ in the plant leaves. These pigments, along with other pigments that form in leaves in autumn, are responsible for the colors of autumn leaves.

When carbon dioxide and water combine by using the light energy absorbed by chlorophyll, sugar and oxygen form.

CARBON DIOXIDE + WATER --- LIGHT ENERGY--- SUGAR + OXYGEN

Sugar is the basic unit of food ___5___ by plants. Food not immediately used by plants can be stored in roots, stems, leaves, fruits, and seeds. The oxygen becomes part of the air we breathe. Animals and plants use the food and oxygen formed by the process of photosynthesis.

Leaves ___6___ a plant's main "solar energy collectors." The leaves of many kinds of plants have a large surface area available to absorb the sun's energy. In addition to the sun's energy, carbon dioxide and water ___7___ also be available in the leaf for photosynthesis to occur. How do these substances get into a leaf?

The leaves of land plants obtain carbon dioxide ___8___ the surrounding air by diffusion. The surrounding air has more carbon dioxide than the leaf, so carbon dioxide gas diffuses into the leaf through openings called **stomata** (singular—stoma) in the epidermis of the leaf. Leaves usually ___9___ more stomata on the lower epidermis than on

the upper epidermis. The word *stoma* comes from the Greek word meaning “mouth.” Do stomata look like mouths? Green stems can also have stomata. Stomata open into the air spaces inside the leaf. Each stoma is 10 by two cells called guard cells.

1	A	changes	B	change	C	changed	D	changing
2	A	caused	B	cause	C	causes	D	causing
3	A	broken	B	broke	C	break	D	breaking
4	A	remaining	B	remained	C	remains	D	remain
5	A	produce	B	produced	C	producing	D	produces
6	A	were	B	be	C	is	D	are
7	A	must	B	can	C	may	D	are
8	A	out	B	from	C	with	D	in
9	A	had	B	has	C	having	D	have
10	A	surrounding	B	surrounded	C	surround	D	surrounds

ACTIVITY 10. Answer the questions.

1. What does less available sunlight cause?
2. When do the plant leaves no longer appear green?
3. What is the energy from the light wavelengths absorbed by chlorophyll necessary for?
4. When do sugar and oxygen form?
5. How do carbon dioxide and water get into a leaf?



ACTIVITY 11. Order the paragraphs (a – d) to build a text. Then read and translate it.

FALLING LEAVES



(A)_____ **Evergreen** trees such as pine trees and fir trees lose their needle-shaped leaves gradually. Therefore, evergreen trees are never completely without leaves and appear to be ever green.

(B)_____ You've learned that leaves are important plant structures. Photosynthesis occurs in leaves. DO the same leaves stay on a tree for the entire life of the tree?

(C)_____ But what about trees that lose all their leaves in a short period of time? These trees called deciduous trees. **Deciduous trees** such as oak trees and maple trees lose all their leaves at the end of each growing season.

(D)_____ You've probably seen leaves fall from trees or seen pictures of bare trees. The yearly life cycle of many plants in cool and cold regions of Earth involves a shutdown of growth, or a period of dormancy. The shorter and cooler days of autumn affect plant hormones. The changing plant hormones cause the materials in the cells of the petiole and leaf to break down. When an area of cells at the base of the petiole breaks down, the leaf will fall from the stem of the tree. In the spring, when warmer temperatures and longer days return, new leaves develop and the growth cycle begins again.

1_____ 2_____ 3_____ 4_____

ACTIVITY 12. Arrange the sentences in logical order according to the text from ACTIVITY 11. Then use them as a plan to retell it.

- a) The yearly life cycle of many plants in cool and cold regions of Earth involves a shutdown of growth, or a period of dormancy.
- b) Evergreen trees are never completely without leaves and appear to be ever green.
- c) Deciduous trees such as oak trees and maple trees lose all their leaves at the end of each growing season.
- d) In the spring new leaves develop and the growth cycle begins again.
- e) Photosynthesis occurs in leaves.

1)	2)	3)	4)	5)
----	----	----	----	----

ACTIVITY 13. Read the text below. Match choices (A – G) TO (1 – 5). There are two choices you do not need to use.

STEM SUPPORT

You've seen why leaves are important for plants — they provide a place for photosynthesis to take place. Why are stems important for plants?



Stems provide 1)_____.

Stems also provide pathways for the movement of water from the roots up to the leaves and for the movement of food from the leaves to other parts of the plant.

Stems have the same kinds of tissues as roots. Xylem is 2)_____ through the stem, through the petiole, and through the leaf. Phloem is also continuous through all of these plant parts. Food made in the leaves of plants moves to the other parts of plants through the phloem. Xylem and phloem 3)_____ tubes.

There are two kinds of stems. **Herbaceous stems** are green and soft.

They are 4)_____ such as tulips and tomatoes. Xylem and phloem in herbaceous stems are arranged in bundles. **Woody stems** are rigid and hard. Woody stems are found in trees and shrubs. They have a lot of xylem tissue. The xylem tissue becomes 5)_____ the tree. Xylem and phloem in woody stems are arranged in two separate rings with the xylem ring inside the phloem ring. The tissue outside of the wood is called the bark.

- A – continuous from the root
- B – found in plants
- C – life cycle of many plants
- D – are separate conducting
- E – has more carbon dioxide
- F – support for leaves
- G – the wood of



ACTIVITY 14. Read the text and do exercises after it.

RESPIRATION — THE PROCESS OF GETTING ENERGY FROM FOOD



Xylem and phloem cells, as the other as the other cells in leaves and stems, grow by the process of mitosis. The energy from food must be available to all living and growing cells.

How do plants use the food that is made in their leaves? Plants get energy from food through the process of respiration. Respiration is the process of obtaining energy by using sugar and oxygen, which go through a series of chemical reactions to produce carbon dioxide, water, and energy.



Sugar and oxygen are the end products of photosynthesis. Plants and animals use the end products of photosynthesis to produce energy through respiration. Photosynthesis occurs only in cells that contain chlorophyll. Respiration occurs in all living cells of all living organisms.

A) Choose the correct items to complete the sentences. Translate the following sentences into Ukrainian.

- 1) The energy from food must be _____ to all living and growing cells.(interesting, available, necessary)
- 2) Respiration is the process of obtaining energy by using _____ and oxygen.(salt, water, sugar)
- 3) Sugar and oxygen are the _____ products of photosynthesis.(finish, start, end)
- 4) Photosynthesis occurs only in _____ that contain chlorophyll.(plants, cells, flowers)
- 5) Respiration occurs in _____ living cells of all living organisms. (all, some, every)
- 6) Plants and animals use the end products of photosynthesis to _____energy through respiration. (get, produce, leave)

B) Find the meaning of the words given in bold print in the dictionary and translate the following sentences.

- 1) **Xylem and phloem cells**, as the other as the other cells in leaves and stems, grow by the process of mitosis.
- 2) Plants get energy from food through the **process of respiration**.
- 3) Plants and animals use the end products of **photosynthesis** to produce energy through respiration.
- 4) Respiration is the process of **obtaining energy** by using sugar and oxygen, which go through a series of chemical reactions to produce carbon dioxide, water, and energy.
- 5) Photosynthesis occurs only in cells that contain **chlorophyll**.

6) The energy from food must be available to all living and growing cells.

ACTIVITY 15. Match the following words in the left column with their definitions in the right column.

1. Herbaceous stem	a. - is the tissue outside of the wood.
2. Cell	b. - is rigid and hard.
3. The bark	c. - is green and soft.
4. Respiration	d. - is a basic unit of structure and function in living organisms.
5. Woody stem	e. - is the process of obtaining energy by using sugar and oxygen, which go through a series of chemical reactions to produce carbon dioxide, water, and energy.

ACTIVITY 16. Read and translate the text below and do exercises after it.

SUM IT UP



The systems and interactions of plant cells, along with carbon dioxide and water, provide the food that makes all life on Earth possible.

Green plants can use the sun's energy to produce food. Many cells in the leaves of green plants contain chlorophyll. Chlorophyll absorbs energy from sunlight, carbon dioxide and water combine by using the light energy absorbed by chlorophyll to form sugar and oxygen. This process is called photosynthesis. Plants and animals must be able to use the products of photosynthesis (food and oxygen) to produce the energy needed to grow and support life functions.

Respiration is the process of using food and oxygen to produce energy, water, and carbon dioxide. Respiration occurs in the living cells of all living organisms.

The stems of vascular plants have xylem and phloem tissue that transports water, dissolved nutrients, and food throughout the plants. Vascular plants can grow very large because these transport tissues grow as the plants grow and provide all the needed substances to all parts of the growing plants. Nonvascular plants don't have xylem and phloem tissues; therefore they can't grow as large as vascular plants.

A) Answer these multiple-choice questions.

1) How can green plants use the sun's energy?

- a) They can use it to produce food.
- b) They can use it to produce food.
- c) They can use it to produce water.

2) What process is called photosynthesis?

- a) The process of using food and oxygen to produce energy,
- b) The process of producing the energy needed to grow and support life functions.
- c) The process of combining carbon dioxide and water by using the light energy to form sugar and oxygen.

3) What transports water, dissolved nutrients, and food throughout the plants?

- a) The stem of vascular plant does.
- b) Chlorophyll does.
- c) Xylem and phloem tissue does.

B) Make a choice and connect two parts of the sentence.

1) Plants and animals must be able to use the products of photosynthesis (food and oxygen)	a) provide the food that makes all life on Earth possible.
2) Respiration is the process of using food and oxygen	b) xylem and phloem tissues.
3) The systems and interactions of plant cells, along with carbon dioxide and water,	c) to produce the energy needed to grow and support life functions.
4) Nonvascular plants don't have	d) xylem and phloem tissue that transports water, dissolved nutrients, and food throughout the plants.
5) The stems of vascular plants have	e) to produce energy, water, and carbon dioxide.

ACTIVITY 17. Give the Ukrainian equivalents of the English words and word combination and make up sentences with them.

respiration	
substance	
stem	
chlorophyll	
carbon dioxide	
growth ring	
life span	
taproot	
fibrous root	
annual plant	
biennial plant	
perennial plant	

ACTIVITY 18. Fill in the gaps in the text below with one of the words given in the box.

HOW AND WHERE SEEDS ARE PRODUCED



Pollination occurs when pollen grains from the anthers are carried by water, wind, or animals to the stigma. When a 1 lands on the sticky stigma, a tube grows downward through the style, into the ovary, and into the ovule

Fertilization occurs when a 2 cell from the pollen grain moves down through the pollen tube and fuses with an egg cell in the ovule. Sperm and eggs are gametes. A gamete is a 3 cell. Within the ovule, the sperm cell and the 4 cell join to form a new cell called a zygote. The zygote then develops into an 5 . An embryo is a young growing plant. As the embryo grows, the outer layers of the ovule become tough layers to form **a seed coat**.

The seed 6 protects the embryo after it is released into the environment. **The seed** consists of the embryo, stored food, and the seed coat. The ovary that surrounds a seed or seeds gets larger and develops into the 7 . **A fruit** is a ripened ovary of a flower that contains one or more seeds.

Seeds are usually carried away from the 8 plant. This process is called **seed dispersal**. Fruits assist in seed dispersal, as well as in seed protection.



coat, sex, fruit, sperm, pollen grain, egg, parent, embryo
--

ACTIVITY 19. Match the following words in the left column with their definitions in the right column.

1.A gamete	a. - is a young growing plant.
2. A zygote	b. - is the process of carrying seeds away from the parent plant.
3. An embryo	c. - is a large ovary that surrounds a seed or seeds.
4. Seed dispersal	d. - is a sex cell.
5. A fruit	e. - is a cell formed with the sperm cell and the egg cell.

ACTIVITY 20. Answer the questions.

1. When does pollination occur?
2. When does fertilization occur?
3. What is a gamete?
4. What is an embryo?
5. What is a seed coat?
6. What is seed dispersal?

ACTIVITY21. Read, translate and discuss the article.

SAVING SEEDS



Prehistoric farmers began saving seeds more than twenty thousand years ago.

They stored seeds in cool, dry places — often in clay pots that protected the seeds from insects and mice. Keeping seeds dormant enabled these early farmers to grow crops of the same kinds of food year after year.

Scientists are now using new techniques for storing seeds of rare plants. Some of these plants may be used for making medicines in the future. Others may be used to make crops resistant to drought or plant diseases. The seeds of many crop plants can be stored quite easily for years — perhaps even hundreds of years — by freezing them in liquid nitrogen at — 196°C.

Many potentially useful plants are in danger of becoming extinct because of widespread clearing and burning of the rain forests. Freezing

the seeds of these plants is not a good way to preserve them. However, scientists have discovered that the seeds of rain forest plants can be preserved by storing them in nitrous oxide gas. A seed stored in nitrous oxide gas shows its respiration to half the normal rate. This allows the period of dormancy to be longer. The seeds resume their regular respiration rate when exposed to normal again and can then germinate.

ACTIVITY 22. Answer the questions.

1. What techniques for storing seeds of rare plants are scientists using now?
2. Is freezing the seeds of plants a good way to preserve them? Why do you think so?
3. What allows the period of dormancy to be longer?
4. When do the seeds resume their regular respiration rate?

ACTIVITY 23. Match the beginnings and the ends of the sentences.

1.Many potentially useful plants are in danger of becoming extinct because of	a.- storing them in nitrous oxide gas.
2.Keeping seeds dormant enabled these early farmers to grow crops of	b. - a good way to preserve them.
3.Scientists have discovered that the seeds of rain forest plants can be preserved by	c. - its respiration to half the normal rate.
4. Prehistoric farmers began saving seeds	d. - the same kinds of food year after year.
5. Freezing the seeds of these plants is not	e. - can then germinate.
6. A seed stored in nitrous oxide gas shows	f. - widespread clearing and burning of the rainforests.
7. The seeds resume their regular respiration rate when exposed to normal again and	g. - more than twenty thousand years ago.

ACTIVITY 24. Look through the text about saving seeds again and answer the questions.



1. When did prehistoric farmers begin saving seeds?
2. How did prehistoric farmers store seeds?
3. What techniques for storing seeds of rare plants are scientists using now?
4. Why are many potentially useful plants in danger of becoming extinct?
5. How have scientists offered to preserve the seeds of rain forest plants?

ACTIVITY 25. Read the article and find out how plants survive in earth's different environments and what adaptation is.

Plants thrive in seas, deserts, jungles, and in almost every other environment found on Earth. The soil, water, nutrients, amount of sunlight, and temperatures are different in each of these places. Plants can survive on Earth because of adaptations they have developed to respond to different types of environments.

Adaptation is the term used to describe a trait that helps an organism to survive in a particular environment. The better adapted an organism is to its environment, the more likely it is to complete its life cycle.

In order to complete their life cycles, living things must obtain a reliable source of nutrients and energy, and they must reproduce. All living organisms have many adaptations that help them complete these tasks. In addition, most organisms have a number of unique adaptations for self-defense.

ACTIVITY 26. Arrange the sentences in logical order according to the text from ACTIVITY 25. Then use them as a plan to retell it.

1. The better adapted an organism is to its environment, the more likely it is to complete its life cycle.
2. All living organisms have many adaptations that help them complete these tasks.
3. Plants can survive on Earth because of adaptations they have developed to respond to different types of environments.
4. Plants thrive in seas, deserts, jungles, and in almost every other environment found on Earth.

ACTIVITY 27. Read the text below. Match choices (A – G) TO (1 – 5). There are two choices you do not need to use.

WHAT IS A PLANT BEHAVIOR?

Plants need sunlight, water carbon dioxide, oxygen, and dissolved nutrients from 1)____. When seeds sprout they must get their roots anchored in the soil and their leaves up into the sunlight. But the first root pushing 2)____ may be pointing in any direction. If it grows up into the air, the seedling will probably die.



Gravity provides the plant root with a clue about where it will find soil. Gravity is a stimulus to which the plant responds. A **stimulus** is something outside a plant in 3)_____ a plant's behavior. **A plant**

behavior is the response of a plant to a stimulus. The response of plants to gravity is called gravitropism. If a root is growing horizontally, it will

curve downward because the cells on the lower side of the root don't become as long as 4)_____ of the root. As the upper cells become longer, the root curves and pushes down into the soil.

Most plants spend their lives anchored in one place by their roots. But a plant can change 5)_____ from a stimulus. This type of plant response is called a **tropism**. Gravitropism is just one example of a tropism. Plants also respond to sunlight (phototropism), to water (hydrotropism), and to touch (thigmotropism). All these tropisms are responses that help the plant survive by obtaining more sunlight, water, or dissolved nutrients from the soil.

- A – its environment that affects
- B – its position slightly by growing toward or away
- C – adapted an organism is to its environment
- D – the soil in order to survive
- E – the cells on the upper side
- F – other environment found on Earth
- G – out of a sprouting seed

ACTIVITY 28. Look through the text about a plant behavior again and answer the questions.

1. What do plants need to survive?
2. Why may the seedling die?
3. What does gravity provide the plant root with?
4. What is a plant behavior?
5. What is gravitropism?
6. What other kinds of tropism do you know?

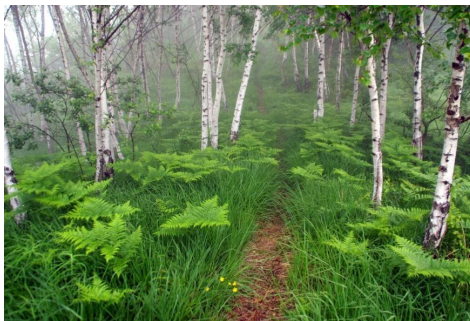
ACTIVITY 29. Match the following words in the left column with their definitions in the right column.

1. A plant behavior	a. – is the response of plants to gravity.
2. A gravitropism	b. - is a type of plant response/
3. A tropism	c. - is the term used to describe a trait that helps an organism to survive in a particular environment.
4. Adaptation	d. - is the response of a plant to a stimulus..

ACTIVITY 30. Order the paragraphs (a – d) to build a text. Then read and translate it.

ADAPTATIONS THAT HELP PLANTS COMPETE WITH OTHER PLANTS

(A)_____ Growing tall stems and producing a thick covering of leaves are other adaptations that help plants compete for sunlight and nutrients. Oaks, maples, and other trees grow tall and form a dense canopy of leaves above forests. Their



leaves capture most sunlight before it reaches the ground. Other plants have difficulty growing in the dark, shady areas around these trees. Since few large plants can grow to them, tall trees face less competition for water and nutrients in the soil.

(B)_____ Huge quantities of sunlight strike Earth every second. Plants compete to trap a small share of this light. Vines like ivy, wild grapes, and honeysuckle climb trees to capture sunlight. Climbing plants may support themselves by wrapping around the taller plant (thigmotropism), or they may have special sticky structures that attach to the bark of the tree.

(C)_____ Plants constantly compete with other plants for light, water, and nutrients from the soil. Any plant that is more efficient than neighboring plants in obtaining these necessities of life is likely to

survive and reproduce. Plants have developed a vast number of adaptations that help them win this competition for nutrients.

1_____ 2_____ 3_____

ACTIVITY 31. Do you know anything about genetic engineering in plants? Read and translate the text about this. Complete the following sentences with the correct words.

GENETIC ENGINEERING IN PLANTS



Genetic engineering may soon allow scientists ___1___ the genes for useful adaptations from plant to plant. This process has already been shown to work in tobacco and

tomato___2___. Researchers are working to produce seeds for crops that will resist plant diseases, have high food values, and produce their own insecticides for fighting off plant pests.

Here is an example of how genetic ___3___ works. A gene is a small part of the material ___4___ the nucleus of a cell. Genes contain the instructions that a cell uses to assemble all the substances the cell makes. The first task of genetic engineers is ___5___ the gene for a useful adaptation, such as resistance to a disease. For example, scientists are currently searching for a gene that will help prevent leaf rust.

Leaf rust is a disease that damages corn crops. Scientists know that some plants produce ___6___ that enables them to fight off this infection. Finding the gene for this adaptation is not easy. Every plant being tested ___7___ about twenty thousand genes. Only one plant in 100,000 contains the gene for resistance to leaf rust.

If scientists can locate and isolate the gene for leaf rust resistance, they will then try to transfer this gene into varieties of corn that are ___8___ commercially. The potential value of producing new ___9___

plants is great. But so far, scientists have not 10 discover a practical way to transfer genes disease resistance into corn.

1	A	transfer	B	to transfer	C	transferred	D	to transferring
2	A	fields	B	field	C	plant	D	plants
3	A	engine	B	engineer	C	engineering	D	engineers
4	A	in	B	outside	C	inside	D	on
5	A	to produce	B	to find	C	to see	D	to make
6	A	a part	B	a medicine	C	a thing	D	a substance
7	A	have	B	haves	C	has	D	had
8	A	grow	B	grows	C	grew	D	grown
9	A	well-resistant	B	disease-resistant	C	sick-resistant	D	ill-resistant
10	A	be able to	B	been able	C	been able to	D	been to

ACTIVITY 32. Answer the comprehensive questions.

1. What is a gene?
2. What do genes contain?
3. What tasks do genetic engineers put?
4. How many genes do plants have?

ACTIVITY 33. Use the information from the text about genetic engineering in plants and complete the following sentences with the correct words.

1. Researchers are working to produce _____ that will resist plant diseases, have high food values, and produce their own insecticides for fighting off plant pests.
2. The potential value of _____ new disease-resistant plants is great.
3. Scientists _____ lot a gene that will help prevent leaf rust.
4. A gene is a small part of the material inside _____ of a cell.
5. Genetic engineering may soon allow scientists to transfer _____ for useful adaptations from plant to plant.
6. Genes contain _____ that a cell uses to assemble all the substances the cell makes.

EXTENSIVE READING

TEXT 1. POLLINATION — THE PROCESS OF MOVING POLLEN



How does pollination occur? When pollen from the anther of a flower on one plant lands on the stigma of a flower from another plant, **cross-pollination** occurs. A seed that results from cross-pollination will contain hereditary information from

two different parent plants. When pollen from a flower on one plant lands on the stigma of the same flower or on the stigma of another flower on the same plant, **self-pollination** occurs. A seed that results from self-pollination contains hereditary information from one parent plant.

The flowers of most plants have characteristics that favor cross-pollination. Some of these are nectar (a sweet, sugary substance), bright colors, and sweet smells. Birds and insects are attracted by the colors, smells, and nectar of many flowers. They pollinate many other flowers on different plants of the same species as they move from plant to plant in search of nectar and pollen. Some pollen grains stick to the birds and insects that feed on the nectar and pollen. These pollen grains are then moved from flower by the birds and insects.

TEXT 2. GYMNOSPERMS PARTS AND REPRODUCTIVE PROCESSES

Not all plants that produce seeds have flower. **Gymnosperms** are seed-bearing vascular plants that do not produce seeds in flowers and do not have fruits to help in seed dispersal and do not protection. The word *gymnosperm* comes from the Greek words *gymnos* and *sperma*. *Gymnos* means “naked”, and *sperma* means “seed”.



Plants such as pine trees and spruce trees are gymnosperms. Most gymnosperms are conifers. The leaves of conifers are needle-shaped. Most conifers are evergreens. Conifers produce seeds on the woody scales of cones rather than inside the pistils of flowers.

TEXT 3. REPRODUCTIVE ADAPTATIONS

Plants live longer than any other type of organism on the Earth. Bristlecone pine trees over 5000 years old grow in the southwestern United States. Trees 200 to 500 years old can be found almost anywhere in the U.S. But no plant lives forever. Plants must reproduce or become extinct.

Recall that many plants can undergo vegetative reproduction, as well as producing seeds or spores for reproduction. This adaptation increases the chances that some of the plant's offspring will survive.

Other plants, such as lodgepole pine trees, produce two kinds of seeds. Some of the lodgepole pine's seeds are released every year. These seeds will sprout if they land on fertile soil and other conditions for growth are favorable. The second kind of lodgepole pine seed is held in tightly closed cones as a sort of "life insurance policy".

TEXT 4. PROBLEMS CAUSED BY IMPORTED PLANTS

Environmental scientists are keenly aware that plants imported from different parts of the world may become serious nuisances in their new environment. Plants grown for food or for decoration in one part of the world may become hard to control in a different location.

South American water hyacinths are beautiful plants. About 100 years ago, some were brought as gifts to people in the United States. The offspring of these water hyacinths have become the most damaging water plant in North America.

Water hyacinths are a problem because of their incredibly high rate of reproduction. Scientists in Louisiana reported that in one growing season, 25 of these plants could produce approximately two million offspring. That's enough water hyacinths to form a dense mat completely covering a pond about the size of two football fields. This mass of plant material weighs about as much as a fully loaded jumbo jet.

Water hyacinths don't directly affect food crops, but they still harm human beings. Mats of water hyacinths prevent boats from going through canals, interfering with trade. They clog irrigation ditches and water pipes. Water hyacinths also use up the oxygen in the water, driving off or killing fish.

No Western movie is complete without a picture of tumbleweed blowing across the range or rolling down the street of a deserted town. Tumbleweed is more common than ten-gallon hats. But this "Western" plant is actually a form of thistle imported into the United States by accident from Russia in the early 1800s.

Tumbleweed was becoming a problem plant in some western states by the 1870s, causing sharp losses of wheat production. In addition to damaging crops, tumbleweeds' sharp spines can injure horses and cattle. In the fall when its seeds are ripe, its roots break off. It tumbles for miles across open land spreading its seeds as it bounces along. Tumbleweed was not brought under control until new herbicides were invented during the 1940s. Killing tumbleweed is still a major expense for farmers and ranchers.

TEXT 5. PLANT ADAPTATIONS FOR DEALING WITH WATER SHORTAGES



Desert plants burst into bloom when it rains. Desert plants producing flowers and seeds need more water than is available to them for most of the year. When water is available, many desert plants bloom immediately. The flowers produce drought resistant seeds that germinate the next time water is available.

Some deserts may not receive rain for several years in a row. Plants that live in deserts must survive on less than 25 centimeters (about 10 inches) of water per year. In order to survive these harsh conditions, desert plants have a variety of adaptations for collecting, storing, and conserving water.

Cactus is a common desert plant. Cacti have a thick, waxy covering that reduces the amount of water they lose through their cell walls. The water lost by cactus plants through transpiration is reduced because cactus plants open their stomata only at night.

Cactus roots absorb rainwater very quickly before it evaporates or sinks into the sandy desert soil. Many cactus plants have a pulpy center that swells to absorb water taken up by the roots and shrinks as the water is used up. Cactus spines discourage animals from eating the moist parts of the plant.

AFTER-READING ACTIVITY



PROJECT WORK. Aim: to choose one of the topics and design a poster, make a brochure or presentation:

1. Plant Adaptations for Dealing with Water Shortages;
2. Problems Caused by Imported Plants;
3. Genetic Engineering in Plants.

APPENDIX

DEFINITIONS OF FORESTRY TERMS

Aesthetics is a set of principles concerned with the nature and appreciation of beauty.

Annual Ring is the combination of one earlywood layer (light colored) and one latewood layer (dark colored) seen in a cross-section of a tree. One annual ring usually represents one year of growth.

Artificial Regeneration is the growth of new trees through seeding and planting.

Bark is the tough exterior covering of a woody root or stem that protects the tree from injury caused by insects and other animals, by other plants, by disease and by fire.

Biological diversity (Biodiversity) is the variety of life on the Earth.

Best Management Practices are the procedures employed during harvesting and/or timber stand improvement activities that reduce erosion and prevent or control water pollution.

Biodiversity is the variety of life forms in a given area; can be categorized in terms of number of species, variety of plant and animal communities, genetic variability or some combination of these categories.

Biome is way to describe a large group of similar ecosystems. Biomes have similar weather, rainfall, animals, and plants.

Bole is the main trunk of a tree.

Broadleaf is a class of trees that have broad, flat leaves of many different shapes; most are deciduous; also called hardwood because most broad-leaved trees have harder wood than do conifers. Examples include oak, hickory, maple and ash.

Commercial logging is the activity of cutting down trees in order to get wood that can be sold.

Canopy is formed by the mass of intertwined branches, twigs and leaves of the mature trees; the “roof” of the forest formed by the crowns of the tallest trees.

Carrying Capacity is the maximum number of healthy wildlife that a given habitat or area can support without degradation of the habitat.

Clear-cut is a harvesting and regeneration method that removes all trees within a given area. Most commonly used in pine and hardwood forests that require full sunlight to regenerate and grow efficiently.

Conservation is the protection of plants and animals, natural areas, and interesting and important structures and buildings, especially from the damaging effects of human activity; planned management and wise use of natural resources for present and future generations.

Conservation biology is the management of nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions.

Conservation movement is the political, environmental, or social movement that seeks to protect natural resources, including biodiversity and habitat.

Conservation organization is an organization dedicated to protection and management of the environment or natural resources.

Competition is the struggle between trees to obtain sunlight, nutrients, water and growing space. Every part of the tree, from the roots to the crown, competes for space and food.

Conifer is a class of trees that are evergreen, has needle or scale like foliage and cone like fruit; often called softwood. Examples include pine, hemlock, cedar and cypress.

Crown is the branches and foliage at the top of a tree.

Deciduous is a group of trees that lose all of their leaves every year.

Decomposition is the process by which organic material such as leaves and branches are broken down by bacteria, fungi, protozoans and the many different kinds of animals that live in the soil.

Dendrology is the study of trees; tree identification.

Ecological Succession is the gradual change of plant and animal communities over time.

Ecosystem is a loosely defined area consisting of numerous habitats. It describes a specific area where all living organisms work together as a unit interacting with the sun, soil, water, air and each other.

Emergent layer exists in the tropical rain forest and is composed of a few scattered trees that tower over the canopy.

Environment is the air, water, and land in or on which people, animals, and plants live; the sum of all external living and non-living conditions and influences that affect the development and survival of an organism.

Erosion is the wearing away or removal of land or soil by the action of wind, water, ice or gravity.

Even-Aged Management is a forest management method used to produce stands that are all the same age or nearly the same age by harvesting all trees in an area at one time or in several cuttings over a short time. This management method is commonly applied to shade-intolerant conifers and hardwoods.

Evergreen is a group of trees that do not lose all of their leaves every year but go through a gradual replacement by dropping only their oldest leaves each year. Instead of being bare in winter, these trees have leaves all year.

Firefighter is a person whose job is to stop fires from burning, someone whose job is to stop fires and to save people and property from being harmed.

Foliage is the leaves of a tree or other plant.

Forage is vegetation such as leaves, stems, buds and some types of bark that can be eaten for food and energy.

Forb is any herb other than grass.

Forest Floor is the lowest level of the forest that is made up of tree seedlings, dead leaves and needles, grasses, ferns, flowers, fungi, and decaying plants and logs.

Forest is a large area dominated by trees; an area growing trees above some threshold (**Land cover definition**); may be defined as any land that is used primarily for production of timber (**Land use definitions**).

Forest farming is the cultivation of high-value specialty crops under a forest canopy that is intentionally modified or maintained to provide shade levels and habitat that favor growth and enhance production levels.

Forest fire is a fire burning in an area of land with many trees that is difficult to control and sometimes spreads quickly.

Forest floor contains decomposing leaves, animal droppings, and dead trees.

Forest genetic resources (FGR) are the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value. It also maintains the vitality of forests and provides resilience to stresses such as pests and diseases.

Forest management is a branch of forestry concerned with overall administrative, economic, legal, and social aspects, as well as scientific and technical aspects, such as silviculture, protection, and forest regulation.

Forest Type is a designation or name given to a forest based on the most abundant tree type or types in the stand; groups of tree

species commonly growing in the same stand because their environmental requirements are similar.

Forestry is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources for human and environmental benefits.

Fuel Loading is a buildup of easily ignited leaves, pine straw, branches and trees on the forest floor.

Global warming is the term used to describe the rising of the average temperature on Earth.

Gymnosperm is a plant whose seeds are not enclosed in flowers. Most gymnosperms produce their seeds on the surface of the scales of female cones and are pollinated by wind. Conifers are the most common type of gymnosperm.

Habitat conservation is a management practice that seeks to conserve, protect and restore habitats and prevent species extinction, fragmentation or reduction in range.

Hardwoods are the trees with broad, flat leaves as opposed to coniferous or needled trees. Wood hardness varies among the hardwood species, and some are actually softer than some softwoods.

Heartwood is the central core of a tree, which is made up of dense, dead wood and provides strength to the tree.

Herb is any plant with leaves, seeds, or flowers used for flavouring, food, medicine, or perfume; a type of plant whose leaves are used in cooking to give flavour to particular dishes or in making medicine.

Hunter is a person or an animal that hunts animals for food or for sport.

Hunting is chasing and killing an animal or bird for food, sport, or profit.

Hypsometer is any device used for measuring tree height.

Landscape is the visible result of various natural geographical processes — the formation of rocks, their uplift into mountains, subsequent erosion of the mountains, distribution and deposition of eroded sediments, movements of the continents, and the modification of coastlines by the action of the sea.

Latewood is a wood cells produced at the end of the growing season that make up the darker section of an annual ring. It is also called summerwood.

Limiting Factor is any requirement for wildlife survival that is in limited supply.

Logger (lumberjack) is a person who cuts down trees for wood; a person whose job is to cut down trees that will be used for building, etc. or to transport trees that have been cut down.

Mammal is any of a class of higher vertebrates whose bodies are covered with hair, who give birth to live young, nourish their young with milk from mammary glands, regulate their body temperature internally, have four types of well-developed teeth and typically have four well-developed legs with toes that have nails, claws or hoofs.

Mast is fruits or nuts used as a food source by wildlife. Soft mast includes most fruits with fleshy coverings, such as persimmon, dogwood seed or black gum seed. Hard mast refers to nuts such as acorns and beech, pecan and hickory nuts.

Multiple-Use Management is the management of land or forest for more than one purpose, such as wood production, water quality, wildlife, recreation, aesthetics and clean air.

Mushroom is a fungus with a round top and short stem. Some types of mushroom can be eaten.

Nature is all the animals, plants, rocks, etc. in the world and all the features, forces, and processes that happen or exist independently of people, such as the weather, the sea, mountains, the production of young animals or plants, and growth.

Natural Regeneration is the growth of new trees in one of the following ways without human assistance: (a) from seeds carried by wind or animals, (b) from seeds stored on the forest floor, or (c) from stumps that sprout.

Permafrost is a layer of ground below the topsoil that remains frozen throughout the year.

Phloem is the part of a tree that carries sap from the leaves to the rest of the tree. It is also called inner bark.

Photosynthesis is the process by which a plant or tree combines water and carbon dioxide with energy from the sun to make glucose and oxygen.

Plant is a living thing that grows in earth, in water, or on other plants, usually has a stem, leaves, roots, and flowers, and produces seeds.

Planting is the activity of putting plants into the ground or into a container of soil so that they will grow.

Plant Succession is the progression of plants from bare ground to mature forest.

Prescribed Burning is the practice of using regulated fires to reduce or eliminate material on the forest floor, for seedbed preparation or to control competing vegetation. Prescribed burning simulates one of the most common natural disturbances. It is also called controlled burning.

Pulpwood is a wood used in the manufacture of paper, fiberboard or other wood fiber products.

Rainforests are forests characterized by high rainfall, with annual rainfall in the case of tropical rainforests between 250 and 450 centimeters, and definitions varying by region for temperate rainforests.

Recreation is the act of making something exit or happen again.

Reforestation is the reestablishing of a forest by planting or seeding an area from which forest vegetation has been removed.

Renewable Resource is a naturally occurring raw material or form of energy that has the capacity to replenish itself through ecological cycles and sound management practices.

Resin is a group of sticky liquid substances secreted by plants that appear on the plant's external surface after a wound.

Root is the underground portion of a tree that helps anchor the tree in the ground and absorbs water and nutrients from the soil.

Salvage Cut is the harvesting of dead or damaged trees, or the harvesting of trees in danger of being killed by insects, disease, flooding or other factors in order to save their economic value.

Sawtimber is wood of large enough size to be used to produce lumber for construction and furniture.

Seed Tree Cut is a harvesting method in which a few scattered trees are left in the area to provide seeds for a new forest stand. Selection of seed trees is based on growth rate, form, seeding ability, wind firmness and future marketability. This harvesting method produces an even-aged forest.

Selective Cutting is the periodic removal of individual trees or groups of trees to improve or regenerate a stand.

Shade-Intolerant Species is trees that require full sunlight to thrive and cannot grow in the shade of larger trees.

Shade-Tolerant Species is trees that have the ability to grow in the shade of other trees and in competition with them.

Shelterwood Cut is removing trees in the harvest area in a series of two or more cuttings so that new seedlings can grow from the seeds of older trees. This method produces an even-aged forest.

Silviculture is the art, science and practice of establishing, tending and reproducing forest stands of desired characteristics. It is based on knowledge of species' characteristics and environmental requirements.

Softwood is a tree belonging to the order Coniferales. Softwood trees are usually evergreen, bear cones and have needles or scale like leaves. Examples include pines, spruces, firs and cedars.

Snag a standing dead or dying tree.

Sparse trees and savanna are forests with lower canopy cover of trees.

Species are a set of animals or plants in which the members have similar characteristics to each other and can breed with each other.

Stand is a group of trees that are sufficiently the same in species composition and arrangement of age classes and condition so that they can be managed as a unit.

Suppression is the process by which a tree loses its vigor due to inadequate light, water and nutrients.

Thinning is a tree removal practice that reduces tree density and competition between trees in a stand. Thinning concentrates growth on fewer, high-quality trees, provides periodic income and generally enhances tree vigor. Heavy thinning can benefit wildlife through the increased growth of ground vegetation.

Temperate broadleaf and mixed forests include a substantial component of trees in the Anthophyta.

Temperate needle leaf forests are composed entirely, or nearly so, of coniferous species.

Timber is the trees that are grown so that the wood from them can be used for building.

Transpiration is the loss of water through leaves

Tree is a perennial plant with an elongated stem, or trunk, supporting branches and leaves in most species.

Tropical dry forests are characteristic of areas in the tropics affected by seasonal drought.

Understory is made up of bushes, shrubs, and young trees that are adapted to living in the shades of the canopy; the area below the forest canopy that comprises shrubs, snags and small tree. Because the understory receives little light, many of the plants at this level tolerate shade and will remain part of the understory. Others will grow and replace older trees that fall.

Wildlife is animals and plants that grow independently of people, usually in natural conditions.

Wilderness is an area of land that has not been used to grow crops or had towns and roads built on it, especially because it is difficult to live in as a result of its extremely cold or hot weather or bad earth; an outside area in which plants are left to grow naturally or untidily.

Wood is a hard substance that forms the branches and trunks of trees and can be used as a building material, for making things, or as a fuel.

Wood Products are materials developed from use of the hard fibrous substance (wood) which makes up the greater part of the trunks and limbs of trees.

Wood Chemicals are chemicals that are found naturally in the various parts of a tree.

Xylem is the part of a tree that transports water and nutrients up from the roots to the leaves. Older xylem cells become part of the heartwood. It is also called sapwood.

VOCABULARY FOLDER

UNIT 1. WORLD FORESTRY

tree density	щільність дерев
tree height	висота дерева
legal standing	правовий статус
the dominant terrestrial ecosystem	домінуюча наземна екосистема
gross primary production	валова первинна продукція
boreal forests	бореальні ліси, тайга
tropical forests	тропічні ліси
temperate forests	помірні ліси
broad categories of forest	широкі категорії лісів
administrative definitions	адміністративні визначення
land use definitions	визначення землекористування
land cover definitions	визначення земельного покриття
vegetation growing	зріст рослинності
density	щільність
canopy	лісовий покрив, крона
cross-section of tree trunks	поперечний переріз стовбурів дерев
immature trees	незрілі дерева
biotic	біотичні (живі)
abiotic	абіотичні (неживі)
components	компоненти
shrubs	чагарники
vines	лози
herbaceous	трав'янисті
moss	мох
algae	водорості
fungi	гриби
mammals	ссавці
amphibians	земноводні
forest floor	лісова підстилка
the understory	підземелля

intertwined branches	переплетені гілки
emergent layer	шари, що формуються
scattered	розкидані
temperate needleleaf forests	помірні хвойні ліси
the taiga or boreal forests	бореальні ліси або тайгові ліси
temperate broadleaf and mixed forests	помірні широколистяні та змішані ліси
rainforests	тропічні ліси
monsoon	мусон
tropical moist forests	тропічні вологі ліси
tropical dry forests	тропічні сухі ліси
sparse trees and savanna	рідколісся і савана
gas balance	газовий баланс
planetary climate	клімат планети
carbon dioxide	вуглекислий газ
oxygen	кисень
annually	щорічно
volumes of gas	обсяги газу
gas composition	газовий склад
coniferous	хвойні
broad-leafed	широколистні
sapling	саджанець
remain active	залишитися активним
migrate	мігрувати
die and lay eggs	вмирають і відкладають яйця
evergreen trees	вічнозелені дерева
cold weather	холодна погода
dry	сухо
thin layer of soil	тонкий шар ґрунту
short growing season	короткий вегетаційний період

UNIT 2. PLANTS AND ANIMALS OF UKRAINE

marten	куниця
roe	козуля
elk	лось
beaver	бобер
lynx	рись
the forest-steppe zone	лісостепова зона
elm	в'яз
hornbeam	граб
black poplar	осокір (чорна тополя)
the steppe zone	степова зона
marmot	бабак
deer	олень
wild pig	дика свиня
oak	дуб
pine	сосна
fir	ялиця
beech	бук
birch	береза
aspen	осика
maple	клен
linden	липа
alder	вільха
willow	верба
plateaux	плато
saffron	шафран
primrose	первоцвіт
edelweiss	едельвейс
meadows	луг
widespread	поширений
gecko	геккон
cedar	кедр

endemic	ендемічний
endangered	зникають
relict thickets	реліктові зарості
muskrat	ондатра
fescue	соломинка
woodpecker	дятел
black stork	чорний лелека
badger	борсук
steppe	степ
larch	модрина
juniper	ялівець
hind	лань
wildings	дикі
scrub	чагарник
laurels	лаври

UNIT 3. NATURE OF ENGLISH- SPEAKING COUNTRIES

herbicides	гербіциди
mainland	материк
sagebrush	полин
vegetation	рослинність
marshlands	болота
exterminated	винищені
plentiful	багато
freshwater fish	прісноводні риби
invertebrate	безхребетний
coverage	покриття, зона спостереження
mammal	ссавець
concern	важливість
stoat	горностай
pike	щука
perch	окунь
trout	форель

hemlock	болиголов
spruce	ялина
transition zone	перехідна зона
hardwood forest	листяний ліс
palmettos	карликова пальма
tamarack	лиственниця американська
arid	посушливий
juniper	ялівець
mortality	смертність
gradual climatic warming	поступове кліматичне потепління
armadillo	броненосець
DDT	інсектицид
waterfowls	водоплавний птах
whooping crane	журавель
fragrant oil	ароматне масло

UNIT 4. HUMAN ACTIVITIES

landscape	ландшафт
the formation	формування
subsequent erosion	подальша ерозія
eroded sediments	розмиті відклади
natural processes	природні процеси
alterations	зміни
landscape modifications	модифікації ландшафту
technological ability	технологічні можливості
inhabit	мешкають
surroundings	околиці
rapid development	бурхливий розвиток
virgin state	незайнятий штат
lifestyle	спосіб життя
negligible effect	незначний ефект
penetrate	проникають

adoption	прийняття
environmental effect	екологічний ефект
countryside	сільська місцевість
source of food	джерело їжі
conservation biology	збереження біології
exploitation	експлуатація
surface	поверхня
nomadic hunters	кочові мисливці
hunter-gathers	мисливці-збирачі
flint	кремень
crops	посіви
constraints	обмеження
biodiversity	біорізноманіття
terrestrial	мешканець землі
sunlight	сонячне світло
soil	грунт
vital stage	життєва стадія
grazing livestock	випас худоби
tanning agents	дубильні агенти
rubber	гума
dye	барвник
fiber	волокно
turpentine	скипидар
wax	віск

UNIT 5. FOREST MANAGEMENT

forestry	лісове господарство
recreation	відпочинок
biological diversity	біологічне розмаїття
timber	пиломатеріали, деревина
natural system	природна система
influenced	під впливом
natural environment	природне середовище

human activity	людська діяльність
forest management	управління лісами
firewood	дрова
environmental awareness	екологічна свідомість
public awareness of natural resource policy	інформування громадськості про політику щодо природних ресурсів
preservation	збереження
protecting biodiversity	захист біорізноманіття
economical sustainable reasons	економічні причини
photogrammetrymodelling	фотограмметріямоделювання
standing trees	стоячі дерева
aesthetic	естетичний
extraction	добування
replanting	пересадка
encompasses	охоплює
marketability	товарність
sustainable	стійкий
intentional	навмисне
integrated	інтегрований
intensive	інтенсивний
interactive	інтерактивний
Agroforestry	Агролісозаготівля
land management	землеуправління
integrity	цілісність

UNIT 6. ENVIRONMENT, ITS PROBLEMS AND PROTECTION

abatement	знищення
acid rains	кислотні дощі
canopy	накриття, дах
creed	переконання
damage	шкода
defense	захист

deforestation	вирубання лісів
disrupted	зруйнований
(to) eliminate	знищувати
(to) identify	порівнювати, визначати
environment	навколишнє середовище
greenhouse effect	парниковий ефект
hailstorm	гроза з градом, злива, сильний град
implication	значення
loss	втрати
natural resources	природні ресурси
nuclear weapons	ядерна зброя
on the one hand	з одного боку
on the other hand	з іншого боку
pollution	забруднення
property	власність, надбання
(to) provide	забезпечувати
(to) save	рятувати
sediment	осад
(to) take care	турбуватися
waste	відходи
unprotected	беззахисна
disaster	лихо, біда, катастрофа
frequency	частота, часте повторення
hazard	ризик, небезпека
(to) damage	завдавати збитків, пошкоджувати
(to) occur	траплятися, відбуватися
(to) respond	відповідати
(to) under flood	підтоплювати
frequent	частий, часто повторюваний
resistant	стійкий

UNIT 7. EVERYTHING ABOUT PLANTS

landscape architect	ландшафтний дизайнер
ornamental plant	декоративна рослина
water supply	водопостачання
annual plant	однорічна рослина
biennial plant	дворічна рослина
perennial plant	багаторічна рослина
growth ring	річне кільце
life span	тривалість життя
root system	коренева система
taproot	стрижневий корінь
fibrous root	мичкуватий корінь
cell	клітина
moisten	зволожувати
nucleus	ядро
erosion	ерозія, руйнування
hormones	гормони
chlorophyll	хлорофіл
carbon dioxide	вуглець
solar energy	сонячна енергія
stoma	стома
deciduous trees	листяні дерева
bare trees	безлисті дерева
stem	стовбур, стебло
woody stem	дерев'янистий стовбур
herbaceous stem	трав'янисте стебло
respiration	дихання
substance	речовина
pollination	запилювання
fertilization	запліднення, внесення добрив
pollen grain	пилок
nutrients	поживні речовини

gravity	сила тяжіння
gene	ген
genetic engineering	генна інженерія
vascular	судина
seed coat	насіннева оболонка
seed dispersal	розповсюдження насіння
sex cell	статева клітина
gymnosperm	голо насінна рослина

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Навчальне видання

АНГЛІЙСЬКА МОВА

НАВЧАЛЬНИЙ ПОСІБНИК ДЛЯ СТУДЕНТІВ СПЕЦІАЛЬНОСТІ 205 «ЛІСОВЕ ГОСПОДАРСТВО» ВИЩИХ АГРАРНИХ НАВЧАЛЬНИХ ЗАКЛАДІВ

Формат 60х84/16. Ум. друк. арк. 13,71.

Наклад 7. Зам. № 000.

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*Свідомство про внесення суб'єкта видавничої справи
до Державного реєстру видавців, виготівників
і розповсюджувачів видавничої продукції України
серія ДК № 3544 від 05.08.2009 р.*

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