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АНГЛІЙСЬКА МОВА

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Міністерство освіти і наукиУкраїни
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АНГЛІЙСЬКА МОВА

Навчальний посібник
для здобувачів першого (бакалаврського) рівня вищої освіти за спеціальністю 206 «Садово-паркове господарство»

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Шульга І.В. Англійська мова: навч. посіб. для здобувачів першого (бакалаврського) рівня вищої освіти за спеціальністю 206 «Садово-паркове господарство» / І.В. Шульга. – Харків : ДБТУ, 2022. – с.

Навчальний посібник містить 15 тем, які базуються на професійно-орієнтованих текстах та комплексах вправ, включаючи вірші англомовних поетів та укладача, які спрямовані на розвиток фахової комунікації. Містить завдання для самостійної роботи студентів.

Призначено для здобувачів першого (бакалаврського) рівня вищої освіти за спеціальністю 206 «Садово-паркове господарство», які вивчають професійну англійську мову в аграрному ВНЗ II-IVрівнів акредитації. Підготовлено з урахуванням вимог Болонського процесу.

CONTENTS

MODULE I
ROLE OF GREEN PLANTATIONS IN HUMAN LIFE
UNIT 1

I. Read and memorize the following words and word-combinations:

urban (adj) – міський
environment (n) – оточуюче середовище
reduction (n) – зменшення
pollutant (n) –забруднювач
shading (ger) – затінок
intercept (n) – перехоплення
precipitation (n) – випадіння опадів
avoid (v) – уникати
protection (n) – захист
hazard (n) – ризик, небезпека
landslide (n) – зсув, обвал
benefit (n) – вигода, користь, перевага
health (n) – здоров'я
impervious (adj) – непроникний, непрохідний
impact (n) – вплив, дія
contribute (v) – сприяти, робити внесок
mitigate (v) – пом'якшувати, зменшувати
resistance (n) – опір, протидія
release (n) – звільнення
remnant (n) – слід, залишок
species (n) – вид
awareness (n) – усвідомлення
biodiversity (n) – біорізноманіття
repository (n) – сховище, умістище
tremendously (adv) – величезно
access (n) – доступ
foster (v) – виховувати, виходжувати, доглядати
opportunity (n) – можливість
ultimately (adv) – зрештою
perceive (v) – сприймати, розуміти
heat (n) – спека
appreciate (v) – високо цінувати
heritage (n) – спадковість

Word-combinations

urban environment – оточуюче середовище міста
water run-off – стік води
water-table – рівень грунтових вод
slope erosion – ерозія схилів
torrential floods – розливи, що швидко течуть

traffic noise – шум транспорту
air pollution – забруднення повітря
summer time extreme temperatures – дуже високі температури влітку
long-term – довгостроковий
ancient historical gardens – стародавні історичні садки
to be worth preserving – бути вартим зберігання
under circumstances – за умов
liminal space – пороговий простір
social relevance – соціальна доречність
place for recreation – місце відпочинку
complex of greenery – комплекс рослинності
historic events – історичні події

II. Read the text and be ready to answer the following questions:

1. What do plant benefits include from the environment point of view?
2. What do plants in densely urbanized areas contribute to?
3. How do benefits provided by plants change relative to their urban location?
4. What environmental services do plant species fulfill?
5. What are remnants of ancient historical and botanical gardens characterized by?
6. What purpose were botanical gardens founded for initially?
7. What role have botanical gardens been playing since the second half of the twentieth century?
8. When did the concept of an urban park as an open space for community use arise?
9. Where was the first urban park designed?
10. What opportunities do parks and gardens represent from the point of view in human well-being?
11. What does the complex of greenery in urban areas contribute to?

TEXT
PLANTS IN URBAN ENVIRONMENT

It is well known that plants in urban environments, particularly trees, provide several ecosystem services in different aspects of life. In general, from the environmental point of view, plant benefits include climatic regulation; uptake/reduction of CO_2 and other greenhouse gases and pollutants; shading, which reduces urban heat island effects and is a general cooling factor, also intercepting incoming precipitations and avoiding dangerous water run-off while enriching water-table capacity. Plants in densely urbanized areas also contribute to environmental protection from several hazards like strong winds, soil and slope erosion, torrential floods, landslides, and reduce traffic noise. According to several results reviewed by scientists, benefits provided by plants change relative to their location within the urbanized area. For example, trees in parks and public areas with high air pollution, likely provide the greatest public-health benefits, whereas

trees covering impervious surfaces have the greatest impact on storm-water management, and trees close to houses contribute mitigating summertime extreme temperatures. Modern city planning often uses plant species supposed to better fulfill environmental services, e.g., easy care, fast growth, small size, pollution resistance, while avoiding unfavorable effects, e.g., release of allergens. However, this may imply introducing novel plants whose long-term environmental impact should be carefully considered.

While the interactions above are generally well-known and recognized, this general picture may need a more detailed discussion, as many more environmental benefits can be attributed to plants growing in urban environments, especially botanical gardens and historical parks (both public and private). Remnants of ancient historical gardens and botanical gardens are characterized by the presence of native trees, and of exotic species introduced in the past centuries which are nowadays worth preserving for historical and educational purposes.

Initially founded as "physic gardens" for studying medicinal plants in the middle of the sixteenth century, during European exploration and expansion in other continents from the seventeenth to the nineteenth century botanical gardens became centers of trade for the introduction, acclimatization, and propagation of exotic flora. Since the second half of the twentieth century, with increased awareness of biodiversity, botanical gardens have been playing an important role as repositories of plant diversity conservation.

Public urban parks have a different origin. The concept of urban park as an open space for community use arose in the nineteenth century, when population of both European and North American large cities tremendously increased. Under these circumstances, quality of life for many citizens was poor and unhealthy, with no access to natural spaces. In this period, landscape architects established public parks, which were considered as liminal space, marking the transition between the urbanized and the natural environment, areas where they foster passive recreation and provide safe spaces for people. In 1843, architect Joseph Paxton designed what is considered the first urban park worldwide: Birkenhead Park in Liverpool.

From the point of view in human well-being, green areas integrated in the metropolitan context fulfill strong social relevance. Parks and gardens represent opportunities for relaxing and staying away from everyday routines; give positive impact on human social relationships; provide a place for recreation and meditation; contribute to make better life quality. Ultimately, they satisfy the definition of "restorative environments" for different ages, ethnics and genders.

Indeed, most people in urbanized areas tend to perceive natural environments as more peaceful and restful than urban ones, and often seek for restoration of urban green spaces. In general, for park and garden visitors the most meaningful attributes are learning experience, stress relief and relaxation, improved quality of life, and thermal comfort during extreme heat events. The complex of greenery in urban areas, commonly defined as "urban forestry", contributes to provide human-related benefits and well-being. Citizens particularly appreciate mature trees-patriarchs, which can awake emotions and peaceful

sentiments, and tend to assign them symbolic, religious and ritual value, making these trees iconic landscape and heritage elements, and important landmarks in urban areas. Whenever old trees characterize with their presence particular places, they become part of the place identity, making it impossible to describe history and present condition of such places without their presence. In several cultures, old trees are symbol of local history and cultural heritage, recalling historic events and personalities.

INCREASE YOUR VOCABULARY

III. Give English equivalents to the following words and word-combinations:

дерева, регулювання клімату, екосистема, парникові гази, впливати, фактор охолодження, небезпечний, збагачувати, рослини, захист навколишнього середовища, міська територія, вплив, планування сучасного міста, швидкий ріст, несприятливий, взаємодія, ботанічні садки, екзотичні види, флора, захист рослинного різноманіття, пасивний відпочинок, символ культурної спадщини.

IV. Look through paragraphs 1,2,3 again and say what words in the text have the same meaning:

- environment;
- reduction;
- effect;
- hazard;
- benefit;
- location;
- great;
- close;
- extreme;
- fast

V. Which words in the text correspond to the definitions?

a) perennial plant with single woody self-supporting stem or trunk usually unbranched for some distance above ground
b) ornamental grounds for public resort; piece of ground devoted to growing flowers, fruit or vegetables
c) enclosure in town ornamentally laid out for public recreation
d) living organism capable of living wholly on inorganic substances and having neither power of locomotion nor special organs of sensation or digestion, member of the vegetable kingdom.

VI. Match each word on the left with a word on the right. Then use them to speak about plants in urban environment:

urban, ecosystem, climatic, greenhouse, water, strong, slope, traffic, air, public-health, botanical, exotic	gases, run-off, winds, species, gardens, regulation, erosion, benefits, services, noise, pollution, environment

VII. One word doesn`t belong to each of the following groups. Cross out the word:

a) garden, orchard, park, wood, house, forest
b) city, settlement, road, town, village, campus
c) tree, flower, nest, bush, shrub, grass
d) land, book, earth, ground, soil

VIII. What part of speech do the following words belong to? Underline suffixes and translate the words:

environment, particularly, different, environmental, climatic, regulation, dangerous, capacity, densely, protection, erosion, location, greatest, impervious, management, unfavourable, resistance, carefully, general, discussion, historical, European, acclimatization, nineteenth, unhealthy, relationship, peaceful, heritage.

CHECK YOUR GRAMMAR

IX. Use the following verbs to complete the sentences below (in the Present Indefinite Active or Passive):

interfere, affect, contribute, review, provide, unintegrate, consider, require, manage, ignore, disregard

It is well-acknowledged that plants in urban areas … multiple ecosystem services. They … improving ambient quality and mitigating negative impacts of human presence, beautifying the anthropic environment, and promoting place identity and cultural heritage. However, the existence of plants in general, and trees in particular, cannot be … independent on urban activities and infrastructures. Release of plant volatile compounds is profoundly … in urban environments, in turn modifying plant relationships with other living organisms, both plants and animals, and affecting air chemistry and quality. Plants also … with stone artifacts, cultural and historical heritage. Plant-human coexistence … precise and adequate managing measures, which have often been … in cities' government and planning. Plants and humans (and human infrastructures) are frequently … as independent from each other and plant requirements are often … , thus causing difficult or erroneous management and environmental damage. We … some of the most important ecosystem services provided by plants in urban environment, and also focus on possible negative effects of plants that may become relevant if urban vegetation is improperly … and … in proper city planning, both of historical centers and of new towns or suburbs.

X. Form degrees of comparison from the following adjectives:

independent, difficult, important, negative, dangerous, dense, strong, high, great, good, small, unfavourable.

XI. Insert the necessary prepositions in the following sentences:

for, in, through, of, among, as, along

1. It is worth to underline that the social role is … the leading ussues … establishing botanical gardens … developing countries.
2. … the town of Bolsena, central Italy, pine trees are maintained in spite. … their precarious equilibrium … 'witness' … the anthropic landscape designed … the lake shore.
3. … the historic Florentine garden 'Boboli' and old Cedrus being a representative … the ancient flora … the garden itself is maintained … external protections.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Make up a dialogue using the following words and word-combinations:

- to be known
- to benefit
- urban environments
- dangerous water run-off
- to contribute
- to provide
- the greatest impact on
- to use
- modern cities
- to be attributed to
- to become
- public urban parks
- to fulfill
- symbolic, religious and ritual value
- to appreciate
- to characterize

XIII. Speak about:

a) the environmental beneficial services of plants in urban area;
b) the connection between human well-being and green areas integrated in the metropolitan context.

XIV. Read the verse and express your attitude to the urban flowers.

HIGHWAY TULIP
(by Abram Bom R.)

Like a ray of hope I stand truly strong.
you have thrown away knowingly wrong.
my roots deep inside the tarred road.
I have learnt for survival on the dot.
No water for my thirsty soul,
No nutrients for my empty bowl,
No protection from the scorching heat,

No respite from people's threat.
I watch them go in my life,
With no hurt in my hive.
Rejected for I was not beautiful indeed.
Dejected for I was not useful in deed.
Like a desert soul among the desert sand,
Biting the heat among the soulful rant.
Today I stand tall amidst all,
Enrobed in golden call.
By the love of my mother,
Who lulled in the couch of hers.
Today I wait for my life ever,
Enclaved in hues forever.
I am no longer an unknown name.
I seek no longer fame.
All I do is the hope for all,
That journey is for the call.
I am your highway tulip,
Life is for you to live.

XIV. Read the verse and arrange its stanzas according to their meaning. Express the main idea of the verse.

(by Shulga I.V.)

Growth of leaves on oaks,
Limes, birches, chest-nut trees
Which warm wind likes to stroke
And we are glad to breathe

Cannot be found here
In the realm of the cars,
Bikes, lorries, buses where
Fog covers Sun, Moon, stars:

Under the shade of maples
We recreate and rest,
Even wild tiny apples
Picking. The very zest

Walking across the alley
Early in May you can
See lilies of the valley
Under the trees. A glen

Gas's released from traffic,

Factories, plants is thick.
Hey! Urban green patch! Let it
Be neutralized with quick

Where exotic species –
Trees – monuments of past,
Our History witness:
Our memories last!

Of green areas – nature
Living, exciting, nice!
In cities – fine adventure –
Beauty and gladness's prize!

In oxygen of theirs
Given off from green plants,
Hiding from sun heat jeers
In ancient garden remnants.

UNIT2

I. Read and memorize the following words and word-combinations:

aesthetic (adj) – естетичний
promote (v) – сприяти
accomplish (v) – здійснювати, виконувати
protection (n) – захист
issue (n) – питання, проблема
refuge (n) – притулок
shelter (n) – притулок, захист
nest (n) – гніздо
survival (n) – виживання
diversify (v) – зробити різноманітним
occurrence (n) – місцезнаходження, розповсюдження
density (n) – густота, щільність
resident (n) – мешканець
define (v) – визначати
peri-urban (adj) – приміський
unutilize (v) – не використовувати
reservoir (n) – резервуар, запас, джерело
species (n) – вид, рід
enhance (v) – збільшувати, посилювати
apply (v)– застосовувати
patch (n) – ділянка землі
habitat (n) – мешканець

predator (n) – хижак
valorization (n) – встановлення та підтримка ціни шляхом державних заходів
autochthonous (adj) – автохтонний, місцевий, первісний
mutualistic (adj) – мутуалістичний, симбіотичний
prey (n) – здобич
imply (v) – містити (в собі), означати
threaten (v) – погрожувати
alien (adj) –чужий, невластивий
emerge (v) – з'являтися
pollution (n) – забруднення

Word – combinations

well recognized – добре визначений
native animal – дика тварина
agricultural landscapes – аграрні ландшафти
to be in crucial importance – мати вирішальне значення
to be particularly of interest – бути особливо цікавим
to be underestimated – бути недооціненим
scientific purposes – наукові цілі
artificial origin – штучне походження
unusual consequences – незвичайні наслідки
fragile equilibrium – ламка рівновага
disabled people – інваліди
well – maintained parks – парки, які добре доглядаються

II. Read the text and be ready to answer the following questions:

1. What contributes to understand the role of urban biodiversity for human well-being?
2. What do urbanized green areas often become?
3. What do trees in urban landscape protect?
4. What are plants of crucial importance for?
5. Where is flora well-managed and highly diversified?
6. Is the occurrence of wildlife highly appreciated by human?
7. What are bird diversity and density recognized as?
8. What is an important tool to enhance biodiversity in urban environment?
9. What does successful species reintroduction depend on?
10. What do urban green areas result from?
11. What unusual consequences can occurin biodiversity protection?
12. What are further indirect benefits by urban green areas?

TEXT
BIODIVERSITY AND BIOECONOMY

Despite the extensive use of the term "biodiversity" in policy-making and science, this concept is often not well-recognized among people, which usually tend to confer biodiversity an aesthetic or emotional rather than a functional and economic value.

Promoting and accomplishing interdisciplinary studies (i.e., natural and social scientists working together) contribute to understand which is the role of urban biodiversity for human well-being, how people perceive and appreciate plant species richness and how it may be linked to ecological issues such as diversity protection and provision of ecosystem services.

Urbanized green areas often become islands and refuges for native animal and plant biodiversity. This important role of remnant vegetation and natural areas in urban planning has been highlighted recently. Trees in urban landscapes protect wildlife as they do in agricultural landscapes, supplying appropriate sites for food, shelter and nest. Plants are therefore of crucial importance for the survival of metropolitan fauna, particularly for the most mobile organisms, such as birds and bats. Botanical gardens, where flora is well-managed and highly diversified, represent a sheltered urban environment also for insects. The occurrence of wildlife in densely inhabited areas, particularly of songbirds, is highly appreciated by human. Therefore, bird diversity and density are recognized as cultural value, increase well-being, and provide ecosystem services for city residents.

The contribution of urban green areas to a more general concept of "biodiversity," including cultural diversity and social integration is also important. Under this respect, the concept of "Third Landscape" was proposed to define those spaces between urban and peri-urban areas that have not been occupied yet by human activities. As long as these environments are unutilized and left to natural landscape evolution, they can be considered as "genetic reservoirs of species diversity".

An important tool to enhance biodiversity in urban environment is species reintroduction, which can be applied whenever connectivity between green patches is poor and rural habitats presenting priority to urbanization experienced strong modification. However, successful species reintroduction depends on limiting factors such as presence and pressure of predators, habitat quality, and social factors.

From an ecological perspective, it should not be underestimated that urban green areas result from human initiatives led by city planning, heritage conservation, scientific purposes, or others. All of these foster and preserve biodiversity but have artificial origin, which may have unusual consequences in biodiversity protection and valorization. For example, green areas in cities usually host both autochthonous and non-autochthonous species, and native and non-native mutualistic, companion, or antagonistic organisms, such as pollinators, predators, and preys. Altogether, this implies a fragile equilibrium in which positive

outcomes for biodiversity conservation and human well-being might be threatened by the potential spread of alien species.

Further indirect benefits by urban green areas are the provision of services like food. Urban farming is emerging as a major field to preserve green spaces in urban areas while providing a community benefit, an income to poor or unemployed residents, and a pleasant workspace for disabled people, therefore also fulfilling an important social goal. Moreover, urban vegetable gardens and other farming systems may help shortening the food supply chain, thus avoiding costs and ecological problems associated to food transportation (e.g., road traffic and pollution) and conservation (e.g., refrigeration).

The added value to residential areas is another important side benefit of well-managed green areas. For example, houses close and with access to well-maintained parks and gardens may have additional economic value.

INCREASE YOUR VOCABULARY

III. Give the Ukrainian equivalents to the following words and word – combinations:

extensive use, science, to confer, economic value, interdisciplinary studies, social scientists, human well-being, plant species richness, provision of ecosystem services, prior to urbanization, successful, habitat quality, social factors, ecological perspective, human initiatives, to host, non-native, pollinators, positive outcomes, potential spread, urban farming, major field, unemployed residents, pleasant workspace, to fulfil, urban environment.

IV. Complete the table to make word families. Use the dictionary to help you. In case there is no corresponding derivative put a NO sign.

Noun	Verb	Adjective	Adverb
diversity			
		emotional	
			usually
		economic	
	contribute		
richness			
	protect		
provision			
			particularly

V. Confirm or contradict the following statements using the introductory phrases given on page 135.

1. The concept of ‘biodiversity’ is often well-recognized among people.
2. Promoting and accomplishing interdisciplinary studies enable to understand the role of urban biodiversity for human well-being.
3. Urbanized green areas often become islands and refuges for native animal and plant biodiversity.

4. Trees in urban landscapes don`t protect wildlife.
5. Plants are not important for the survival of metropolitan fauna.
6. Botanical gardens represent a sheltered urban environment also for insects.
7. Wildlife in densely inhabited areas is highly appreciated by human.
8. Bird diversity and density are not recognized as cultural value.
9. The concept of 'biodiversity' includes cultural diversity and social integration.
10. Species reintroduction is an insignificant tool to enhance biodiversity in urban environment.

VI. Match the words having the opposite meaning:

Diversity	domestic
Natural	to perish
Richness	rural
to link	monotony
Wild	to reduce
to survive	poverty
to increase	Loss
urban	artificial
Positive	to separate
Benefit	negative

VII. What do the underlined words in the following sentences mean? Choose the best definition:

1. People usually tend to confer biodiversity an aesthetic and emotional <u>value.</u>

a) meaning
b) importance
c) insignificance

2. Promoting interdisciplinary studies helps understand the <u>role</u> of urban biodiversity.

a) function
b) place
c) influence

3. It may be <u>linked</u> to ecological issues.

a) recognized
b) provided
c) connected

4. Urbanized green <u>areas</u> often become islands and refuges for native animal and plant diversity.

a) regions
b) states
c) fields

5. Bird diversity and density are recognized as cultural value.
a) difference
b) variety
c) version

6. Plants are important for the survival of metropolitan fauna.
a) flowers
b) predators
c) animals

7. Urban farming is emerging to preserve green spaces in urban areas.
a) to protect
b) to control
c) to keep

VIII. Find in the text the words which correspond to the definitions:

a) systematic and formulated knowledge;
b) unlikeness; different kind;
c) organized being endowed with life sensation and voluntary motion;
d) feathered vertebrate;
e) important town;
f) small invertebrate animal, with body divided into segments and several pairs of legs.

CHECK YOUR GRAMMAR

IX. Match the beginnings of the sentences with their endings:

1. Promoting and accomplishing interdisciplinary studies	a) protect wildlife as they do in agricultural landscapes
2. Urbanized green areas often	b) for the survival of metropolitan fauna
3. This role of remnant vegetation and natural areas	c) contribute to understand which is the role of urban biodiversity for human well – being
4. Trees in urban landscapes	d) recognized as cultural value
5. Trees in urbanized green areas	e) in urban planning has been highlighted by many researchers recently
6. Plants are of crucial importance	f) is highly appreciated by humans
7. Botanical gardens represent	g) human initiatives led by city planning, heritage conservation, etc
8. The occurrence of wildlife in densely inhabited areas	h) become islands and refuges for plants and animals

9. Bird diversity and density are	i) a sheltered urban environment also for insects
10. Urban green areas result from	j) supply appropriate sites for food, shelter and nest

X. Arrange the words to form sentences:

1. work, natural, together, scientists, social, and.
2. perceive, plant, people, and, species, appreciate, richness.
3. is, gardens, well-managed, flora, diversified, and, highly, botanical, in.
4. ecosystem, provide, city, for, diversity, and, services, residents, bird, density.
5. species, tool, in, environment, an, to enhance, is, important, urban, biodiversity, reintroduction.
6. cities, green, host, areas, both, in, autochthonous, usually, nonautochthonous, and, services.
7. be, alien, might, well-being, threatened, human, by, species.
8. preserves, farming, spaces, urban, green, areas, in, urban.
9. depends, successful, factors, reintroduction, limiting, on, species.
10. gardens, help, vegetable, may, urban, chain, the food, shortening, supply.

XI. Translate into English:

1. Незважаючи на поширене вживання терміну «біорізноманіття» в науці, ця концепція часто погано визнається серед тих, хто зазвичай схиляється надавати біорізноманіттю більш естетичну та емоційну цінність, аніж функціональну та економічну.
2. Міждисциплінарні вивчення сприяють розумінню того, яку роль відіграє біорізноманіття для добробуту людей, як люди розуміють та цінують багатство рослинних видів.
3. Міські озеленені території часто стають притулком для диких тварин та біорізноманіття рослин.
4. Дерева в місті захищають дику природу, забезпечуючи її відповідними місцями для їжі, притулку та гніздування.
5. Рослини в містах мають величезне значення для виживання тварин, особливо таких, як птахи та кажани.
6. Ботанічні сади представляють собою захищене міське середовище також для комах.
7. Цей процес сприяє зберіганню біологічного різноманіття, але має штучне походження, що може викликати незвичайні наслідки для захисту біорізноманіття.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Translate these word-combinations. Compose your own sentences with them.

1. economic value

2. natural scientists
3. human well-being
4. plant species richness
5. ecological issues
6. ecosystem services
7. plant diversity
8. agricultural landscapes
9. botanical gardens
10. urban green areas
11. species reintroduction
12. heritage conservation
13. community benefit

XIII. Make the plan of the text and retell it.

XIV. Read the extract from the Bible about creation of flora and fauna by God. Discuss it in pairs.

Then God said, "Let the land produce vegetation: seed-bearing plants and trees on the land that bear fruit with seed in it, according to their various kinds." And it was so. The land produced vegetation: plants bearing seed according to their kinds and trees bearing fruit with seed in it according to their kinds. And God saw that it was good. And there was evening, and there was morning—the third day.

And God said, "Let the land produce living creatures according to their kinds: the livestock, the creatures that move along the ground, and the wild animals, each according to its kind." And it was so. God made the wild animals according to their kinds, the livestock according to their kinds, and all the creatures that move along the ground according to their kinds. And God saw that it was good.

(Genesis 1: 11-12, 24-25)

MODULE II
ECOLOGY OF FORESTS AND PARKS
UNIT 3

I. Read and memorize the following words and word-combinations:

silviculture (n) -	лісівництво
woodland (n) -	лісиста місцевість
essencial (adj) -	істотний, необхідний
breathe (v) -	дихати
protect (v) -	захищати
behave (v) -	поводити себе
survive (v) -	виживати
attempt (v) -	намагатися

purpose (n) -	мета
fuel (n)-	паливо
complexity (n)-	складність
connote (v) -	мати додаткове значення
nutrient (n) -	поживна речовина
focal (adj) -	центральний
diverse (adj) -	різний
approach (n) -	підхід
species (n) -	вид, рід
intricate (adj) -	заплутаний, важкий
guantity (n) -	кількість
heterogeneous (adj) -	різнорідний
environment (n) -	оточуюче середовище
enable (v) -	давати змогу
fern (n) -	папороть
enhance (v) -	збільшувати, посилювати
abundance (n) -	велика кількість
timber (n) -	лісоматеріали
turkey (n) -	індик
diminish (v) -	зменшувати (ся)
mimic (v) -	імітувати
disturbance (n) -	тривога, занепокоєння
retention (n) -	утримання, зберігання
beetle (n) -	жук

Word - combinations:

forest management -	обережне ставлення до лісу
thriving process -	процес буйного росту
inhabited area -	населена територія
infinite number -	нескінченна кількість
spatial arrangements -	просторові заходи, плани
relative humidity -	відносна вологість
terrestrial plant communities -	групи наземних рослин

II. Read the text and summarize the main points under the following headings:

1) forest ecology;
2) surrounding issues of forest ecology:
3) forest ecology relationship to other branches of ecology;
4) community diversity and complexity of forests.

TEXT

FOREST ECOLOGY
(Part A)

Forest ecology is the scientific study of the interrelated patterns, processes, flora, fauna and ecosystems in forests. The management of forests is known as forestry, silviculture, and forest management. A forest ecosystem is a natural woodland unit consisting of all plants, animals and micro-organisms (biotic components) in that area functioning together with all of the non-living physical (abiotic) factors of the environment. The forest ecosystem is very important.

Forests have an enormously important role to play in our ecosystem. They are essential for humans to breathe. They also serve as homes for millions of people, and billions depend on forests in some way. Likewise, a large proportion of the world's animal species live in forests. That's why we absolutely must protect them. Forest ecology helps understand life in the forest. It shows how living organisms behave, live and survive. Furthermore, forest ecology attempts to provide an understanding of the thriving process of forests. Similarly, many forests are also used for economic purposes such as fuel and wood products. Therefore, understanding how forests are managed is also a goal of forest ecology.

Forest ecology is one branch of a biotically-oriented classification of ecological study types (as opposed to a classification based on organizational level or complexity, for example population or community ecology). Thus, forests are studied at a number of organizational levels, from the individual organism to the ecosystem. However, as the term forest connotes an area inhabited by more than one organism, forest ecology often concentrates on the level of the population, community or ecosystem. Logically, trees are an important component of forest research, but the wide variety of other life forms and abiotic components in most forests means that other elements, such as wildlife or soil nutrients, are often the focal point. Thus, forest ecology is a highly diverse and important branch of ecological study.

Forest ecology studies share characteristics and methodological approaches with other areas of terrestrial plant ecology. However, the presence of trees makes forest ecosystems and their study unique in numerous ways.

Since trees can grow larger than other plant life-forms, there is the potential for a wide variety of forest structures (or physiognomies). The infinite number of possible spatial arrangements of trees of varying size and species makes for a highly intricate and diverse micro-environment in which environmental variables such as solar radiation, temperature, relative humidity, and wind speed can vary considerably over large and small distances. In addition, an important proportion of a forest ecosystem biomass is often underground, where soil structure, water quality and quantity, and levels of various soil nutrients can vary greatly. Thus, forests are often highly heterogeneous environments compared to other terrestrial plant communities. This heterogeneity in turn can enable great biodiversity of species of both plants and animals. Some structures, such as tree ferns may be keystone species for a diverse range of other species. A number of factors within the forest affect biodiversity: primary factors enhancing wildlife abundance and

biodiversity; the presence of diverse tree species within the forest and the absence of even aged timber management. For example, the wild turkey thrives when uneven heights and canopy variations exist and its numbers are diminished by even aged timber management. Forest management techniques that mimic natural disturbance event can allow community diversity to recover rapidly for a variety of groups including beetles.

INCREASE YOUR VOCABULARY

III. Give English eguivalents to the following words and word-combinations:

екологія лісу, науковий, екосистема, лісівництво, природний, складатися з, функціонувати разом, оточуюче середовище, важлива роль, людина, дихати, залежати від, види тварин, життя, виживати, забезпечувати, економічні цілі, галузь, класифікація, рівень, компонент, дослідження, характеристика, багаточисельні шляхи, вітер, маленькі відстані, підземні, порівнювати, наріжний камінь, першорядний.

IV. Complete the table to make word families. Use the dictionary to help you. In case there is no corresponding derivative put a No sing.

Noun	**Verb**	**Adjective**	**Adverb**
ecology			
		scientific	
	interrelate		
management			
			adsolutely
		economic	
	orient		
population			
		organizational	
	radiate		

V. Find the terms in the text which describe the following:

a) science and art of managing forests
b) branch of biology dealing with living organisms: habits, modes of life, and relations to their surroundings
c) organized being endowed (more or less perceptibly) with life, sensation, and voluntary motion
d) large tract covered with trees
e) serving as or providing nourishment
f) wood prepared for building, carpentry
g) air in more or less rapid natural motion

VI. What do the underlined words in the following sentences mean?

1. A forest ecosystem is a natural woodland unit which consists of plants, animals and microorganisms.
   a) describes
   b) draws
   c) includes
2. The forest ecosystem is very important.
   a) interesting
   b) significant
   c) big
3. Forests serve as homes for millions of animals.
   a) houses
   b) dwellings
   c) apartments
4. We must protect forests.
   a) help
   b) enclose
   c) save
5. Many forests are used for economic purposes.
   a) aims
   b) roles
   c) ideas
6. Forest ecology often concentrates on the level of the population, community or ecosystem.
   a) focuses
   b) shows
   c) stands

VII. Check you know the meaning of the phrasal verb *«to play»*. Match the verb on the right with its meaning on the left.

1. To avoid guarrels he decided to say "yes "to them	a) to be played out
2. The students took an active part in the discussion of her report at the conference	b) to play around
3. The research method is outdated now	c) to play along
4. They manipulated the conclusions of this case	d) to play up

VIII. Confirm or contradict the following statements using the introductory phrases given on page 135.

1. Forestry ecology studies flora, fauna and ecosystems in forests.

2. Forestry is the management of forests.
3. A forest ecosystem doesn` t consist of plants, animals and microorganisms.
4. Forests play an important rule in our ecosystem.
5. Forests are essential for humans to breathe.
6. A small proportion of the world's animal species live in forests.
7. People must protect forests.
8. Forest ecology enables to understand thriving process of forests.
9. Forests are not used for economic purposes.
10. Forest ecology shows how forests are managed.
11. Forests are studied starting from the individual organism to the ecosystem.
12. Trees are a significant component of forest research.
13. Forest ecology is not very diverse and important branch of ecological study.
14. Trees cannot grow larger than other plant life-forms.
15. Soil structure, water guality and levels of various soil nutrients can be various.

CHECK YOUR GRAMMAR

IX. Find in the text word-combinations which consist of nouns. For example:

forest **(N)+**ecology **(N)-** forest ecology

Use the word-combinations in your own sentences.

X. Define the Tense and Voice of the verbs in the text sentences.

XI. Translate into English:

1. Екологія лісу вивчає світ рослин, тварин та екосистеми лісів.
2. Рослини, тварини, мікроорганізми входять до складу екосистеми лісу.
3. Лісова екосистема дуже важлива.
4. Ліси відіграють дуже важливу роль в нашій екосистемі.
5. Ліси необхідні для дихання людини.
6. Значна частина видів тварин живе в лісах.
7. Люди повинні захищати ліси.
8. Багато лісів використовують в економічних цілях.
9. Ліси вивчаються на різних організаційних рівнях.
10. Екологія лісів дуже різноманітна та істотна галузь екологічної науки.

XII. Make up questions to the following answers:

1. A:…?

   B: Forest ecology is the scientific study of the interrelated patterns, processes, flora, fauna and ecosystems in forests.
2. A:…?

   B: The management of forests is known as forestry, silviculture and forest management.
3. A:…?

   B: A forest ecosystem is a natural woodland unit consisting of all plants, animals and micro-organisms in that area functioning together with all of the non-living physical factors of the environment.
4. A:…?

   B: Yes, they do. Forests have an inormously important role to play in our ecosystem.
5. A:…?

   B: A large proportion of the world's animal species live in forests.
6. A:…?

   B: Yes, we must. We must protect forests.
7. A:…?

   B: Forests ecology helps understand life in the forest.
8. A:…?

   B: Forests ecology shows how living organisms behave, live and survive.
9. A:…?

   B: Many forests are also used for economic purposes such as fuel and wood products.
10. A:…?

    B: Yes, they are. Forests are studied at a number of organizational levels, from the individual organism to the ecosystem.
11. A:…?

    B: The presence of trees makes forest ecosystems and their study unigue in numerous ways.
12. A:…?

    B: There is the potential for a wide variety of forest structures because trees can grow larger than other plant life-forms.
13. A:…?

    B: An important proportion of a forest ecosystem biomass is often underground.
14. A:…?

    B: No, they are not. Forests are often not homogeneous environments.
15. A:…?

    B: The heterogeneity can enable great biodiversity of species of both plants and animals.

DEVELOP YOUR COMMUNICATIVE SKILLS

XIII. Translate these word-combinations. Compose your own sentences with them.

- ecosystems in forests
- natural woodland unit
- important role
- world's animal species
- to protect forests
- living organisms
- thriving process
- to be studied at various levels
- abiotic components
- terrestrial plant ecology
- diverse micro-environment
- wildlife abundance
- natural disturbance events

XIV. Retell the text according to your plan.

XV. Read the verse and reveal its main concept.

THE COMFORT OF THE WOODS
(by Amos Russel Wells)

I understand my comrades of the woods,
And they know me completely. Not an oak
But is my brother, strong, reserved, sincere.
Along the happy, peaceful forest ways
That wind so intimately through the trees
I hold a calm communion with my friends,
The pines and gentle birches. Day by day
Insensibly the bond is closer drawn
With beckons of branches, scents
Of subtle fragrance, melodies of birds,
Flickers of sunlight on the level leaves,
A thousand sweet enchantments pure and good.
This air dissolves my fretfulness and fears;
They fall into the green depths of the dell,
The cheery brooklet carries them away,
The bushes brush them off. I enter here
With furrowed brow and heavy-burdened heart;
But little unseen hands are softly pressed
Upon the frowns, and little unseen hands

Tug at the burdens till they all are gone.
Ah, what am I that these my friends
Should minister to me so graciously?
Do they not know my follies and my sin?
Yet with a mother's blind, forgiving love
They cleanse the foulness they will not see.
Nor do they only wait for me to come,
Withdrawn, expectant; but amid the din
Of cities, and upon the crowded streets,
I feel the brick and mortar fade away,
And find the woods around me once again,
Tall, shadowy, protecting, Once again
I hear the woodland murmurs like a hymn,
And on my troubled spirit lies once more
The peaceful benediction of the trees.

UNIT 4

I. Read and memorize the following words and word-combinations:

flux (n) -	течія, прилив
store (n) -	запас, резерв
contain (v) -	містити в собі
treefall (n) -	падіння дерев
alter (v) -	змінювати (ся)
biota (n) -	флора і фауна певного регіону
induce (v) -	викликати, стимулювати
rate (n) -	норма, пропорція, ступінь
instantaneous (adj) -	миттєвий, негайний
debris (n) -	скалки, уламки
decay (n) -	гнила частина, розпад
due (adj) -	обумовлений
arid (adj) -	сухий, посушливий
remain (v) -	залишатися
eerie (adj) -	моторошний, похмурий
maturity (n) -	зрілість
competition (n) -	змагання, конкуренція
thinning (ger) -	проріджeння
stage (n) -	стадія, фаза
transition (n) -	перехід, переміщення
evaporation (n) -	випаровування
increase (n) -	збільшення
duff (n) -	*амер*. гумус
repository (n) -	сховище, умістище
flooding (ger) -	затоплення

deprivation (n) - утрата, позбавлення
gigatonn (n) - міліард тонн

Word - combinations:

forest floor - лісовий ярус
steady state phase- фаза стійкого рівномірного стану
to be designated- бути призначеним
to be closely aligned- бути приєднаним
leaf litter- настил з листя
through grazing- через випас худоби
to be exacerbated- поглиблюватися загострюватися
human overuse- надмірне використання людиною

II. **Read the text and be ready to answer the following questions:**

1. What do forests accumulate?
2. What represents large stores of potential energy?
3. What radically alters the biota and the physical environment of forests?
4. Where does the rapid growth of the trees induce biotic and environmental changes?
5. Why does woody material decay slowly in comparison to most other organic materials?
6. What do tree trunks and branches remaining on the forest floor for long periods affect?
7. What are tree deaths caused from?
8. What stages are there to forest regrowth after a disturbance?
9. Why do forest trees store large amounts of water?
10. What studies are forest ecological ones sometimes closely aligned with?

TEXT
FOREST ECOLOGY
(Part B)

Forests accumulate large amounts of standing biomass, and many are capable of accumulating it at high rates, i.e. they are highly productive. Such high levels of biomass and tall vertical structures represent large stores of potential energy that can be converted to kinetic energy under the right circumstances.

The world's forests contain about 606 gigatonnes of living biomass (above- and below-ground) and 59 gigatonnes of dead wood.

Two such conversions of great importance are fires and treefalls, both of which radically alter the biota and the physical environment where they occur. Also, in forests of high productivity, the rapid growth of the trees induces biotic

and environmental changes, although at a slower rate and lower intensity than relatively instantaneous disturbances such as fires.

Woody material, often referred to as coarse woody debris, decays relatively slowly in many forests in comparison to most other organic materials, due to a combination of environmental factors and wood chemistry. Trees growing in arid or cold environments do so especially slowly. Thus, tree trunks and branches can remain on the forest floor for long periods, affecting such things as wildlife habitat, fire behavior, and tree regeneration processes.

Some trees leave behind eerie skeletons after death. In reality these deaths are actually very few compared to the amount of tree deaths that go unnoticed. Thousands of seedlings can be produced from a single tree but only a few can actually grow to maturity. Most of those deaths are caused from competition for light, water, or soil nutrients, this is called natural thinning. Singular deaths caused by natural thinning go unnoticed, but many deaths can help form forest ecosystems. There are four stages to forest regrowth after a disturbance, the establishment phase which is rapid increase in seedlings, the thinning phase which happens after a canopy is formed and the seedlings covered by it die, the transition phase which occurs when one tree from the canopy dies and creates a pocket of light giving new seedlings opportunity to grow, and lastly the steady-state phase which happens when the forest has different sizes and ages of trees.

Lastly, forest trees store large amounts of water because of their large size and physiological characteristics. They are therefore important regulators of hydrological processes, especially those involving groundwater hydrology, local evaporation, rainfall and snowfall patterns.

An estimated 399 million ha of forest is designated primarily for the protection of soil and water, an increase of 119 million ha has been since 1990.

Thus, forest ecological studies are sometimes closely aligned with meteorological and hydrological studies in regional ecosystem or resource planning studies. Perhaps more importantly the duff or leaf litter can form a major repository of water storage. When this litter is removed or compacted through grazing or human overuse, erosion and flooding are exacerbated as well as deprivation of dry season water for forest organisms.

INCREASE YOUR VOCABULARY

III. Give Ukrainian equivalents to the following words and word combinations:

forest ecologists, effects of large disturbances, amounts of standing biomass, to be capable, high rates, tall vertical structures, potential energy, under the right circumstances, dead wood, physical environment, high productivity, rapid growth, lower intensity, tree regeneration processes, to leave behind, unnoticed, a single tree, natural thinning, establishment phase, seedlings, a pocket of light, regulators of

hydrological processes, rainfall, meteorological studies, water storage, to be removed or compacted.

IV. What derivatives can you make with the words:

- forest
- ecology
- accumulate
- present
- energy
- relative
- compare
- mature
- establish
- regulate

V. Match the words having the opposite meaning:

to accumulate	moist
rapid	tamed
coarse	to thrive
arid	slow
to remain	dark
wild	to scatter
to decay	to leave
light	loose
to create	smooth
compacted	to destroy

VI. One word doesn't belong to each of the following groups. Cross out the word:

a) forest, leaves, trunk, bird, branch, twig
b) bear, hare, squirrel, wind, fox, wolf
c) drought, river, wilderness, desert, sultriness, heat
d) rainfall, precipitation, rock, snowfall, water, moisture

VII. Fill in the gaps with the suitable words from the list:

species, value, capacity, regeneration, space, high, parameter, intermediate, biotic, geographical, requirements, areas, scientists, resistance, storm, tolerance, dry, growth, low, ecological

The … potential of a particular … is a measure of its capacity to effectively compete in a given … area, ahead of other species, as they all try to occupy a natural … . For some … it has been quantified, as for instance by some … for central Europe. They take three groups of parameters:

- related to site … : tolerance to … temperatures, tolerance to … climate, frugality.
- specific qualities: shade … , height … , stability, longevity, … capacity.
- specific risks: … to late freezing, resistance to wind/ice … , resistance to fire, resistance to … agents.

Every … is scored between 0 and 5 for each considered … , and then a global mean … calculated. A value above 3.5 is considered … , below 3.0 low, and … for those in between.

VIII. Complete the following sentences with the correct form of the underlined words:

I. *Effect (n) / effect (v)*

1. Forest ecologists are interested in … of large disturbances such as wildfires.
2. The dean staff … a change in the examination time-table

II. *Amount (n) / amount (v)*

1. The students had a large … of work last week.
2. Forest losses caused by fires … to ten million hrivnas a year ago.

III. *Accumulate (v) / accumulation (v)*

1. Trees … a lot of biomass.
2. …. of chlorophyll takes place in plants.

IV. *Store (n) / store (v)*

1. Lange … of potential energy are represented by tall vertical tree structures.
2. The shed can … two tons timber.

V. *Combine (n) / combine (v) / combination (n)*

1. A … of environmental factors was researched by the scientists.
2. … harvested the cereals.
3. The investigators … different methods to study this phenomenon.

CHECK YOUR GRAMMAR

IX. Take one clause from each of two columns below to make one sentence. Make sure that your sentences make sense

1. Forests accumulate	a) induces biotic and environmental changes
2. Large stores of potential energy	b) remain on the forest floor for long periods
3. Two conversions of great importance	c) large amounts of standing biomass
4. The rapid growth of the trees	d) caused from competition for light, water, or soil nutrients
5. Woody material often referred to as coarse woody debris	e) are fires and treefalls
6. Tree trunks and branches can	f) be produced from a single tree
7. Some trees leave	g) can be converted to kinetic one under the right circumstances
8. Thousands of seedlings can	h) behind eerie skeletons after death
9. Most of those deaths are	i) to forest regrowth after a disturbance
10. There are for stages	j) decays relatively slowly in many forests

X. Arrange the words to form sentences:

1. capable, standing, forests, accumulating, are, of, biomass, rates, standing, high, at
2. energy, be, to, energy, potential, can, under, converted, circumstances, kinetic, the right.
3. are, conversions, two, and, fires, two, important, very, treefalls.
4. many, woody, decays, material, slowly, forests, in, relatively.
5. actually, to, can, only, seedlings, grow, a, maturity, few.
6. with, deals, the establishment, seedlings, in increase, rapid, phase.
7. happens, phase, a canapy, the thinning, is, after, formed.
8. large, forest, of, trees, water, store, amounts.

XI. Separate the words to form sentences:

1. Treesgrowinginaridorcoldenvironmentsdecayespeciallyslowly.
2. Singulardeathscausedbynaturalthinninggounnoticed.
3. Thetransitionphaseoccurswhenonetreefromthecanopydiesandcreatesapocketoflightgivingnewseedlingsopportunitytogrow.
4. Thesteadystatephasehappenswhentheforesthasdifferentsizesandagesoftrees.

XII. Find in the text sentences with the predicates in the Active Voice and convert them into the Passive Voice.

DEVELOP YOUR COMMUNICATIVE SKILLS

XIII. Make up your own dialogue basing on the text. Use the following expressions:

- to accumulate
- highly productive forests
- large stores of potential energy
- fires and treefalls
- to alter biota
- biotic and environmental changes
- woody material
- to decay slowly
- to affect wildlife habitat
- can be produced
- to store large amounts of water
- to be closely aligned
- forest organisms

XIV. Make up a summary to the text.

XV. Read the following verses and use their key words to describe woods.

THE CREED OF THE WOOD
(by Katharine Lee Bates)

A whiff of forest scent,
Balsam and fern,
Won from dreary mood
My heart's return,
From its discontent,
Joy's run-away,

To the sweet, wise wood
And the laughing day.
Simple as dew and gleam
Is the creed of the wood!
The Beautiful gave us life,
And life is good.
Be the world but a dream,
Let the world go shod
With peace, not strife,
For the Dreamer is God.

FOREST SONG
(by Katharine Lee Bates)

A song for the beautiful trees!
A song for the forest grand,
The Garden of God's own hand,
The pride of His centuries.
Hurrah! for the kingly oak,
For the maple, the sylvan queen,
For the lords of the emerald cloak,
For the ladies in golden green.

For the beautiful trees a song!
The peers of a glorious realm,
The linden, the ash, and the elm,
The poplar stately and strong,—
For the birch and the hemlock trim,
For the hickory staunch at core,
For the locust thorny and grim,
For the silvery sycamore.

A song for the palm,—the pine,
And for every tree that grows,
From the desolate zone of snows
To the zone of the burning line;
Hurrah! for the warders proud
Of the mountainside and the vale,
That challenge the thunder-cloud,
And buffet the stormy gale.

A song for the forest, aisled,
With its Gothic roof sublime,
The solemn temple of Time,
Where man becomes a child,

As he listens the anthem-roll
Of the voiceful winds that call,
In the solitude of his soul,
On the name of the All-in-All.

So long as the rivers flow,
So long as the mountains rise,
May the foliage drink of the skies
And shelter the flowers below;
Hurrah! for the beautiful trees!
Hurrah! for the forest grand,
The pride of His centuries,
The Garden of God's own hand.

FRESH AIR
(by Amos Russel Wells)

Gaily afield, this morning of the skies,
From earth's wide bowl a blessed draught I draw,
Air of the hilltops! air the sun first saw
Dimpling to greet him; air that flits and flies
From where the pond to where the meadow lies;
Crystalline air, that has no fleck or flaw;
Runaway air, itself its own best law,
Wild as the brooks from upland rocks that rise.
Bring me, sweet air, the courage of the hills.
A weary day's before me; murmur low
The meadow-charm that masters frets and ills,
The healthful secret that the woodlands know.
With all the daring joy of mountain rills
Into my surly, stagnant living flow!

UNIT 5

I. Read and memorize the following words and word-combinations:

ecosystem (n) - екосистема
light (n) - світло
heat (n) - спека
rock (n) - скеля, гірська порода
visibility (n) - видимість, видимий предмет
fern (n) - папороть
moss (n) - мох
lichen (n) - лишайник
fungus (*pl*-gi) - гриб, пліснява, цвіль, деревна губка, грибок
mammal (n) - саввець
reptile (n) - плазун
insect (n) - комаха
worm (n) - черв'як
obvious (adj) - очевидний, ясний
ubiquity (n) - всюдисущність
tangible (adj) - відчутний, реальний
species (n) - вид, рід
chief (adj) - головний
convert (v) - перетворювати
herbivore (n) - травоїдна істота
carnivore (n) - м'ясоїдна тварина, комахоїдна рослина
omnivore (n) - всеїдна істота
decompose (v) - розкладатися, гнити
scavenger (n) - тварина або комаха, що живиться падаллю
drop (v) - копати, падати
consume (v) - споживати
rely (v) - покладатися, довіряти
nitrogen (n) - азот
hydrogen (n) - водень

Word-combinations:

non – living parts - неживі частини
intangible factors - невідчутні фактори
solar radiation - сонячна радіація

II. Read the text and summarize the main points under the following headings:

1) biotic factors by type and function;
2) abiotic factors by type and function.**TEXT**

BIOTIC AND ABIOTIC FACTORS IN A FOREST ECOSYSTEM

An ecosystem is composed of two main components: biotic and abiotic factors. Biotic factors are the living parts of the ecosystem, such as plants, animals, insects, fungi and bacteria. Abiotic factors are the non-living parts of the ecosystem, which influence the size and composition of the living parts: these are components like minerals, light, heat, rocks, and water.

The most obvious features of any forest ecosystem are its trees, the dominant biotic feature. They dominate the ecosystem: both in terms of visibility and in terms of biomass. However, they are only one type of organism living in a forest. Other biotic factors include: shrubs, flowering plants, ferns mosses lichens fungi mammals birds reptiles insects, worms, microbes.

The most important abiotic feature of a forest ecosystem may not be obvious, despite its ubiquity and importance: sunlight. Tangible abiotic factors include soil, minerals, rocks, and water. But abiotic factors can be intangible, such as temperature, other types of radiation and the chemistry of soil and water.

Ecologists frequently group an ecosystem factors by what role they play in the system, rather than by what particular species they are. This is known as functional classification.

These functions relate to the movement of energy through an ecosystem, and trees - along with other photosynthetic plants - are the chief primary producers. This means that trees convert the sun energy into food energy, which is then used by other members of the ecosystem.

These other members of the ecosystem can also be categorized. Primary consumers are, for example, herbivores that eat the primary producers. Secondary consumers are the carnivores and omnivores that eat the primary producers. Decomposers are the scavengers, microbes and fungi that consume the droppings and the carcasses of other organisms.

The abiotic factors of a forest fall less obviously into functional classifications, but keep in mind that the energy transferred among the various biotic categories is itself a foundational abiotic element. This energy occurs in the form of solar radiation, which includes both visible light and heat (infrared).

Primary producers (plants like trees and shrubs) convert the light into carbohydrates, a form of energy that can be consumed by other organisms. The function of other abiotic factors relies on the minerals they contain, such as the nitrogen in the soil or the hydrogen in water molecules.

INCREASE YOUR VOCABULARY

III. Give English equivalents to the following words and word-combinations:

складатися з, рослини, екосистема, тварини, комахи, впливати, грибки, склад, домінуюча риса, ліс, кущ, квітучі рослини, ссавці, плазуни, найважливіший, незважаючи на, ґрунт, еколог, часто, відігравати роль, рух енергії, енергія харчів, розділяти на категорії, мікроби, передавати енергію, перетворювати світло, мінерали, молекули води.

IV. Form nouns from the following verbs with the help of noun distinct suffixes:

to compose, to dominate, to include, to radiate, to know, to relate, to move, to convert, to use, to categorize, to produce, to classify, to consume.

Use the nouns in your own sentences.

V. Match the antonyms:

to compose -	frost
main-	seldom
light-	minor
heat-	to raise
the most-	to decompose
frequently-	to be unable
to fall-	common
obvious-	darkness
particular-	vague
can-	the least

VI. Match the words on the left with the left with the words on the right and then use them in your own sentences:

biotic, living, obvious, forest, particular, functional, photosynthetic, chief, sun's, primary, various	features, species, classification, plants, parts, producers, factors, energy, ecosystem, categories, consumers

VII. Match the following terms with their definitions:

1. fern	a) class of animals having mammae for nourishment of young
2. moss	b) kinds of invertebrate limbless or apparently limbless creping animal
3. lichen	c) one of a large group of vascular cryptogams with feathery fronds
4. mammal	d) the ground, upper layer of earth in which plants grow
5. bird	e) minute living being, plant or

	animal (esp. of bacteria causing diseases & fermentation)
6. reptile	f) kinds of small herbaceous cryptogamous plant, some growing in bogs, others on surface of ground, trees, stones
7. worm	g) feathered vertebrate
8. microbe	h) animal or plant feeding on flesh
9. soil	i) crawling animal like a snake, a lizard, a tortoise, etc
10. carnivore	j) kinds of cellular cryptogamic plant (prob. fungus parasitic on alga) usu. of green, or grey, or yellow tint growing on & colouring rocks, treetrunks

VIII. What do the underlined words in the following sentences mean? Choose the best definitions:

1. An ecosystem is composed of two main <u>components</u>.
   a) schemes
   b) functions
   c) parts
2. Abiotic factors are <u>non-living</u> parts of the ecosystem.
   a) inorganic
   b) dead
   c) unnatural
3. These factors <u>influence</u> the size and composition of the living parts.
   a) touch
   b) affect
   c) make
4. The most obvious <u>features</u> of any forest ecosystem are its trees.

a) traits
b) traces
c) factors

5. Ecologists frequently group an ecosystem factors by their role in the system.
   a) classify
   b) characterize
   c) divide
6. Trees convert the sun energy into food energy.
   a) consume
   b) relate
   c) turn into
7. This energy occurs in the form of solar radiation.
   a) comes
   b) is found
   c) is founded

CHECK YOUR GRAMMAR

IX. Translate into English:

1. Біотичні та абіотичні фактори – головні компоненти екосистеми.
2. Рослини, тварини, комахи, грибки та бактерії входять до складу біотичних факторів.
3. Дерева – це домінуюча біотична характерна риса лісової екосистеми.
4. Ці функції відносяться до руху енергії.
5. Дерева перетворюють сонячну енергію в енергію їжі.

X. Arrange the following words to form sentences:

1. factors, the size, abiotic, influence, of, and, the, living, composition, parts.
2. dominate, trees, the, ecosystem, biomass, visibility, in, of, terms, and.
3. belong, shrubs, factors, ferns, to, mosses, mammals, insects, biotic.
4. rocks, tangible, minerals, are, soil, and, factors, water, abiotic
5. producers, chief, are, the, primary, trees.
6. energy, converted, the, sun, is, energy, trees, by, food, into.
7. producers, primary, consumers, primary, eat, herbivores, are, that, the, example, for.

XII. Ask questions to the following statements:

1. A: …?

B: An ecosystem is composed of two main components: biotic and abiotic factors.

2. A: …?

   B: Biotic factors are the living parts of the ecosystem.

3. A: …?

   B: Minerals, light, heat, rocks and water are abiotic factors.

4. A: …?

   B: Trees are the most obvious features of any forest ecosystem.

5. A: …?

   B: The most important abiotic feature of a forest ecosystem is sunlight.

6. A: …?

   B: Tangible abiotic factors include soil, minerals, rocks and water.

7. A: …?

   B: Yes, they can. Abiotic factors can be intangible, such as temperature, radiation, chemistry of soil and water.

8. A: …?

   B: Ecologists group an ecosystem factors by their role in the system.

9. A: …?

   B: Primary consumers are herbivores that eat the primary producers.

10. A: …?

    B: Decomposers are the scavengers, microbes and fungi that consume the droppings and the carcasses of other organisms.

11. A: …?

    B: Secondary consumers are the carnivores and omnivores that eat the primary producers.

12. A: …?

    B: Yes, it is. The energy transferred among the various biotic categories is itself a foundational abiotic element.

DEVELOP YOUR COMMUNICATIVE SKILLS

XIII. Make up your own dialogues about biotic and abiotic factors using the following key words and word-combinations:

ecosystem, biotic and abiotic factors, (non) living parts, composition, minerals, light, heat, rocks, water, trees, to dominate, animals, birds, insects, to include, sunlight, to be intangible, radiation, soil, to group on, species, role, functions, primary and secondary consumers, herbivores, carnivores, omnivores, decomposers, various categories, to contain, nitrogen, hydrogen.

XIV. Make a summary to the text.

XV. Fill in the gaps of the verse with the rhymed words from the list:

clocks, up, fur, advice, Earth, drops

Translate the verse into Ukrainian and say what biotic and abiotic factors are mentioned in it. What does the verse teach us?

WE AND NATURE
(by Shulga I.V.)

Don't make noise! You will frighten her-
Emerald lizard lying on the ….
Made of lichens and mosses of the rocks,
Basking in sunlight, like the time – in … .

Please, don't wave your hands: bird is in the shrub,
Singing a merry song which is raising …
To big grey clouds with warm rainy …
Falling on green trees, grasses, bushes, crops.

Don't leave dirty rubbish on the …
Where the blooming flower is worth
Watching, amusing' cos it is so nice,
You should respect the nature – great … !

MODULE III
TREES AND FLOWERS. THEIR PECULIARITIES AND STRUCTURE

UNIT 6

I. Read and memorize the following words and word-combinations:

vascular (adj) – судинний
root (n) – корінь
stem (n) – стебло
leaf (n) – листок
nutrient (n) – поживна речовина
oxygen (n) – кисень
carbohydrate (n) – водень
growth (n) – ріст
successive (adj) – послідовний
apical (adj) – верхівковий
meristem (n) –
cambium (n) – камбій
secondary (adj) – побічний
tip (n) – верхній кінчик
node (n) – вузол
attach (v) – прикріпляти
internode (n) – міжвузля
bud (n) – брунька
support (n) – підтримка
storage (n) – зберігання
anchorage (n) – закріплення
supplement (v) – поповнювати
fungal (adj) – грибковий
depot (n) – склад, сховище
branch (n) – гілка
trunk (n) – стовбур
bole (n) – стовбур
terminate (v) – закінчувати (ся)
axis (n) – вісь
tissue (n) – тканина
interconvert (v) –взаємно перетворювати
seedling (n) – сіянець
dwarf (n) – карлик
clump (n) – брила, грудка; група (рослин)
graze (v) – пасти(сь)
survival (n) – виживання
flush (n) – розпускання листя
seed (n) – насіння

epidermis (n) – епідерма
knit (v) – скріплювати(ся)
invest (v) – надягати
cutin (n) – воскова водовідштовхуюча речовина у кутикулі рослин
cuticle (n) – кутикула, захисний шар, що вкриває епідерміс рослини
desiccation (n) – випаровування, висушування
intersperse (v) – розкидати
vapour (n) – пара

Word – combinations

principal photosynthetic organs – основні органи фотосинтезу
free exchange – вільний обмін
annual growth rings – річні кільця росту
conical layers – конічні шари
shoot apex – верхівка пагону
celldivision – ділення клітин
ultimatesource – основне джерело
abovegroundparts – надземні частини
food conduction – проведення їжі
toppling over – падіння
enormous quantities – величезні кількості
nitrogen – fixing microorganisms – мікроорганізми, що утримують азот
lowerpart – нижня частина
totally inactive – повністю пасивний
long leaf pine – довголисткова сосна
grass stage – трав'яниста фаза

II. Read the text and be ready to answer the following questions:

1. What major organs are trees as vascular plants organized into?
2. What organs of trees are principal photosynthetic ones?
3. Where is a region of new tree cell division?
4. Where is the cambium layer located?
5. What is the stem divided into?
6. What is a tree node?
7. What is a tree internode?
8. What are leaves and stems called together?
9. What does the stem provide?
10. What do roots provide?
11. What processes take place in shoot apical meristems?

TEXT

GENERAL FEATURES OF THE TREE BODY

As vascular plants, trees are organized into three major organs: the roots, the stems, and the leaves. The leaves are the principal photosynthetic organs of

most higher vascular plants. They are attached by a continuous vascular system to the rest of the plant so that free exchange of nutrients, water, and end products of photosynthesis (oxygen and carbohydrates in particular) can be carried to its various parts.

Let us study growth regions of a tree. Longitudinal section of a young tree shows how the annual growth rings are produced in successive conical layers. Shoot apex, the extreme tip of which is the apical meristem, or primary meristem, a region of new cell division that contributes to primary growth, or increase in length, is the ultimate source of all the cells in the aboveground parts of the tree. Segment of a tree trunk showing the location of the cambium layer is a secondary meristem that contributes to secondary growth, or increase in thickness. The apex of a root tip is also an apical meristem and the ultimate source of all the cells of the root system.

The stem is divided into nodes (points where leaves are or were attached) and internodes (the length of the stem between nodes). The leaves and stem together are called the shoot. Shoots can be separated into long shoots and short shoots on the basis of the distance between buds (internode length). The stem provides support, water and food conduction, and storage.

Roots provide structural anchorage to keep trees from toppling over. They also have a massive system for harvesting the enormous quantities of water and the mineral resources of the soil required by trees. In some cases, roots supplement the nutrition of the tree through symbiotic associations, such as with nitrogen-fixing microorganisms and fungal symbionts called mycorrhizae, which are known to increase phosphorous uptake. Tree roots also serve as storage depots, especially in seasonal climates.

All the branches and the central stem of trees (the trunk or bole) terminate in growing points called shoot apical meristems. These are centres of potentially indefinite growth and development, annually producing the leaves as well as a bud in the axis of most leaves that has the potential to grow out as a branch. These shoot apical growing centres form the primary plant body, and all the tissues directly formed by them are called the primary tissues. As in the stems, the growing points of the roots are at their tips (root apical meristems); however, they produce only more root tissue, not whole organs (leaves and stems). The root meristem also produces the root cap that covers the outside of the root tip.

The shoot apical meristems do not appear different between long and short shoots, but the lower part of the meristem does not produce as many cells in short shoots. In some cases, it may be totally inactive. Shoot meristems in some species may interconvert and change the type of shoot they produce. For example, in the longleaf pine, the seedlings enter a grass stage, which may last as long as 15 years. Here the terminal bud on the main axis exists as a short shoot and produces numerous needle-bearing dwarf shoots in which there is little or no internode elongation. Consequently, the seedling resembles a clump of grass. This is probably an adaptation to fire, water stress, and perhaps grazing. The root volume, however, continues to grow, increasing the chance of seedling survival once the

shoot begins to grow out (i.e., the internodes start to expand). This process is called flushing.

The outermost layer of cells surrounding the roots and stems of the primary body of a vascular plant (including the leaves, flowers, fruits, and seeds) is called the epidermis. The closely knit cells afford some protection against physical shock, and, when invested with cutin and covered with a cuticle, they also provide some protection from desiccation. Stomata (pores) are interspersed throughout the epidermal cells of the leaves (and to some extent on the stems) and regulate the movement of gases and water vapour into and out of the plant body.

INCREASE YOUR VOCABULARY

III. Give the Ukrainian equivalents to the following words and word – combinations:

vascular plants, continuous systems, the rest of the plant, end products, various parts, growth regions, annual, an extreme tip, a region, to increase, a meristem, to contribute, a tree trunk, thickness, a root tip, internodes, long shoots, a structural anchorage, harvesting, mineral resources, nutrition, symbiotic associations, fungal symbionts, a central stem, development, to produce, numerous, needle – bearing, dwarf shoots, consequently, a root volume.

IV. Complete the following sentences with an appropriate word from the list. Make sure you use the correct one.

fulfill, aquatic, organic, to colonize, to require, modifications, plants, nutrients, competition, development

1. Land plants are descended from … plants.
2. The early aquatic plants required few … for structural support.
3. The surrounding water … the plant needs.
4. Primitive … began to invade the land.
5. … soils were not widely developed.
6. The earliest terrestrial plants first … bare rock near large water sources, such as oceans and lakes.
7. Generations of the plants recycled … (e.g. nitrogen, carbon and oxygen).
8. The plants contributed to the … of a rich organic soil.
9. … for available space, nutrients and sunlight intensified.
10. This process … the physiological and morphological complexity.

V. Explain the following terms:

- root
- stem
- leaf
- meristem
- cambium
- node

- bud
- trunk
- seed

VI. Complete the following sentences with the correct form of the underlined words:

1) Plant (n) / plant (v)

1. Trees are vascular … .
2. The students … some bushes near the university last week.

2) Growth (n) / grow (v)

1. The trees … on a fertile soil.
2. These are … regions of a tree.

3) Produce (n) / produce (v)

1. Crops are processed to get an agricultural … .
2. The plant … agricultural machinery.

4) Shoot (n) / shoot (v)

1. The plants … under favourable conditions.
2. The … develop fast early in April.

5) Change (n) / change (v)

1. Shoot meristems may … the type of shoot.
2. Growth … require particular attention of growers.

VII. What derivatives can you make with the words:

- to organize
- organ
- to continue
- to vary
- to grow
- thick
- to separate
- to provide

VIII. Check you know the meaning of the phrasal verb *"to grow"*. Match the verb on the right with its meaning on the left.

1. Last year the crop capacity of these fruit trees decreased.	to grow out
2. The seedlings of the lime – tree have sprouted.	to grow down
3. The seeds of the flowers matured a week ago.	to grow over
4. The plot was covered with weeds.	to grow up

IX. Match the words having the opposite meaning:

Major	to decrease
High	short
to continue	root
end	old
Long	low
New	to unite
to increase	to interrupt
to separate	minor
Apex	to disappear
to appear	start

CHECK YOUR GRAMMAR

X. Translate the following sentences into English using the Passive Voice:

1. Дерева поділяються на три головні органи.
2. Листя прикріплюються судинною системою до решти дерева.
3. Річні кільця росту утворюються у послідовних конічних шарах.
4. Цей процес називається розпусканням листя.
5. Таким чином забезпечується захист від випаровування.

XI. Choose the correct articles or use nouns without any article.

1. They are attached by (a/the) continuous vascular system.
2. (The/an) extreme tip of (the/a) shoot apex is (the/an) apical meristem.
3. (The/a) secondary meristem contributes to (the/a) secondary growth.
4. (The/a) stem is divided into (the/a) nodes and (the/an) internodes.
5. All (the/a) branches and (the/a) central stem of (the/a) trees terminate in (the/a) growing prints.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Speak about general features of the tree body using the following verb schemes:

… are organized into …
… are attached to …
… are produced …
… is divided into …
… contributes to …
… can be separated …
… provides …
… have …
… terminate …
… are called …
… may change …
… exists …

… continues …
… afford …
… are interspersed …

XIII. Read the poems and work in pairs discussing them.

LYRICS ABOUT A TREE
(by Edward Thomas)

I think I shall never see
A poem lovely as a tree.
A tree whose hungry mouth is pressed
Against the earth's sweet flowing breast;
A tree that looks at God all day,
And lifts her leafy arms to pray;
A tree that may in summer wear
A nest of robins in her hair;
Upon whose bosom snow has lain;
Who intimately lives with rain.
Poems are made by men like me,
But only God can make a tree.

ASPENS
(by Edward Thomas)

All day and night, save winter, every weather,
Above the inn, the smithy, and the shop,
The aspens at the cross-roads talk together
Of rain, until their last leaves fall from the top.

Out of the blacksmith's cavern comes the ringing
Of hammer, shoe, and anvil; out of the inn
The clink, the hum, the roar, the random singing—
The sounds that for these fifty years have been.

The whisper of the aspens is not drowned,
And over lightless pane and footless road,
Empty as sky, with every other sound
Not ceasing, calls their ghosts from their abode,

A silent smithy, a silent inn, nor fails
In the bare moonlight or the thick-furred gloom,
In tempest or the night of nightingales,
To turn the cross-roads to a ghostly room.

And it would be the same were no house near.

Over all sorts of weather, men, and times,
Aspens must shake their leaves and men may hear
But need not listen, more than to my rhymes.

Whatever wind blows, while they and I have leaves
We cannot other than an aspen be
That ceaselessly, unreasonably grieves,
Or so men think who like a different tree.

UNIT 7.

I. Read and memorize the following words and word-combinations:

landscape (n) – ландшафт
spread (v) – простирати (ся)
branch (n) – гілка
loose (adj) – просторий, широкий
canopy (n) – запона, навіс
beneath (adv) – внизу, нижче
care (n) – турбота
attractive (adj) – приваблюючий
tolerate (v) – терпіти, зносити; дозволяти
insect (n) – комаха
aphid (n) – попелиця
fuzzy (adj) – пухнастий, запушений
twig (n) – гілочка
damage (n) – пошкодження
temporary (adj) – тимчасовий
casual (adj) – випадковий, нерегулярний
prune (v) – підрізати
cluster (n) – кетяг, група
dangle (v) – вільно звисати, гойдатися
nutlet (n) – горішок
basswood (n) – американська липа
coarse (adj) – грубий, шорсткий
superior (adj) – найкращий, вищої якості
defoliate (v) – утрачати листя
permanent (adj) – постійний
sprout (v) – пускати паростки, рости
fall (n) – осінь *амер.*
drop (v) – подати
partial (adj) – частковий
alkaline (adj)– лужний
acidic (adj) – кислотний
even (adj) – рівний

backfill (v) – заповнювати, засипати заглибину
remove (v) – усувати
mulch (n) – мульча
shred (v) – різати або рвати на клоччя
suppress (v) – припиняти, стримувати
weed (n) – бур'ян
moisture (n) – волога
nutrient (n) – поживна речовина
rot (n) – гниття
soggy (adj) – вологий, просочений водою
manure (n) – гній
fertilize (v) – удобрювати
pale (adj) – блідий
avoid (v) – уникати
lawn (n) – галявинка, лужок, газон
distort (v) – перекручувати, викривляти

Word – combinations

plenty of room – широкий простір
medium-to-large – від середнього до великого
dappled shade – строката тінь
adverse conditions – несприятливі умови
sticky sap – липкий сік (*рослин*)
cottony scale – пухната луска
pine needles – соснові голки
well-drained soil – добре дренований ґрунт
dry spell – короткий проміжок посухи

II. Read the text and be ready to answer the following questions:

1. What kind of canopy do linden trees have?
2. Does a linden canopy allow grasses and flowers to grow beneath the tree?
3. Why are linden trees ideal for urban landscapes?
4. What is the problem with linden trees?
5. Is a linden tree easy or difficult to care for?
6. What do linden trees produce in summer?
7. What are American linden trees called?
8. What is produces of linden nectar?
9. Do European lindens need pruning off?
10. What is the best time for planting a linden tree?
11. What soils do linden trees prefer?
12. What mulch do lindens require?
13. Do established linden trees need annual fertilization?

TEXT
LINDEN TREE

If you have a large landscape with plenty of room for a medium-to-large tree to spread its branches, consider growing a linden tree. These handsome trees have a loose canopy that produces dappled shade on the ground below, allowing in just enough sunlight for shade grasses and flowers to grow beneath the tree. Growing linden trees is easy because they require little care once established. Linden trees are effective trees that are ideal for urban landscapes because they tolerate a wide range of adverse conditions, including pollution. One problem with the trees is that they attract insects. Aphides leave sticky sap on the leaves and cottony scale insects look like fuzzy growths on the twigs and stems. It is hard to control these insects on a tall tree, but the damage is temporary and the tree gets a fresh start each spring. Here are the linden tree varieties most often seen in North American landscapes. Little-leaf linden (*Tilia cordata*) is a medium to large shade tree with a symmetrical canopy. It is easy to care for and needs little or no pruning.

In late summer dangling clusters of nutlets replace the flowers. American linden, also called basswood *(T. americana)*, is best suited to large properties such as public parks because its wide canopy. The leaves are coarse and not as attractive as those of the little-leaf linden. The fragrant flowers that bloom in early summer attract bees, which use the nectar to make a superior honey. Unfortunately, a number of leaf-eating insects are also attracted to the tree and it is sometimes defoliated by the end of summer. The damage is not permanent and the leaves return the following spring. European linden *(T. europaea)*is a handsome, medium to large tree with a pyramid-shaped canopy. It can grow 70 feet (21,5 m.) tall or more. European lindens are easy to care for but they tend to sprout additional trunks that should be pruned off as they appear.

The best time for planting a linden tree is autumn after the leaves drop, although you can plant container-grown trees any time of year. Choose a location with full sun or partial shade and moist, well-drained soil. The tree prefers a neutral to alkaline pH but tolerates slightly acidic soils as well. Place the tree in the planting hole so that the soil line on the tree is even with the surrounding soil. As you backfill around the roots, press down with your foot from time to time to remove air pockets. Water thoroughly after planting and add more soil if a depression forms around the base of the tree. Mulch around the linden tree with organic mulch such as pine needles, a bark or shredded leaves. Mulch suppresses weeds, helps the soil hold moisture and moderates temperature extremes. As the mulch breaks down, it adds essential nutrients to the soil. Use 3 to 4 inches (7,5 to 10 cm.) of mulch and pull it back a couple of inches (5 cm.) from the trunk to prevent rot. Water newly planted trees once or twice a week for the first two or three months in the absence of rain. Keep the soil moist, but not soggy3. Well-established linden trees only need watering during prolonged dry spells. Fertilize newly planted linden trees the following spring. Use a 2-inch (5 cm.) layer of compost or a 1-inch (2,5 cm.) layer of rotted manure over an area roughly twice the

diameter of the canopy. If you prefer, you can use a balanced fertilizer such as 16-4-8 or 12-6-6. Established trees do not need annual fertilization. Fertilize only when the tree does not grow well or the leaves are pale and small, following the package directions. Avoid using weed and feed products designed for lawns over the root zone of a linden tree. The tree is sensitive to herbicides and leaves may become brown or distorted.

INCREASE YOUR VOCABULARY

III. Give the English equivalents to the following words and word – combinations:

липа, гарні дерева, достатньо сонячного світла, небагато турботи, широкий діапазон, забруднення, комахи, пухнаті паростки, кожної весни, види липи, симетричний навіс, нерегулярний ландшафт, запашні жовті квіти, громадський парк, липа з маленьким листям, найкращий мед, втрачати листя, найкращий час для висадки, місце, оточуючий ґрунт, навколо коріння, висока температура, щоб запобігти гниття, шар складеного добрива, зона коріння.

IV. Complete the table to make word-families. Use the dictionary to help you. In case there is no corresponding derivative put a NO sign.

Noun	Verb	Adjective	Adverb
	consider		
care			
		attractive	
	produce		
pollution			
	tolerate		
	require		
variety			
		symmetrical	

V. Give your definitions to the following terms from the text:

- canopy
- tree
- grass
- landscape
- stem
- leaf
- pruning
- bloom
- compost

VI. Complete the following sentences of the text with the appropriate words from the list. Make sure you use the correct form.

foliage, bees, lime, furniture, tiny, heart-shaped, deciduous, nectar-rich, drought, climates, instruments, profuse, well-groomed, shape, alkaline, rivers, adaptable, irrigation

Linden trees, also known as basswood or, in Britain, ... trees, are large … trees known for their attractive ... and form. The ... flowers are prized for the honey that ... produce from them and the wood was used historically for building ... and fine … . Their ... white flowers are ... in number, but fairly insignificant in appearance. The foliage, however, is quite stunning - large ... leaves that turn bright yellow in fall. Lindens are also known for having a ... look, usually starting out with a pyramidal … when young and developing a broad, symmetrical crown with age.

Hot, southern ... are hard on lindens, but at the other end of the temperature spectrum, they can take extremely cold conditions. They are fairly ... to soil type (sandy or clayey is fine), but tend to prefer moist, slightly ... conditions. They are not adaptable to highly acidic soils and … conditions will eventually catch up with linden trees if supplemental ...is not provided. In nature, they are commonly found growing near streams and ... .

VII. Confirm or contradict the following statements using the introductory phrases given on page 135.

1. You should consider growing a linden tree if you have a small landscape.
2. A loose canopy of a linden tree doesn't allow in enough sunlight for grasses and flowers to grow beneath the tree.
3. Linden trees are attractive and ideal for urban landscapes.
4. Linden trees don't attract insects.
5. In Britain linden trees are called lime trees.
6. A little-leaf linden tree (*Tilia cordata*) is often seen in Europe.
7. Dangling clusters of nutlets replace the flowers of lindens in late summer.
8. The fragrant flowers of lindens that bloom in early spring attract bees.
9. The additional trunks of European lindens should be pruned off.
10. The best time for planting a linden tree is in summer.
11. Linden trees don't prefer a neutral to alkaline pH soils.
12. Mulch can consist of shredded leaves, pine needles or bark.
13. Mulch doesn't add essential nutrients to the soil.

VIII. Match the words having the opposite meaning:

to spread	benefit
to attract	stinking
handsome	favourable
damage	stuffy
fuzzy	ugly

fragrant	to frighten off
fresh	to rise
adverse	thorny
coarse	to decrease
to drop	smooth

CHECK YOUR GRAMMAR

IX. Match beginnings of the sentences with their endings to make one sentence expressing conditions.

1. If you have a large landscape with plenty of room for a medium-to-large tree,	a) when clusters of fragrant yellow flowers are produced
2. Little care will be required	b) people plant lindens
3. If trees attract bees,	c) when summer is over
4. When aphides hatch,	d) superior honey will be made
5. Bees will pollinate linden trees	e) if a depression forms around the base of the tree
6. Dangling clusters of nutlets will replace the flowers	f) linden trees will spread their branches
7. You will water thoroughly after planting and add more soil	g) it will add essential nutrients to the soil
8. After the linden leaves drop in fall	h) they will leave sticky sap on the leaves of lindens
9. Mulch will suppress weeds, help the soil hold moisture	i) if you grow linden trees
10. When the mulch breaks down,	j) if you mulch around the linden tree with organic mulch

X. Arrange the words to form sentences:

1. should, for, you, care, linden, trees.
2. on, better, lindens, fertile, grow, soils.
3. one, popular, linden, of, is, park, the most, trees.
4. to plant, trees, fall, linden, a great, is, time.
5. before, will, themselves, the roots, spring, have, begins, established, growth.
6. should, near, not, foundations, lindens, you, plant.
7. may, these, the roots, damage, of linden, structures, trees.
8. are, shade, structurally, lindens, considered, trees, sound.
9. be, where, will, their, lindens, safely, can, limbs, the house, planted, overhang, eventually.
10. wood, to dropping, some, and, tree, prone, brittle, some, limbs, species, in, have, are, storms.

XI. Translate into English:

1. Вирощувати липи не важко тому, що коли ці дерева укорінились, вони не потребують багато турботи.
2. Ці дерева гарні й ідеально пасують міським ландшафтам.
3. Єдина проблема щодо цих дерев є те, що вони приваблюють комах.
4. Попелиця залишає липкий сік на листях липи.
5. Важко боротися з цими шкідниками на високих деревах.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Make up your own dialogue using the following words and word-combinations:

- large landscape
- to spread branches
- to produce dappled shade
- easy growing
- adverse conditions
- to attract insects
- cottony scale
- fuzzy growth
- temporary damage
- to get a fresh start
- linden tree varieties
- blooming flowers
- to be defoliated
- to be pruned off

XIII. Ask questions to the following statements:

1. Gardeners should water linden trees deeply every few weeks for their first few years.
2. One of the best things you can do to support the establishment of a young linden tree is to maintain a three to four inch layer of mulch over the root zone.
3. With such large leaves linden trees cover the blanket around themselves in fall, making for a big raking project – a great source of mulch for the garden.
4. Lindens send up sprouts from the base of the trunk or from exposed roots that may need to be cut back periodically.
5. The main pest associated with linden trees is aphides.
6. Aphides secrete a sugary substance that then combines with sooty, black mold to cover the ground.
7. It`s best to plant lindens out in the lawn.

XIV. Read the verse and answer the questions:

1. What trees are mentioned in the verse?
2. Where do the trees grow?

3. How old are the trees?
4. What is there beneath the trees?
5. Are the trees fragrant?
6. What insects are mentioned in the verse?
7. What are the linden flowers compared with?
8. Do you like the verse? Why?

THE LINDEN AVENUE

(by B. Pasternak)

A house of unimagined beauty
Is set in parkland, cool and dark;
Gates with an arch; then meadows, hillocks,
And oats and woods beyond the park.

Here, with their crowns each other hiding,
Enormous linden trees engage
In dusky, quiet celebration
Of their two hundred years of age.

And underneath their vaulted branches,
Across the regularly drawn
Symmetric avenues, grow flowers
In flower-beds upon a lawn.

Beneath the trees, on sandy pathways,
Not one bright spot relieves the dark,
Save-like an opening in a tunnel-
The distant entrance of the park.

But now the blossom-time is starting,
The walled-in linden trees reveal
And spread about within their shadow
Their irresistible appeal.

The visitors, in summer clothing,
While walking on the crunchy sand,
Breathe in unfathomable fragrance
Which only bees can understand.

This gripping scent is theme and subject,
Whereas-however well they look-
The flower-beds, the lawn, the garden,

Are but the cover of a book.

The clustered, wax-bespattered flowers
On massive trees, sedate and old,
Lit up by raindrops, burn and sparkle
Above the mansion they enfold..

UNIT 8

II. Read and memorize the following words and word-combinations:

bloom (n) – квіт, квітіння
shape (n) – форма, вид
bulb (n) – цибулина
identify (v) – встановлювати тотожність
perennial (n) – багатолітня рослина
annual (n) – однолітня рослина
spectacular (adj) – ефектний
star (n) – зірка
smooth (adj) – гладенький, рівний
fringe (v) – оздоблювати бахромою
ruffle (v) – морщити; брижити
single (adj) – один, самотній
swirl (v) – кружляти у вирі, утворювати вир
flame (v) – полум'яніти, палати
margin (v) – облямовувати, оторочувати
lance (n) – піка, спис
inch (n) – дюйм (2,54 см)
upright (adj) – вертикальний, прямий
phototropic (adj) – фототропний
bend (v) – нахилятися
cultivar (n) – сорт
fragrant (adj) – ароматний, духмяний
showy (adj) – ефектний, яскравий
tunicate (n) – оболонка
injury (n) – пошкодження
scale (n) – луска
bulbet (n) – маленька цибулина
filament (n) – тичинкова нитка
lobe (n) – доля, частина
pistil (n) – пестик
ovary (n) – зав'язь
stigma (n) – рильце

Word – combinations

distinct cup – чітка чашечка
to vary in size – змінюватися за розміром
bowl form – у формі чаши
striped blossoms – смугасте цвітіння (переважно плодових дерев)
foot-tall – фут *(30,48 см*) у висоту
pink-edged leaves – рожеве по краю листя
papery covering – паперове покриття
lateral buds – побічні бруньки

III. Read the text and be ready to answer the following questions:

1.What makes the tulip blooms easy to identify?
2. What is the root system of tulips like?
3. How many tulip species are there in the world?
4. What do tulips vary in greatly?
5. Are tulips perennials?
6. What blossom forms do tulip cultivars have?
7. How many petals do all tulip flowers consist of?
8. What colour don't tulip flowers come in?
9. What are shapes of tulip leaves?
10. What does phototropic nature of tulip mean?
11. Where do tulips flower?
12. What tulip cultivars are sweetly fragrant?
13. What proves that tulips are perfect flowers?

TEXT
TULIP

Tulips come in a rainbow of colours, making them a varied group of blooms for your garden. Many tulips have the distinct cup shape that makes the blooms easy to identify, but others have a slightly different shape. A tulip flower also has a distinct structure and bulb and root system that makes them unique. Learning the differences makes it easier to identify tulips.

Tulips, a large group of approximately 100 species, include over 3,000 varieties of flowering plants. The flowers vary greatly in size, shape and form, depending on the cultivar. Although they are perennials, some gardeners choose to grow tulips, especially the hybrid varieties, as annuals because their blooms aren't always as spectacular the second year.

The common tulip description includes a cup-shaped blossom, but some cultivars have a star or bowl form. All tulip flowers have six petals. The petals can be smooth, fringed or ruffled. Blossoms may be single or double.

The flowers come in nearly every colour except true blue. Some tulip blossoms are single-coloured, while others are striped, swirled, flamed from the

bottom or margined. Their leaves are usually medium green in colour, with a lance or oval shape.

Tulip plants range in size from 4 to 24 inches in height, with an upright form. Tulip blossoms open during the day but close in the evening. These plants are phototropic, meaning they bend toward the light.

Tulips are grouped according to whether they flower early, mid-season or late. Some tulips, for example, bloom early in the season around March or early April, while *Darwin* hybrids bloom mid-season, in April and at the beginning of May. *Parrot, Double Late and Lily-Flowered* tulips are late bloomers. They usually don't start blooming until May.

Most tulips aren't especially aromatic, but some cultivars such as *Couleur Cardinal*, a dark red variety, *Generaal de Wet*, a soft orange flower, and *Apricot Beauty* are sweetly fragrant as well as showy. Most fragrant tulips are early-blooming varieties, but several cultivars such as *Holland's Glory*, a 2-foot-tall cultivar with large reddish-orange blossoms, and *Silver Stream*, a creamy-white blossom with pink-edged leaves, bloom in mid-season.

Tulips grow from tunicate bulbs. This type of bulb has a thin, papery covering on the outside that protects the inner storage tissue from injury. Each bulb produces one flower. The center of the bulb holds the developing flower bud and is surrounded by the developing leaf and leaf scale.

The roots grow from the bottom of the bulb, called the basal plate. Lateral buds grow just above the basal plate. These lateral buds are smaller bulbs called bulblets. The bulblets eventually produce new tulip plants.

All tulips have a perianth composed of six petals and six sepals. Sepals are the small leaf-like structures at the bottom of the flower that once protected the flower bud.

Tulips are classified as perfect and complete flowers, which means the tulip structure contains both male and female parts. Each blossom contains six male reproductive organs called stamens. Stamens are composed of a filament topped by a pollen sac called an anther.

Each flower also contains a three-lobed female part called a pistil. Inside the pistil, a tube called a style connects an ovary to a stigma, a receptacle that collects the pollen during the fertilization process. Birds, insects and wind carry the pollen from the anther to the stigma. Once fertilized, fruit and seeds form the ovary inside.

INCREASE YOUR VOCABULARY

III. Give the English equivalents to the following words and word – combinations:

веселка кольорів, квіти, трохи відрізнятися за формою, цибулинна коренева система, унікальні, в залежності від сорту, однолітня рослина, квітіння у формі чашечки, гладенькі пелюстки, від нижньої частини, овальна форма, до 24 дюймів у висоту, закриватися увечері, схилятися у напрямку світла, цвісти рано, темно-червоний сорт, запашний, на зворотній стороні, внутрішня тканина, оточуватися листям, захищати

квіткову бруньку, складатися з, з'єднувати зав'язь, збирати пилок, запліднювати, насіння.

IV. Complete the words of the following sentences with the suitable suffixes of the speech parts:

1. The broad range of varia … in the morphology … and structure of nonreproduct … organ … within the angiospecm … has been outlin … .
2. Many vegetat … bud … soon … or lat … become flower bud … .
3. Flower bud … are modify … leave … borne on a short axis with very short internode … .
4. The floral ... axis has determinate grow … , in that at some point in cease … to grow.
5. Flower … are reproduct … tissue … of plant … .
6. Flower … may be borne sing … or in cluster … call … inflorescence … .
7. Fruit … are deriv … from the flor … part … of the angiosperm … plant.

V. One word doesn't belong to each of the following groups. Cross out the word:

a) bud, stamen, pistil, ovary, pollen, soil, petal;
b) garden, orchard, field, greenhouse, house, plot, kitchen-garden;
c) rose, tulip, tree, camomile, lily-of the-valley, violet, dandelion;
d) pink, smooth, red, orange, purple, blue, yellow.

VI. What do the underlined words in the following sentences mean?

1. A rainbow of colours makes tulips a varied group of <u>blooms</u>.
a) species
b) cultivars
c) flowers
d) kinds
2. Many tulips have the distinct cup <u>shape</u>.
a) size
b) form
c) height
d) variety
3. A tulip flower has a bull root <u>system</u>.
a) structure
b) group
c) line
d) scheme
4. Tulip species <u>include</u> over 3,000 varieties.
a) identify
b) show
c) mean
d) contain

5. Some gardeners choose <u>to grow</u> tulips as annuals.

a) take care
b) cultivate
c) look after
d) watch

VII. Complete the following sentences of the text with the appropriate words from the list. Make sure you use the correct form:

whorls, internode, floral, flower, spiral, inflorescence, leaf, peduncle, pedicel, equivalent

The Receptacle

The receptacle is the axis (stem) to which the ... organs are attached. Floral organs are attached either in a low continuous ... , as is common among primitive angiosperms, or in alternating successive ... , as is found among most angiosperms.

The peduncle is the stalk of a ... or an inflorescence. When a flower is borne singly, the ... between the receptacle and the bract (the last ... , often modified and usually smaller than the other leaves) is the peduncle. When the flowers are borne in an ... , the ... is the internode between the bract and the inflorescence; the internode between the receptacle of each flower and its underlying bracteole is called a ... . Thus, in inflorescences, bracteole is the ... of bract, and pedicel is the equivalent of peduncle.

VIII. Check you know the meaning of the phrasal verb *"<u>to make</u>". Match the verb on the right with its meaning on the left.

1. You should <u>formulate</u> a plan of your work	to make against
2. The professor <u>shared</u> his research experience with his students	to make out
3. The results of the experiments <u>were not in favour</u> of their opinion	to make up
4. His hand writing is illegible. Nobody can <u>understand</u> what he has written in his exercise-book	to make over

CHECK YOUR GRAMMAR

IX. Fill in the gaps with suitable prepositions where they are necessary in the following sentences:

of, in, by, for, from, up

1. Often the bract subtending an inflorescence is brightly coloured as … many flowers or provides protection as … the woody, boat - shaped bracts … many palms.
2. … the strawberry, … example, the receptacle is the fleshy edible part … the strawberry and, when eaten … small mammals and birds, aids … seed dispersal.
3. The fleshy part … the edible fruit … forms … the receptacle and peduncle, and several internodes below that grow … and surround the carpels... .
4. Each cluster … three small tubular flowers is surrounded … colourful petallike bracts.

X. Find and correct grammar mistakes in the following sentences:

1. The sepals (collectively calls the calyx) most resembles leaves because of their green colour.
2. From their base and along most of its length, sepals either remain separate nor marginally fused.
3. The sepals form a tube with terminal lobes or toothes.
4. The number off calyx lobes equal the number of fused sepals.
5. A conspicuous reds calyx tube envelops the closed yellow petals of the bell-shapes flowers.
6. The anthers is attached to the apex of the exserted staminal column.
7. The sepals enclosing and protect the unopened flower bud.
8. The calyx is commonly persistent and evidents when the fruit had matured.
9. Sepals may been brightly coloured and functions as petals when truth petals is missing.
10. Petaloid sepals differs from tepals.

DEVELOP YOUR COMMUNICATIVE SKILLS

XI. Make up a dialogue using the following words and word – combinations:

rainbow of colours, a varied group of blooms, distinct cup shape, bulb root system, to vary in size, shape and form, perennials, annuals, tulip description, cultivars, smooth, fringed, ruffled, striped, oval shape, mid-season, to bloom, aromatic, fragrant, reddish-orange blossoms, to produce, flower bud, leaf-like structures, to be called.

XII. Read the verses about tulips. Choose any of them and learn it by heart.

THE TULIPS
(by Theodora Onken)

That was the year I planted tulip bulbs.
After a year of eager and patient waiting
The gorgeous red and yellow flowers
Of mellow beauty filled in the garden.

I watched every morning in quiet admiration,
The dew drops and bees circling on soft petals.
The young tulips in mischievous breeze made,
Flower bed sizzle with life, vibrant and aerial.

As morning rays spread to light up the sky
From tall glass windows of my living room
Their exquisite brilliance and soothing aura
of beauteous harmony entered into my being.

But I didn't know much about tulips then.
Soon I came to realize that each stem
Bore just one flower, and their delicate
Flashy bloom lasted only for a week most.

I felt chagrined and cheated for my labour.
A sadness prevailed as the flowers wilted
And the single stem soon started to limp.
This was my first intimate tending of gardening.

Nothing much I could do but to miss the tulips
And endure the hurt of their short span of life.
As spring advanced into summer, the long
Herbaceous plants also withered to ground.

To see flowerbeds devoid of green was a blow.
The intricate planning of nature felt erroneous.
The showy life and the quick decay, that the
Tulips exhibited was new to my experience.

Or should I say that for the first time I was
Touched so deeply by the natural ending of
plant life. Like the devastating loss of my mother,
The saddest encounter- I took long to recover.

But nature is still kind and benevolent.
It takes our loved ones never to return again
But blesses us again with family and friends.
Tulips too bloom every year again and again.

They give me a week of their life filled with
Amorous beauty and post a cruel message
Wrapped in quiet tenderness to accept
Mother Nature's workings at her behest.

TULIPS FOR YOU
(by Theodora Onken)

It was a dance for two
Call it a Floral Ballet afar
A vertible blossoming pas de deux
Beautiful as ‘Les Tulips’ By Renoir
Oh, the colurs were so vibrant
A dance of pastel stroked measures
A French trifled daliance of lovers
A bountiful safe of artistic treasures

RADIANT GOLDEN TULIPS
(by Mark Heathcote)

Contra to all light there is
No straight paths – but one.
So, if yours is a rainbow, after a storm:
You’ll still reach home a chosen one.
God’s rainbow is strong…
His – is a double helix, bound up?
Close to your own heart and soul.
You’ll chalice all His love up
Like a hopelessly sinking vessel
Then you’ll be his radiant golden tulips.
Even; if your stem too is bent.
For God’s love is strong for you.
Contra to all light there is
No straight paths – but one.

BLACK TULIPS
(by Mark Heathcote)

Black tulips, tulips red, tulips gold
They warm my heart from the bitter cold.
On bending stems they curtsy on the wind
Bob on the air, like sunlight, been pinned.
In frozen earth crossways hatched at night
They weep – close – fall asleep till daylight.
Black tulips, tulips red, tulips gold
They warm my heart from the bitter cold.
I wish I were a snowdrop an astronaut.
Above the clouds but I’m not, I’m an inkblot.

COLOURFUL TULIPS
(by Lamar Cole)

Tiny Tim would probably tiptoe through the tulips.
He and his sweetie would lay there and drink mint juleps.
They would enjoy the beautiful sunshine.
And he softly kissing his lady so fine.

And softly stroking her hair of blond.
Enjoying the colorful pretty tulips and having so much fun.

STILL LIFE WITH TULIPS
(by Erica Jong)

Because you did, I too arrange flowers,
Watching the pistils just like insolent tongues
And the hard, red flesh of the petals
Widening beneath my eyes. They move like the hands
Of clocks, seeming not to move except
When I turn my gaze; then savagely
In the white room, they billow and spread
Until their redness engulfs me utterly.
Mother, you are far away and claim
In mournful letters that I do not need you;
Yet here in this sunny room, your tulips
Devour me, sucking hungrily
My watery nourishment, filling my house
Like a presence, like an enemy.
Geared to your intervals as the small hand
Of a clock repeats the larger, I,
Your too-faithful daughter, still drag behind you,
Turning in the same slow circles.
Across the years and distances, my hands
Among these fierce, red blossoms repeat
Your gestures. I hope my daughter never writes:
'Because you did, I too arrange flowers.'

XIII. Read the verse and name the parts of flower structure.

(by Shulga I.V.)

Look at flying little bees
Pollinating flowers, trees,
Their wings are buzzing, trembling
With sun bright sparks on them stamping.

They are entering the calyx
Made of sepals with grey helix.
It does not prevent them from
Gathering, collecting warm
Pollen, its crumbs and grits
On abdomens, bristles, wings

Touching pistils, stamens, petals
Fertilizing blooms. Green sepals
Are supporting them and flowers;
Honey`s dripping like May showers!

MODULE IV
TECHNOLOGIES TO GROW PLANTS
UNIT 9

I. Read and memorize the following words and word combinations:

graft (n)-	щеплення *(рослини)*
scion (n) -	пагін *(рослини),* черенок
stock (n) -	подвій
rootstock (n) -	подвій, кореневище
bud (v) -	прищеплювати
core (n) -	серцевина, внутрішність
repair (v) -	відновлювати
dwarf (n) -	карлик
strengthen (v) -	посилювати
retain (v) -	утримувати, зберігати
ensure (v) -	гарантувати, забезпечувати
propagate (v) -	розмножувати (ся)
interaction (n) -	взаємодія
invigoration (n) -	зміцнення
hardiness (n) -	міць, витривалість
juniper (n) -	ялівець
interstock (n) -	внутрішньовидовий подвій
invigorate (v) -	зміцнювати
compatibility (n) -	сумісність
genus (n) (*pl* genera)	рід, сорт, вид
failure (n) -	невдача, провал
infallible (adj) -	безпомилковий, надійний
available (adj) -	доступний, придатний, дійсний
ability (n) -	здатність, спроможність
mediate (v) -	бути посередником, слугувати сполучною ланкою
congeniality (n) -	конгеніальність, спорідненість
weaken (v) -	слабнути
lilac (n) -	бузок
privet (n) -	бирючина
permit (v) -	дозволяти
adjustment (n) -	пристосування

Word - combinations

beneath the bark -	нижче кори
frequent cell division -	часте ділення клітин
multifruited plants -	багатоплідні рослини
complete range of dwarfing -	закінчена / повна лінія карликових *(порід)*
probable success -	імовірний успіх

II. Read the text and be ready ta answer the following questions:

1. What is graft?
2. What is stock?
3. What is the added piece called?
4. When is the middle piece called interstock?
5. What is called budding?
6. What are the principles involved in grafting based on?
7. What is a cambial tissue in most woody trees and shrubs?
8. What purposes is grafting used for nowadays?
9. What ornamentals is grafting used with as a means of growth control?
10. What plants can be grafted?
11. When are grafts often successful?
12. When are grafts nearly always failures?
13. Is compatibility in grafting of various degrees?

TEXT

GRAFT

Graft is the joining together of plant parts by means of tissue regeneration. Grafting is the act of placing a portion of one plant (bud or scion) into or on a stem, root, or branch of another (stock) in such a way that a union will be formed and the partners will continue to grow. The part of the combination that provides the root is called the stock; the added piece is called the scion. When more than two parts are involved, the middle piece is called the interstock. When the scion consists of a single bud, the process is called budding. Grafting and budding are the most widely used vegetative propagation methods.

The principles involved in grafting are based on the matching of scion and stock cambiums (meristematic tissue, the cells of which are undifferentiated and capable of frequent cell division). Cambial tissue in most woody trees and shrubs is an inconspicuous single cell layer covering the central core of wood and lying directly beneath the bark.

Nowadays grafting is used for a variety of purposes: to repair injured trees, to produce dwarf trees and shrubs, to strengthen plants' resistance to certain diseases, to retain varietal characteristics, to adapt varieties to adverse soil or climatic conditions, to ensure pollination, to produce multifruited or

multiflowered plants, and to propagate certain species (such as hybrid roses) that can be propagated in no other way. The interaction of rootstocks may affect the performance of the stock through dwarfing or invigoration and, in some cases, may affect quality. Further, the use of more than one component can affect the disease resistance and hardiness of the combination.

Grafting as a means of growth control is used extensively with fruit trees and ornamentals such as roses and junipers. Fruit trees are normally composed of a scion grafted onto a rootstock. Sometimes an interstock is included between the scion and stock. The rootstock may be grown from seed (seedling rootstock) or asexually propagated (clonal rootstock). In the apple, a great many clonal rootstocks are available to give a complete range of dwarfing; rootstocks are also available to invigorate growth of the scion cultivar.

In theory any two plants that are closely related botanically and that have a continuous cambium can be grafted. Grafts between species are often successful, between genera occasionally so, and grafts between families are nearly always failures. Within the genus the closeness of botanical relationship is not an infallible guide as to probable success, but in the absence of recorded experience it is the best available. The ability of two plants to continue to grow or be compatible when joined together by the asexual practice of grafting is mediated by many complex physiological and environmental factors.

Compatibility or congeniality in grafting is of various degrees. Apple grafted on oak fails immediately; apple grafted on pear may grow well for one or two years but gradually weakens and dies. Some lilacs exist for a number of years on privet stocks but fail ultimately. The common apricot is, other things being equal, the best stock for apricot varieties, but in moist soils in cool regions apricot trees flourish better on certain plum stocks than on apricot. These differences in adaptability of closely related plants that can be successfully grafted permit a greater degree of adjustment to soil conditions than would ordinarily be possible.

INCREASE YOUR VOCABULARY

III. Give the English equivalents to the following words and word-combinations:

щеплення *(рослини)*, з'єднувати разом частини рослин, відновлення тканин, продовжувати рости, комбінація, додаткова частина, складатися з однієї бруньки, методи вегетативного розмноження, підбирати пагони, відновлювати пошкоджені дерева, зміцнювати опірність рослин до захворювань, пристосовувати різновиди до несприятливих ґрунтових та кліматичних умов, вирощувати багатоквіткові рослини, впливати на якість, кореневище сіянця, зміцнювати ріст сорту пагону, міжвидове щеплення, близькість ботанічної спорідненості, практика безстатевого щеплення рослин, бузок на подвої бірючини, різниці в адаптивності.

IV. Form nouns from the following verbs with the help of appropriate suffixes:

to regenerate; to continue; to combine; to propagate; to differentiate; to produce; to adapt; to pollinate; to interact; to invigorate; to grow; to fail; to relate.

V. Suggest an appropriate synonym for each of the following words from the text:

- to unite
- to restore
- a stem
- to go on
- to be named
- to include
- to be founded
- a reproduction
- a bush
- to reinforce

VI. Which words from the text correspond to the definitions?

a) shoot of plant, esp. one cut for grafting or planting;
b) to multiply specimens of plant, animal, disease by natural process from parent stock;
c) portion of protoplasm usually enclosed in membrane, ultimate element of organic structures;
d) prickly bush or shrub bearing a beautiful and usually fragrant flower usually of red or yellow or white colour;
e) shoot or scion inserted in slit of another stock, from which it receives sap;
f) to arrange, to put in order; to harmonize; to adapt;
g) shrub with fragrant pale pinkish violet or white blossoms.

VII. What do the underlined words in the following sentences mean?

1. Graft is the joining together of plant parts <u>by means</u> of tissue regeneration.
   a) by meaning
   b) with meaning
   c) with the help
2. Grafting is the act of <u>placing</u> a portion of one plant into or on a stem, root, or branch of another.
   a) putting
   b) staying
   c) seating
3. The part of the combination that <u>provides</u> the root is called the stock.
   a) takes
   b) mentions

c) ensures

4. Grafting and budding are the most widely used vegetative propagation methods.
   a) roads
   b) ways
   c) things
5. Cambial tissue is an inconspicuous single cell layer covering the central core of wood.
   a) pith
   b) focus
   c) middle
6. Grafting is used to retain varietal characteristics.
   a) conditions
   b) peculiarities
   c) points

VIII. Match the words on the left with the words on the right and then use them to speak about graft.

single, vegetative, stock, disease, added, cell, injured, tissue, central, varietal, climatic, clonal, botanical, growth, environmental	method, cambiums, trees, regeneration, layer, core, piece, bud, characteristics, resistance, control, factors, conditions, rootstocks, relationship

CHECK YOUR GRAMMAR

IX. Find in the text sentences in the Passive Voice and use them in the Active Voice. Define their tense forms.

X. Say which constructions are used in the following sentences: the Complex Object or the Complex Subject.

1. Grafting is known to be the act of placing a portion of one plant into or on a stem, root, or branch of another stock.
2. The gardener expects the union of two plants to be formed and the partners to continue growing.
3. Grafting and budding are believed to be the most widely used vegetative propagation methods.
4. Grafting is stated to be used to repair injured trees, to strengthen plants resistance to certain disease, to retain varietal characteristics, to produce multifruited plants.
5. The interaction of rootstocks appears to affect the performance of the stock through dwarfing or invigoration.
6. Scientists notice the further use of more than one component affect the disease resistance.
7. Grafts between species are sure to be successful.

8. Grafts between families are likely to be nearly always failures.

XI. Translate these word combinations. Do not forget that in some cases the translation should be started with the last word:

- plant parts
- middle piece
- tissue regeneration
- propagation method
- cell division
- hybrid roses
- rootstock interaction
- combination hardiness
- fruit trees
- seedling rootstock
- scion cultivar

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Complete the sentences of the dialogue between two participients at the scientific conference devoted to the issues of grafting.

A: As far as I know graft is the joining together of plant parts by means of tissue regeneration.
B: I think, you are guite … .
A: Can we call grafting as the union of two plants?
B: As to me, it goes without saying that … .
A: How can you explain the difference between stock and scion?
B: Judging from botanical scientific literature it deals with … .
A: Is it possible to firm that the principles involved in grafting are based on the matching of scion and stock cambiums?
B: There is no doubt that … .
A: Will you point out the purposes of grafting?
B: As world's practice witnesses … .
A: Can you state that interstock is included between the scion and stock?
B: To my mind … .
A: Naturally two plants that are closely related botanically can be grafted, can't they?
B: According to the numerous experiments we can assume that … .
A: Thank you for your interesting answers.
B: You are welcome! I hope this information will be useful for you in your research work.

XIII. Make up a plan to the text and retell the text.

XIV. Read the sonnet by W. Shakespeare and say what graft the poet meant?

SONNET 15

(by William Shakespeare)

When I consider everything that grows
Holds in perfection but a little moment,
That this huge stage presents nought but shows
Whereon the stars in secret influence comment;
When I perceive that men as plants increase,
Cheered and check'd even by the selfsame sky,
Vaunt in their youthful sap, at height decrease,
And wear their brave state out of memory;
Then the conceit of this inconstant stay
Sets you most rich in youth before my sight,
Where wasteful Time debates with Decay
To change your day of youth to sullied night;
And all in war with Time for love of you,
As he takes from you, I engraft you new.

UNIT 10

I. Read and memorize the following words and word – combinations:

intimate (adj) – близький, тісний
callus (n) – наплив
interlock (n) – з'єднання
respond (v) – відповідати, реагувати
surface (n) – поверхня
graftage (n) – черенкування
xylem (n) – ксилема (основна водопровідна тканина наземних судинних рослин)
phloem (n) – флоема, луб (провідна тканина судинних рослин, по якій транспортуються продукти фотосинтезу до частин рослини, в яких його немає)
bast (n) – лико, луб, мочало; луб'яне волокно
arrange (v) – упорядковувати, розташовувати
possess (v) – мати, володіти
pressure (n) –тиск
exert (v) – натискати; впливати
rubber (n) – гума, каучук
strip (n) – стрічка
apply (v) – застосовувати
store (v) – зберігати
raise (v) – піднімати
remove (v) – усувати
insert (v) – вставляти *(в що-небудь)*
invert (v) – перевертати, переставляти

incision (n) – розріз; насічка
tie (v) – зав'язувати(ся); скріплювати
circumference (n) – окружність
necessitate (v) – робити необхідним
saw (v) – пиляти (ся); розпилювати
bare (v) – оголювати
contribute (v) – сприяти
heal (v) – загоювати (ся)
proceed (v) – продовжувати; вирушати *(далі)*

Word – combinations:

continuous ring – тривале кільце
closeness of fit – близькість відповідності
dormant material – дрімаючий, потенційний матеріал
vertical slits – вертикальн ідовгі розрізи

II. Read the text and be ready to answer the following questions:

1. What does the basic technique in grafting consist of?
2. What do stock cambium and scion cambium respond to?
3. What is the basis of graftage?
4. How is cambium arranged in dicots?
5. Do monocot stems possess a continuous cambium layer?
6. What do success and failure of any grafting operation depend on?
7. What temperatures increase callus formation?
8. What is budding effected by?
9. What does grafting of a larger scion usually involve?
10. What is the establishment of union between grafted components effected through?

TEXT
GRAFTING TECHNIQUES

The basic technique in grafting consists of placing cambial tissues of stock and scion in intimate association, so that the resulting callus tissue produced from stock and scion interlocks to form a living continuous connection. Stock cambium and scion cambium respond to being cut by forming masses of cells (callus tissues) that grow over the injured surfaces of the wounds. The union resulting from interlocking of the callus tissues is the basis of graftage. In dicots (e.g., most flowering trees) cambium-a layer of actively dividing cells between xylem (wood) and phloem (bast) tissues-is usually arranged in a continuous ring; in woody members new layers of tissue are produced annually. Monocot stems (e.g., lilacs, orchids) do not possess a continuous cambium layer or increase in thickness; grafting is seldom possible.

The success or failure of any grafting operation is based upon the compatibility of each plant part, closeness of fit, and cambial contact. The union is initially held in place by pressure exerted by the stock, by grafting tape, or by rubber budding strips applied over the point of union. Warm temperatures (27–30 °C) increase callus formation and improve "take" in grafting. Thus grafts using dormant material are often stored in a warm moist place to stimulate callus formation.

Budding is effected by raising or removing a segment of bark from the stock and inserting a segment of the scion, containing a bud, into the wound thus made. In bud grafting involving fruit trees, the bark is lifted away from around an upright or inverted T-shaped incision, and the bud is then inserted under the bark and tied securely in place.

Grafting of a larger scion, on the other hand, usually involves the use of the complete circumference of a plant as the scion. Certain types of grafts thus may necessitate sawing through the trunk and inserting the scion in vertical slits made between the bark and wood of the trunk bared core.

The establishment of union between grafted components is effected through the formation of a loose growth of cells (callus) contributed by both elements. These cells fuse into a mass so continuous in compatible grafts that the precise location of the line of union is frequently impossible to determine, even microscopically. Just as in wound healing, union proceeds more rapidly if the wounded areas are protected against drying out; and, in most forms of grafting, rapid knitting is essential to maintenance of life in the scion.

In grafting and budding, the rootstock can be grown from seed or propagated asexually. Within a year a small amount of scion material from one plant can produce hundreds of plants.

INCREASE YOUR VOCABULARY

III. Give Ukrainian equivalents to the following words and word – combinations:

basic techniques, placing cambial tissues, intimate association, callus, scion interlock, continuous connection, masses of cells, to be arranged in, monocot stems, to increase, failure, success, plant part, pressure, rubber budding strips, points of union, to be stored, warm moist places, segments of bark to be lifted away, T-shaped incision, to tie securely, complete circumference, certain types, the trunk bared core, loose growth.

IV. What derivatives can you make with the words:

- associate
- connect
- respond
- injure
- act
- trick

- operate
- press
- insert

Translate and use them in the sentences of your own.

V. One word doesn't belong to each of the following groups. Cross out the word:

a) technique, method, way, connection, instrument, tool;
b) graft, slit, degree, scion, budding, wound;
c) to injure, to damage, to worsen, to harm, to hurt, to insert;
d) to store, to keep, to preserve, to retain, to improve, to save.

VI. Confirm or contradict the following statements using the introductory phrases given on page 135.

1. The basic technique in grafting consists of placing cambial tissues of stock and scion in distant association.
2. Callus tissue produced from stock and scion interlocks to form a living continuous connection.
3. Stock and scion cambiums don't respond to being cut by forming masses of cells that grow over the injured surfaces of the wounds.
4. The union resulting from interlocking of the callus tissues is the basis of graftage.
5. In dicots cambium is not usually arranged in a continuous ring.
6. In woody members new layers of tissue are produced every year.
7. Monocot stems do not have a continuous cambium layer.
8. The success or failure of any grafting operation is based upon the absence of compatibility between plant parts.
9. Grafts using dormant material are often stored in a warm moist place to stimulate callus formation.
10. Budding is not effected by raising or removing a segment of bark from the stock and inserting a segment of the scion, containing a bud, into the wound thus made.

VII. Complete the following sentences with the correct form of the words:

I. *Produce (v) / production (n)*
1. Agricultural … has increased recently.
2. Stock and scion … callus tissue.

II. *Respond (v) / respondent (adj)*
1. The ornamentals are … to the fertilizer application.
2. The plant … to the favorable climatic conditions.

III. *Wound (v) / wound (n)*
1. There are some … on the trunk of the tree.
2. Gardeners ... plants when grafting is necessary.

IV. *Act (v) / action (n) / actively (adv)*

1. The … of the pesticides decreases quantity of these leaf buds.
2. Compatibility of plant parts … on success or failure of any grafting operations.
3. Cells divide … .

V. *Arrange (v) / arrangement (n)*

1. A continuous ring … usually occurs in dicot cambium.
2. Botanists … plants according to different factors.

VIII. Match the words having the opposite meaning:

intimate	to improve
to produce	to wither
to continue	passive
to grow	to unite
to injure	to destroy
active	often
to divide	failure
thick	remote
seldom	thin
success	to interrupt

CHECK YOUR GRAMMAR

IX. Match the beginnings of the following sentence with their endings:

1. The basic technique in grafting consists of	a) is the basis of graftage
2. The callus tissue produced from stock and scion interlocks	b) placing cambial tissues of stock and scion in intimate association
3. Stock cambium and scion cambium respond	c) are often stored in a warm moist place to stimulate callus formation
4. The union resulting from interlocking of the callus tissues	d) effected through the formation of a loose growth of cells
5. In dicots cambium is usually	e) to being cut by forming masses of cells
6. In woody members new layers of tissue	f) callus formation and improve “take” in grafting
7. Monocot stems do not possess	g) are produced annually
8. Warm temperatures increase	h) to form a living continuous connection
9. Grafts using dormant material	i) a continuous cambium layer

10. The establishment of union between grafted components is	j) arranged in a continuous ring

X. Find in the text– *ed* and –*ing* forms, define their functions and translate them.

XI. Correct grammar mistakes in the following sentences:

1. The basic technique in grafting deal with placing cambial tissues of stock and scion in association intimate.
2. The callus tissue produced from stock and scion shall interlock to form a living continuous connections.
3. When stock and scion cambiums are cutted they form masses of cell.
4. Callus tissues takes place on the injured wounds of the surfaces.
5. There are not a continuous cambium layer in stems of lilacs and orchids.
6. Compatibility of each plant parts, closeness of fit and cambial contact has an influences on the success or failure of any grafting operation.
7. Warm temperatures favouring callus formation.
8. Raising or removing a bark segment from the stock is effected budding.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Make a summary to the text

XIII. Describe graft techniques using the following verb schemes:

…. consists of …. .
…. interlocks …. .
…. respond to …. .
…. grow over …. .
…. is arranged …. .
…. do not possess …. .
…. is based upon …. .
…. is held in …. .
…. increase …. .
…. are stored …. .
…. is effected …. .
…. is lifted …. .
…. is inserted …. .
…. involves …. .
…. may necessitate …. .
…. fuse into …. .
…. proceeds …. .
…. can be grown …. .

UNIT 11

I. Read and memorize the following words and word-combinations:

sapling (n) – молоде деревце
seed (n) – сім'я, насінина
capacity (n) – здатність, місткість
multiplication (n) – розмноження
variable (adj) – мінливий, перемінний
protect (v) – захищати
sensitive (adj) – чутливий
susceptible (adj) – вразливий, сприйнятливий
re-rooting (ger) –повторне укорінювання
extra (adj) – додатковий
vulnerable (adj) – уразливий
advantage (n) – перевага

Word – combinations

virus-free – той, що не має вірусів
externally different – зовнішньо різні
the same genotype – однаковий генотип
mother plants – батьківські рослини

I. Read the text and summarize the main points under the following headings:

1) growing saplings by seed;
2) growing saplings by vegetative multiplication.

TEXT
SAPLINGS

Saplings are young trees. They can be produced in various ways: through seeds; vegetatively through cuttings.

In general, a seed produces plants that are variable in genotype and phenotype. Genotype is the genetic capacity and characteristics of the plant. Phenotype is the visible characteristics of the plant.

In short, we can say that variable populations of plants differ externally in how they look and differ in their capacities - like growth, resistance, fruit production, etc. Populations grown from seed are far more resistant to diseases because:

. through multiplication by seeds, the plants are by nature, virus-free. Moreover

. in a variable population, plants have variable capacities to protect themselves against diseases.

If a disease attacks a population originated from a seed, one plant may die while another survives as it is less sensitive or not susceptible to that disease.

Growing saplings by vegetative multiplication can be done through the traditional way of cutting and re-rooting, or through tissue (vitro) culture multiplication. With these methods, all plants have the same genotype and phenotype. Through selection of the mother plant we can choose a plant that has extra capacities like more production, stronger growth, etc. But they are also very vulnerable to diseases to which they have no resistance. Once attacked, the whole population can and often will die.

With the method of vegetative multipliction from a variable population of plants the population is more variable than one created by vegetative multiplication from one plant; so it is less sensitive to an attack from disease. The advantage of this method is that we can focus on multiplying mother plants that carry better characteristics than a population that is multiplied through a seed. Vegetative multiplication can be done through roots, stems or small parts of them.

INCREASE YOUR VOCABULARY

III.Give the English equivalents to the following words and word – combinations:

різні способи, молоді деревця, вегетативно, генетична здатність, видимі характеристики рослин, різнитися, ріст, стійкий до хвороб, захищати від хвороб, породжуватися з насіння, виживати, менш чутливий, різання, повторне укорінювання, селекція, сильніший ріст, гинути, сфокусуватися, стебла.

IV.Complete the table to make word families. Use the dictionary to help you. In case there is no corresponding derivative put a No sing:

Noun	Verb	Adjective	Adverb
	produce		
			vegetatively
	grow		
		variable	
characteristic			
	differ		
population			
			externally
resistance			
	protect		

V.Explain the following terms:

- sapling
- genotype
- phenotype

VI.Look through the text again and say which words in the text have the opposite meaning:

- to destroy
- the same
- invisible
- decline
- susceptibility
- infected with virus
- to live
- weaker
- worse

VII.What do the underlined words in the following sentences mean? Choose the best definitions:

1. Saplings can be produced in various ways.

a) manufactured
b) grown
c) described

2. Seeds produce plants that are variable in genotype and phenotype.

a) complicated
b) important
c) different

3. Plants have variable capacities to protect themselves against diseases.

a) chances
b) abilities
c) characteristics

4.The plant population is originated from seeds.

a) found
b) received
c) grown

5. Other plants may survive.

a) continue to live
b) be resistant
c) protect

6) This method deals with vegetable multiplication.

a) growth
b) reproduction
c) increase

7) The plants are vulnerable to diseases.
a) different
b) weak
c) susceptible

VIII. Ask questions to the following sentences:

1. A: ….?
   B: A sapling is a young tree..
2. A: ….?
   B: They can be produced through seeds and vegetatively through cuttings.
3. A: ….?
   B: Genotype is the genetic capacity and characteristics of plants.
4. A: ….?
   B: Phenotype is the visible characteristics of plants.
5. A: ….?
   B: Populations grown from seeds are far more resistant to diseases for two reasons: they are virus-free and resistant to diseases.
6. A: ….?
   B: Growing saplings by vegetative multiplication can be done by cutting and re-rooting or through tissue culture multiplication.
7. A: ….?
   B: The advantage of this method is that we can focus on multiplying mother plants that carry better characteristics than a population that is multiplied through seeds.

IX.Arrange the words to form sentences:

1. are, ways, there, for, various, production, sapling.
2. produced, seeds, in, plants, genotype, and, through, are, phenotype, variable.
3. deals, phenotype, of, the visible, with, of plants, characteristics.
4. of, differ, populations, variable, in, plants, growth, production, resistance, fruit.
5. form, virus-free, grown, populations, plant, are, seeds, to, far, diseases, resistant, more.
6. against, protect, diseases, plants, themselves, can.
7. are, the plants, sensitive, less, diseases, to.

X.Find in the text modal verbs and explain their meanings.

XI.Translate the following sentences into English:

1. Молоді деревця можна вирощувати різними методами.
2. Це дерево виростили з насіння.
3. Рослини різняться за генотипом і фенотипом.
4. Існує низка причин, через які рослини більш стійкі щодо хвороб.

5. В цих рослинах немає вірусів.
6. Рослини можуть по-різному захищати себе від хвороб.
7. Одна рослина може загинути в той час, як інша може вижити тому, що вона менше уразлива.
8. Різання та повторне укорінювання рослини – один з традиційних шляхів вирощування молодих дерев за допомогою вегетативного розмноження.
9. Ці рослини мають однаковий генотип.
10. Цей метод вирощування молодих дерев має багато переваг.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Make a summary to the text.
XIII. Say what new useful information for your speciality you have obtained from the text.

UNIT 12

I. Read and memorize the following words and word-combinations:

plug (n) – втулка; циліндр
prefer (v) – надавати перевагу
prevent (v) – запобігати
search (v) – шукати
handle (v) – брати руками, перекладати
tip (n) – кінчик
pythium (n) –пітій
mould (n) – пліснява
peat (n) – торф
pot (n) – горщечок
tap (v) – витягати
irrigation (n) – зрошення

Word – combinations

radical root – основний корінь
to be harvested – бути зібраним
current methods – поточні методи
substantial help – значна допомога

II. Read the text and be ready to answer the following questions:

1. When will a very strong radicle root be formed?
2. Is a radicle developed from a seed weaker or stronger than that formed by cutting?
3. What kind of plugs should we use for sapling multiplication?

4. What indicates the infection in the root tips?
5. Why are the roots for planting often wrong?
6. Why do the current multiplication methods destroy the radicle roots?
7. Why is irrigation used?

TEXT
ROOT SYSTEM OF PLANTS

When producing saplings on plugs through a seed, a very strong radicle root will be formed. Once growing, this radicle is able to break through even rocks. This is possible because the radicle of a tree is able to develop very heavy pressure. Look at the image of the seed of the oak (acorn). The second seed on the left is breaking open by the radicle root. At the seed on the right, you see the strong radicle which looks like a nail just a few days old. By putting cuttings on plugs, a radicle is also formed, but it is weaker than a radicle developed from a seed - its growing point is mostly divided between a few weaker roots rather than one strong one. If we multiply saplings using seeds or cuttings in a plug, we prefer a plug to have the following features: - at least 15 cm deep so that the radicle is able to develop long enough;

- not rounded to prevent the root from growing in rounds (horizontal circles) instead of vertically: once growing in rounds, it will continue so after planting;

- then it will not be able to penetrate deeply enough to search for capillary water;

- enough openings so that the roots have sufficient oxygen to grow well;

- easily handled once the plant is taken out of them.

Once you take the sapling from the plug, you should see white tips and an undivided radicle root. If the tips of the roots are not white, it means that they are infected with a disease like pythium or other moulds. It is also possible that the peat is too salted and the root tips have burned.

During the investigations of roots, it has been found that in more than 95% of the occasions, when people plant trees or bushes, the roots used for planting are wrong. The reason is that they keep the plants too long in the pot; once the strong radicle root reaches the bottom of the pot, it splits into weaker secondary roots. There are also industries where the bushes are multiplied with the bare root system. In vines, for instance, growers multiply their plants in the full ground; and once they are harvested to be V transplanted to their final planting location, the growers clean the roots (thereby destroying all the secondary roots) and cut the radicle roots back to 5- 10 cm - and so, destroy the radicle roots.

The current multiplication methods destroy the radicle roots - the roots that in nature are able to penetrate deeply into the soil and tap capillary water. These same methods stimulate the development of secondary roots with their weak force. This means that the nursery industry creates trees and bushes that are unable to grow without substantial help in dry areas. As a solution to this mistake, we use irrigation. This irrigation is needed not because plants are unable to grow in dry places, but because the plants have an inadequate root system.

INCREASE YOUR VOCABULARY

III. Give the English equivalents to the following words and word-combinations:

вирощувати молоді деревця, дуже сильний корінь, гірські породи, тиск, бути схожим, формування основного кореня, точка росту, слабкіше коріння, замість, горизонтальні кола, глибоко проникати всередину, достатня кількість кисню, нерозділене коріння, занадто солоний, горіти, дослідження, висаджувати дерева або кущі, досягати дна, слабкіше побічне коріння, чистити, методи, що стимулюють розвиток, необхідне зрошення.

IV. What derivatives can you make with the following words?

- form
- break
- possible
- develop
- press
- divide
- follow
- prevent
- plant
- multiply

V. Complete the following sentences of the text with appropriate words from the list. Make sure you use the correct form:

regeneration, immature, tissue, culturing, producing, plants, medium, acclimatized, vulnerable

This is a method for ... of ... and trees by regenerating explants of ... zygotic embryos on a callus induction medium to grow embryogenic ... . of the embryogenic tissue is continued on somatic embryo maturation ... and germination medium. The germinated embryos are further converted to ... plants for field planting. The method suits well for ... clonal planting stock useful for reforestation. This means that this method results in non-variable populations, making them ... for diseases.

VI. Complete the following sentences with the correct form of the word:

1. Root (n) / root (v)

1) The plant has a strong … .
2) The bushes … well on the fertile soil.

2. Break (n) / break (v)

1) There is a … in the rock.
2) The roots of the trees can … through rocks.

3. Cut (n) / cut (v)

1) … away these dried up branches.
2) There are special … on the trunk of the trees.

4. Form (n) / form (v) / formation (n)

1) It is made in the … of the globe.
2) The roots … in the soil.
3) Root … takes place in the soil.

5. Plant (n) / plant (v)

1) All … need sunlight.
2) They … trees in the forests every year.

VII. Check you know the meaning of the phrasal verb "*to cut*". Match the verb on the right with its meaning on the left.

1. The flower is created for administration.	to cut down
2. The more human interferes in nature, the worse it gets.	to cut to
3. The article about parks was criticized.	to cut in
4. Poachers felled a lot of trees in the forest.	to cut out for

VIII. Find in the text the terms which describe the following:

- cut pieces of plants;
- main essential roots;
- a cylinder used to grow saplings;
- wooly or furry growth of minute fungi on things that lie for some time in moist warm air;
- cut piece of vegetable matter decomposed by water and partly carbonized
- supply land with water.

CHECK YOUR GRAMMAR

IX. Take one clause from each of two columns below to make one sentence expressing conditions. Make sure that your sentences make sense:

1. When you produce saplings on plugs through a seed	a) you will prefer a special plug
2. A weaker radicle is also formed	b) if there are many openings in the plug
3. If you multiply saplings using seeds or cuttings in a plug	c) if you put cuttings on plugs
4. You will prevent the root from growing in rounds	d) the root will not be able to penetrate deeply to search for capillar water
5. If you use rounded plugs	e) a very strong radicle root will be formed

6. The roots will have sufficient oxygen to grow	f) they will be infected with disease
7. If the tips of the roots are not white	g) if you use not rounded plugs

X. Fill in the gaps of the following sentences with the appropriate prepositions from the list:

than, by, as, of, in, to, through

... inbreeding, various lines ... plants are developed. These plants are weaker ... their ancestor plants. ... combining two inbreeding lines, a newly created hybrid line is made; its descendants have an equal genotype which results ... an equal phenotype. The so called 'hybrid' effect results ... descendants that can easily be more ... 30% bigger ... the original plants when starting the inbreeding. This means that these plants produce more food, more biomass or more fruit. ... general, they grow strongly; but ... a result ... their non-variability, they are vulnerable ... diseases.

XI. Find in the text the sentences with the Infinitive. State the functions of the Infinitive and translate the sentences.

XII. Translate into English:

1. Це коріння може розламати навіть гірські породи.
2. Цей корінь схожий на цвях.
3. Точка росту рослини поділяється між слабкішим корінням.
4. Коріння повинне рости вертикально.
5. Коріння потребує багато кисню.
6. Якщо торф занадто солоний, корінці рослини згорають.
7. Через те що коріння дуже довго тримають у горщиках, воно робиться поганим для висадки рослини в ґрунт.
8. Зрошення необхідне для того, щоб рослини отримували достатньо вологи та мали відповідно сильну кореневу систему.

DEVELOP YOUR COMMUNICATIVE SKILLS

XIII. Compose a dialogue using the following words and word-combinations:

- a strong radicle root
- to be able to break
- by putting cuttings
- to be formed
- to multiply saplings
- to prevent from
- sufficient oxygen
- to be infected with
- trees and bushes

- to keep too long
- deeply into the soil
- irrigation

XIV. Make a summary to the text.

XV. Guess the rhymed riddle:

(by Shulga I.V.)

They grow in the soil:
Big, small, straight, branched, short, long;
By worms, bugs can be spoilt,
But they are rather strong
To anchor plants, absorbing
Dissolved nutrients,
While leaves in wind are flopping,
And they will never stop it:
To be part of all plant**.**

MODULE V
PLANT PROTECTION. PLANT DISEASES AND PESTS
UNIT 13

I. Read and memorize the following words and word-combinations:

anthracnose (n) – антракноз – переважно грибкове захворювання рослин
fungal (adj) – грибковий
disease (n) – хвороба
humid (adj) – вологий
ash (n) – ясень
oak (n) – дуб
maple (n) – клен
susceptible (adj) – вразливий, сприйнятливий
wilt (v) – в'янути *(про рослини)*
wither (v) – сохнути
shoot (n) – пагін
sunken (adj) – запавший
acervuli (n) –ацервулі *pl від* acervulus– невелике безстатеве плодоносне тіло, яке прориває́ться крізь епідерміс рослин-хазяїв, що паразитують мітоспоричними грибами виду *Melanconiales*
spot(n) – пляма
lesion (n) – пошкодження, ураження *(органу тканин)*
blight (n) – хвороба рослин
blight (v) – шкодити *(рослинам)*
canker (n) – язва
unsightliness (n) –неприглядність
dogwood (n) – кизил
thrive (v) – пишно рости
destroy (v) – знищувати
mite (n) – кліщ
shrub (n) – кущ
derive (v) – походити
host (n) – рослина-хазяїн
virus (n) – вірус
excessive (adj) – надмірний
stolon (n) – підземний пагін

Word – combinations

saucer-shaped – у формі блюдця
severe losses – великі втрати
causative agent – збудник *(хвороби)*
disease – free seed – неуражене хворобою насіння
witches`-brooms – «відмівські мітли » *(хвороба рослин)*

adventitious buds – побічні бруньки

II. Read the text and summarize the main points under the following headings:

1) plant disease – anthracnose;
2) plant disease – witches` - brooms.

TEXT
ANTHRACNOSE. WITCHES` BROOMS

Anthracnose is a group of fungal diseases that affect variety of plants in warm, humid areas. Shade trees such as sycamore, ash, oak, and maple are especially susceptible, though the disease is found in a number of plants, including grasses and annuals.

Anthracnose causes the wilting, withering, and dying of tissues. It commonly infects the developing shoots and leaves. The causative fungi (usually *Colletotrichum* or *Gloeosporium)* characteristically produce spores in tiny, sunken, saucer-shaped fruiting bodies known as acervuli. Symptoms include sunken spots or lesions (blight) of various colours in leaves, stems, fruits, or flowers, and some infections form cankers on twigs and branches. The severity of the infection depends on both the causative agent and the infected species and can range from mere unsightliness to death.

In the late 1970s a new form of the disease, known as dogwood anthracnose, was identified in North America. Unlike other forms of anthracnose, it thrives in cool climates. Dogwood anthracnose first appeared in the Pacific Northwest and soon spread to the eastern United States, eventually resulting in severe losses to natural stands of dogwoods in mountainous regions. The causative agent, the fungus *Discula destructive*, was not described until 1991.

Anthracnose can be avoided by destroying diseased parts, using disease-free seeds and disease-resistant varieties, applying fungicides, and controlling insects and mites that spread anthracnose fungi from plant to plant. For infections of annual plants crop rotation is suggested to limit the accumulation of fungal spores in the soil.

Witches' brooms, or hexenbesens, are closely grouped, many-branched structures commonly found on a number of species of trees and shrubs and caused by certain fungi. Witches' brooms exist more or less independently, despite the fact that they are derived from the tissues of the host. In accordance with their independence, the witches' brooms tend to break away from the normal correlations of the parent plant. Instead of branching out horizontally, the brooms stand as more or less erect clusters of branches. Witches' brooms are not flowers as a rule, and the vegetative buds may open several weeks earlier in spring than do those present on healthy branches, indicating further the independence of these structures from normal controls.

Similar structures occur in certain plant species after virus infection. They appear to result from the excessive stimulation and development of secondary

shoots. The witches' broom virus in potatoes, for example, causes the infected plant to produce numerous buds on the above-ground stems of potato plants. Long, slender stolons resembling aerial roots that are covered with hairs develop from these adventitious buds…

INCREASE YOUR VOCABULARY

III. Give the English equivalents to the following words and word – combinations:

грибкові захворювання, уражати рослини, вологий, включаючи трави, заражати, спори, пошкодження різних кольорів, язви на гілках, на відміну від інших форм, з'являтися, гірські регіони, знищувати уражені частини, стійкі до захворювання види рослин, застосовувати фунгіциди, обмежувати накопичення грибкових спор, бути причиною, тканина рослини-хазяїна, горизонтальні розгалуження, здорові гілки, вірусна інфекція, надмірний, виробляти багаточисельні бруньки, надземні стебла, нагадувати.

IV. Read the words, underline the suffixes, define a part of speech and translate them:

to affect – affection – affected
to cause – causer – causative
to infect – infection – infectious
to produce – production – productive
to know – knowledge – known
to include – inclusion – inclusive
to vary – variety – various
to depend – dependence – dependent

V. Suggest an appropriate synonym for each of the following words in the text:

- disease
- variety
- humid
- area
- produce
- various
- appear
- result
- exist
- cluster

VI. Complete the following sentences of the text with appropriate word from the list. Make sure you use the correct form:

weight, stem, abnormalities, fasciation, term, develops, hormones, resemble, growth, disturbances, witches` - broom, plant, flattening, distorted, apical,

affected, tissue

Fasciation

This condition is best placed in that category of teratological ... known as monstrosities. ... is a ... that has been used to describe a series of abnormal ... phenomena resulting from many different causes, all of which result in ... of the main axis of the plant. Although a ribbonlike expansion of the ... is often the most striking feature of this condition, all parts of the ... may be ... . As fasciation ..., the growing point of the plant becomes broader; the unregulated ... growth results in significant increases in the ... and volume of the plant. The ... growing point becomes linear and comblike in some instances or develops numerous growing points, producing a ... effect. In still other instances, the growing points may be coiled and ... a ram's horn, or they may be fused and highly ... into a grotesque tangle of coils.

There seems little doubt that nutritional changes due to ... in the growth-hormone relationships in a plant play an important role in fasciation. It has been suggested that mould is contribution of growth ... in the plant is also a cause of these abnormalities.

VII. Can you explain the terms?

- anthracnose
- shoot
- witches` - broom

VIII. One word doesn't belong to each of the following groups. Cross out the word:

a) wither, wilt, air, blight, lesion, rotting;
b) humid, connection, wet, damp, moist, watered;
c) fungi, mite, beetle, bug, caterpillar, bud;
d) disease, illness, ache, pain, stone, symptom.

IX. Check you know the meaning of the phrasal verb "*to break*". Match the verb on the right with its meaning on the left:

1. The growth of the chest-nut tree ceased suddenly due to cold weather.	to break down
2. The disease affecting park shrubs began early in June.	to break off
3. The experiments to develop a new variety of ornamental flower for this cool region failed.	to break out
4. The flowers can be divided into groups according to their life length.	to break up

CHECK YOUR GRAMMAR

X. Point out sentences of the text in the Passive Voice. Change them into the Active Voice.

XI. Match the beginnings of the sentences with their endings. Make sure your sentences make sense:

1. The disease affects	a) in many plants, including grasses and annuals
2. Shade trees are	b) in tiny, sunken saucer-shaped fruiting bodies known as acervuli
3. The disease is found	c) variety of plants in warm, humid areas
4. It commonly infects	d) it thrives in cool climates
5. The fungi produce spores	e) developing shoots and leaves
6. Unlike other forms of anthracnose	f) especially susceptible

XII. Make up questions to the following answers:

1. A: ….?
   B: It`s a group of fungal diseases.
2. A: ….?
   B: It affects plants in warm, humid areas.
3. A: ….?
   B: Shade trees such as sycamore, ash, oak and maple are especially susceptible.
4. A: ….?
   B: The disease causes the wilting, withering and dying of tissues.
5. A: ….?
   B: The causative fungi produce spores.
6. A: ….?
   B: Symptoms include sunken spots of various colours in leaves, stems, fruits and flowers.
7. A: ….?
   B: The severity of the infection depends on both the causative agent and the infected species.
8. A: ….?
   B: Dogwood anthracnose thrives in cool climates.
9. A: ….?
   B: Anthracnose can be avoided by destroying diseased parts, using disease-free seed and disease-resistant varieties.
10. A: ….?
    B: Witches`-brooms are derived from the tissues of the host.
11. A: ….?
    B: The witches`-brooms tend to break away from the normal correlations of the parent plant.

12.A: ….?

B: Similar structures occur in certain plant species after virus infection.

DEVELOP YOUR COMMUNICATIVE SKILLS

XIII. Make up your own dialogue using the following expressions:

- a group of fungal diseases
- shade trees
- to be susceptible
- to cause wilting and dying
- sunken spots
- the severity of the infection
- can be avoided
- applying fungicides
- many-branched structures
- independent existence
- vegetative buds
- virus infection
- excessive stimulation
- secondary shoots

XIV. Make a summary to the whole text.

UNIT 14

I. Read and memorize the following words and word-combinations:

turgidity (n) -	опуклість
droop (v) -	звисати, в'янути, никнути
confuse (v) -	плутати
injury (n) -	пошкодження
compaction (n) -	компактність, щільність
genus (n) (*pl* genera) -	рід
induce (v)	викликати, стимулювати
stunt (v)	зупиняти ріст (рослини)
shrivel (v)	зморщувати (ся), зсихатися
ooze (n) -	просмоктування, виділення вологи
squeeze (v) -	стискувати
streak (n) -	смужка, жилка
soak (v) -	усмоктувати (ся), всмоктувати (ся)
resistant (adj) -	стискати, міцний
stringent (adj) -	суворий, обов'язковий
tan (adj) -	рудувато-коричневий колір
dull (adj) -	тьмяний, тусклий
curl (v) -	крутити, витися

cling (v) -	чіплятися, прилипати
inject (v) -	вводити, вприскувати
wound (n) -	рана
spot (n) -	пляма
thrip (n) -	
bunchy (adj) -	той, що росте пучками
petiole (n) -	черешок (листка)
mottle (v) -	цяткувати
destroy (v) -	знищувати
debris (n) -	скалки, уламки
destructive (adj) -	руйнівний, згубний
vine (n) -	виноградна лоза, сланка рослина
sapwood (n) -	заболоть
lengthwise (adv) -	в довжину
weed (n) -	бур'ян
vigour (n) -	сила, енергія
tool (n) -	інструмент, знаряддя
harbour (n) -	притулок
fumigate (v) -	дезінфікувати
treat (v) -	обробляти, піддавати дії

Word-combinations

crown rot –	гниття крони
excess water –	надмірна кількість води
water-conducting –	той, що проводить воду
insect-control measures –	заходи боротьби з комахами
root graft -	кореневе щеплення (рослини)
prompt removal -	швидке усунення

II. Read the text and summarize the main points under the following headings:

1) bacterial wilt;
2) oak wilt;
3) spotted wilt;
4) verticillium wilt

TEXT

WILT

Wilt is a common symptom of plant disease resulting from water loss in leaves and stems. Affected parts lose their turgidity and droop. Specific wilt

diseases-caused by a variety of fungi, bacteria, and viruses-are easily confused with root and crown rots, stem cankers, insect injuries, drought or excess water, soil compaction, and other noninfectious problems.

Bacterial wilt, caused by numerous species of the genera *Corynebacterium, Erwinia, Pseudomonas*, and *Xanthomonas,* induces stunting, wilting, and withering, starting usually with younger leaves. Stems, which often shrivel and wither, show discoloured water-conducting tissue. A bacterial ooze is often evident when infected stems are cut and squeezed. Rapidly expanding, dark green, water-soaked areas or streaks may develop first in leaves.

Bacterial wilt may be managed by growing resistant varieties, planting disease-free materials in well-drained, fertile soil that is clean or sterilized; observing stringent sanitation including weed- and insect-control measures and rotating susceptible crops.

Oak wilt, caused by the fungus *Ceratocystis fagacearum*, is a serious disease in the eastern half of the United States. All oaks (*Quercus)* are susceptible, as are Chinese, European, and American chestnuts (*Castanea*) and a tan oak (*Lithocarpus densiflorus*). Trees in the red oak group usually die within several weeks during late spring and summer. Their leaves turn pale or dull green, look water-soaked, curl upward, and often become yellowed or bronzed from the margins inward; the upper branches are usually affected first. White oaks commonly die back slowly over several years. Their leaves usually wilt, turn light brown, curl, and cling to their stems. The disease is spread from tree to tree by natural underground root grafts, sap- and fungus-feeding insects, and possibly by squirrels.

Control measures include prompt removal of diseased trees, injecting fungicide into the soil midway between healthy and recently infected trees, avoidance of injuring or pruning of trees from budbreak to midsummer, and painting wounds promptly with tree wound dressing.

Spotted wilt, caused by a virus, is transmitted by the larvae of several species of insect called *thrips.* Plants commonly are stunted and bunchy. Brown, purplish, pale green, red, yellow, or white rings (often zoned) and spots form in leaves, flowers, and fruit. Long streaks may develop in petioles and stems. Leaves are distorted, sometimes mottled, and may turn yellow or bronze. Tops may wilt and wither; fruit is often rough and distorted. Control includes growing resistant varieties and disease-free stock, spraying or dusting during *thrips* infestations, promptly destroying infected plants and crop debris after harvest, and observing stringent weed control.

Verticillium wilt is a very destructive fungal disease in cool climates. It affects several hundred species of trees, shrubs, vines, flowers, house plants, vegetables, fruits, field crops, and weeds. The causal agent is the soil-inhabiting ascomycete fungus *Verticillium albo-atrum* and the related *V. dahliae*. In hot weather the leaves on one or more branches turn dull green to yellow, wilt, and wither, often from the base upward. Annuals and young trees are often stunted and usually die. Perennials may die branch by branch over a period of from several weeks to years or apparently recover. The sapwood (just beneath the bark) of

wilted branches, when cut lengthwise, usually shows dark streaks. Infections occur through roots and wounds.

Control can be obtained by growing disease-free and resistant or immune plants, rotating with highly resistant or immune plants for five years or longer, destroying infected plants and susceptible weeds, fertilizing and watering to encourage vigour, removing wilted branches on trees and shrubs, sterilizing tools between cuts, and avoiding the wounding of roots or stems when planting or cultivating. Soil known to harbour *Verticillium* can be fumigated or heat-treated to kill the disease organisms.

III. Give the English equivalents to the following words and word-combinations:

загальні симптоми захворювання; легко сплутати; посуха; чисельні види; викликати; припинення росту; уражені стебла; зів'янення, що викликається бактеріями; чистийґрунт; бліднути; верхнігілки;
розповсюджуватися; комахи, щоїдять грибок; білки; сприскування фунгіцидів; уникнення уражених дерев; засоби перев'язання рандерев; переноситися; лялечка; обцятковане листя; жовкнути; знищення; суворо дотримуватися боротьби з бур'янами; грибок, що живее у ґрунті; одужувати; під корою; стійкі рослини; стимулювати.

IV. Complete the table to make the word-families. Use the dictionary to help you. In case there is no corresponding derivative put a No sing

Noun	**Verb**	**Adjective**	**Adverb**
		specific	
turgidity			
		noninfectious	
compaction			
		bacterial	
		resistant	
sanitation			
			usually
	inject		
			rapidly

V. Match the words on the left with the words on the right and then use them to speak about wilt.

water, common, plant, root, insect, soil, oak, water-conducting, healthy, resistant, disease-free, bacterial, stringent, susceptible, late, upper, root, mottled	disease, rots, injuries, compaction, tissue, crops, ooze, varieties, materials, symptom, branches, sanitation, grafts, loss, wilt, leaves, spring, trees

VI. Match the terms with their definitions:

fungicide	vital juice circulation in plants
wither	morbid poison, poison of contagious disease
fungus	injury done by cut or stab or blow or tear
Sap	fungus-destroying substance
Virus	morbid condition of body, plant, or some part of them, illness, sickness
infection	trim (tree) by cutting away superfluous branches
wound	communication of disease, esp. by agency of atmosphere or water
disease	insect from time of leaving egg till transformation into pupa, grub
Prune	make, or become dry and shriveled, deprive of or lose vigor or vitality or freshness
Larva	cryptogamous plant without chlorophyll feeding on organic matter; mushroom, toadstool or allied plant including molds

VII. Complete the following sentences with the correct form of the word:

1) *Affect (v) / affection (n)*

1. The disease … occurs among weak plants.
2. The disease …bark of the trees.

2) *Infect (v) / infection (n) / infectious (adj)*

1. The … spread very quickly.
2. The fungi … stems and leaves of the tree.
3. The … agents injure tops of the shrubs.

3) *Soak n(/ soak (v)*

1. … is in the upper layer of the soil.
2. Water … into the mulch.

4) *Manage (v) / management (n)*

1. Control … includes different measures.
2. Resistant varieties can … bacterial wilt.

5) *Injure (v) / injury (n)*

1. … can be caused by larvae.
2. The beetles … the fruits of the plants.

VIII. Make up noun chains using the following words of the text as main ones:

Example: crown rots (N+N)

disease, injury, water, compaction, measures, group, grafts, midway, dressing, infestations, debris, control, organisms.

Use the word - combinations in your own sentences.

CHECK YOUR GRAMMAR

IX. State the functions of Participle I and Participle II in the following sentences and translate them:

1. Wilt is a common symptom of plant disease resulting from water loss in leaves and stems.
2. Affected parts of the plants droop.
3. Specific wilt diseases are easily confused with root and crown rots.
4. Stems show discoloured water-conducing tissue.
5. Rapidly expanding water-soaked areas may develop first in leaves.
6. The leaves become yellowed and bronzed.
7. The disease is spread by fungus-eating insects.
8. Young trees are often stunted.

X. Translate the following sentences into English:

1. Зів'янення дубу спричиняється грибком *Ceratocystis fagacearum.*
2. Європейські та Китайські дуби вразливі до цієї хвороби.
3. Руді дуби гинуть за декілька тижнів в кінці весни.
4. Їх листя блідне, закручується догори і часто жовкне з країв до середини.
5. Першими, зазвичай, уражуються верхні гілки.
6. Білі дуби гинуть повільно протягом декілька років.
7. Хвороба розповсюджується від дерева до дерева підземними черешками, комахами, що харчуються соком дерев та б*і*лками.

XI. **Ask questions to the following answers:**

1. A: …?
   B: Affected parts lose their turgidity and droop.
2. A: …?
   B: Fungi, bacteria and viruses cause specific wilt diseases.
3. A: …?
   B: Bacterial wilt induces stunting, wilting and withering.
4. A: …?
   B: Water – soaked areas may develop first in leaves.
5. A: …?
   B: Bacterial wilt may be managed by growing resistant varieties, planting disease – free materials, observing stringent sanitation.
6. A: …?

B: Oak leaves turn pale or dull green, look water-soaked, curl upward and become yellowed or bronzed.

7. A: …?

B: The disease is spread by underground root grafts, sap – and fungus – feeding insects and by squirrels.

8. A: …?

B: Control measures include prompt removal of diseased trees, injecting fungicide into the soil, avoidance of injuring or pruning of trees from bud break to midsummer and painting wounds promptly with tree wound dressing.

9. A: …?

B: Spotted wilt is transmitted by the larvae of several species of insect called *thrips*.

10. A: …?

B: Brown, purplish, pale green, red, yellow, or white rings and spots form in leaves, flowers, and fruit.

11. A: …?

B: Fruit is often rough and distorted.

12. A: …?

B: Control includes growing resistant varieties and disease – free stock, spraying and dusting during thrips infestations, etc.

13. A: …?

B: The wilt affects a lot of species of trees and shrubs and vines.

14. A: …?

B: Annuals and young trecs are often stunted and usually die.

15. A: …?

B: Control can be obtained by growing disease – free and resistant or immune plants.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Using the following verb – schemes, compose a dialogue:

…. lose …
…. is caused by …
…. are easily confused with …
…. induces …
…. shrivel and wither …
…. is often evident …
…. may develop …
…. may be managed …
…. is sterilized …
…. are susceptible …
…. turn …
…. become …
…. is spread …
…. include …

…. is transmitted …
…. are stunted …
…. may develop …
…. are distorted …
…. affects …
…. may die …
…. occur …
…. can be obtained by …

XIII. Make a summary to the whole text «Wilt».

UNIT 15

I. Read and memorize the following words and word-combinations:

nematode (n)	нематода
conspicuous (adj) -	помітний
ornamental (adj) -	декоративний
penetrate (v) -	проникати всередину
deposit (v) -	відкладати
decline (v) -	занепадати
search (n) -	пошук
succumb (v) -	піддаватися, ставити жертвою
menace (n) -	загроза, небезпека
dot (v) -	ставити крапки
hatch (v) -	вилуплятися
toll (n) -	жертва
exact (v) -	вимагати
grove (n) -	гай, лісок
dagger (n) -	кинжал
sting (n) -	жало, укус
burrow (v) -	рити нору, ховатися, жити в норі
orchid (n) -	орхідея
chrysanthemum (n) -	хризантема
begonia (n) -	бегонія
fern (n) -	папороть
beetle (n) -	жук
weevil (n)	довгоносик
harmful (adj) -	шкідливий
adult (adj) -	дорослий
bore (v) -	бурити, розточувати
bark (n) -	кора
cambium (n) -	камбій

stalk (n) -	стебло
deadwood (n) -	сухостій
trunk (n) -	стовбур
cone (n) -	шишка
semiwoody (adj) -	напівдерев'яний
herb (n) -	трава
cerambycid (n) -	церамбіцид
scarab (n) -	жук скарабей
chafer (n) -	травневий жук
rotation (n) -	обертання, чергування
fumigate (v) -	дезінфікувати, обкурювання
nematicide (n) -	нематицид
steam (n) -	пара
prohibit (v) -	забороняти
carrier (n) -	носій
promote (v) -	сприяти, підтримувати
fallow (n) -	*(с.г.)*пар
loosen (v) -	рихлити

Word – combinations

gall-like swelling – опуклість у вигляді садна
root-knot – кореневий вузол
nursery stock – розсадник
damaged tissues – пошкоджені тканини
speck – sized cysts – пухирі розміром з цяточки
stubby-root – кремезне коріння
pine-needles – соснові голки
similar habits – схожі звички
long-horned –довгорогі
non-host plants – рослини, які не годують паразитів
preplanting treatment – обробка до висадки
confined areas – обмежені території
cultural practices – агротехнічні засоби

II. Read the text and summarize the main points under the following headings:

1. nematodes;
2. beetles;
3.weevils.

TEXT

PESTS

Root-knot nematodes (*Meloidogyne* species) are well known because of the conspicuous "knots," or gall-like swellings, they induce on roots. More than

2,000 kinds of higher plants are subject to their attack. Losses are often heavy, especially in warm regions with long growing seasons. Certain species, however, such as the northern root-knot nematode (*M. hapla*), are found where soil may freeze to depths of nearly a metre. Vegetables, cotton, strawberry, and orchard trees are commonly attacked. Garden plants and ornamentals frequently become infested through nursery stock.

Root-lesion nematodes (*Pratylenchus* species), cosmopolitan in distribution, are endoparasites that cause severe losses to hundreds of different crop and ornamental plants by penetrating roots and making their way through the tissues, breaking down the cells as they feed. They deposit eggs from which new colonies develop. After a root begins to decline in vigour, nematodes move into the soil in search of healthy roots. Lesions form in the root as fungi and bacteria enter damaged tissues, and root rot often occurs. Annual crops may succumb early in the season, but perennials and orchard trees may not decline for several years.

The golden nematode (*Heterodera rostochiensis*) is a menace of the European agricultural industry. Great efforts have been made to control it. The speck-sized golden cysts that dot infested plant roots are the remains of female bodies. Each cyst may contain up to 500 eggs, which hatch in the soil over a period of up to 17 years. A chemical given off by plant roots stimulates hatching of the eggs.

A related, cyst-forming species, the nematode (*H. schachtii*), is a pest that has restricted agricultural acreage in Europe, Asia, and America.

The nematode (*Tylenchulus semipenetrans*) exacts a heavy toll in fruit quality and production. Typical symptoms are a slow decline, yellowing and dying of leaves, and dieback of twigs and branches in many groves 15 years or older. Infested nursery stock has widely distributed the nematode. The burrowing nematode (*Radopholus similis*) is a serious endoparasite in tropical and subtropical areas, where it attacks citrus (causing spreading decline), banana, avocado, tomato, black pepper, abaca, and more than 200 important crops, trees, and ornamentals, causing severe losses.

Many important ectoparasites feed on plant roots—dagger nematodes (*Xiphinema*), stubby-root nematodes (*Trichodorus*), spiral nematodes (*Rotylenchus* and *Helicotylenchus*), sting nematodes (*Belonolaimus*), and pin nematodes (*Paratylenchus*). Leaf, or foliar, nematodes (*Aphelenchoides* species) and bulb and stem nematodes (*Ditylenchus dipsaci*) cause severe losses in vegetable and ornamental bulb crops, clovers, alfalfa, strawberry, sweet potato, orchids, chrysanthemums, begonias, and ferns.

Control measures for nematodes often include rotation with nonhost plants, growing of resistant varieties and species, use of certified, nematode-free nursery stock, and use of soil fumigants (nematicides) as preplanting or postplanting treatments. Steam or dry heat is applied to soil in confined areas, such as greenhouse benches and ground beds. Exposure to moist heat, such as steam or hot water at 50 °C for 30 minutes, is sufficient to kill most nematodes and nematode eggs. Shorter periods are needed at higher temperatures. State and federal

quarantines prohibiting movement of infested soil, plants or plant parts, machinery, and other likely carriers also exist. Cultural practices to promote vigorous plant growth (i.e., watering during droughts, proper application of fertilizers, clean cultivation, autumn and summer fallowing, use of heavy organic mulches or cover crops, and ploughing out roots of susceptible plants after harvest) are useful for specific nematodes. Asparagus, marigolds (*Tagetes* species), and *Crotalaria* species are toxic to many plant-infecting nematodes.

Most of the beetles and weevils harmful to humans are phytophagous (plant feeders). Of primary importance are the leaf beetles (*Chrysomelidae)* and the weevils and their relatives (*Curculionoidea*). Leaf-beetle larvae feed on leaves, stems, or roots of plants, and most adults chew leaves. Various species of weevil larvae or adults have been found feeding on almost every plant part; especially numerous are species that bore into trunks, stems, and seeds. Both larval and adult forms of *Scolytinae* (bark beetles) are serious pests; they feed beneath tree bark, harming vital areas of living trees (e.g., cambium, pine needles, leaf stalks). The *Platypodinae* have similar habits, but the tropical *Brentidae* (primitive weevils) usually attack deadwood.

The long-horned beetles (*Cerambycidae*) bore into stems, trunks, roots, and cones of living and dead trees and large semiwoody herbs; adults often feed on tender new bark. *Buprestidae* (metallic wood borers) have habits similar to those of cerambycids. They kill trees or branches by boring in the cambium. The scarab beetles (*Scarabaeidae)* include many important pests of crop plants, lawns, and pastures. The larvae of many *Melolonthinae* (June beetles, chafers), for example, feed on grass roots. The *Dynastinae* (rhinoceros, Hercules, and elephant beetles) are often pests of palms, killing them by destroying the growing points.

INCREASE YOUR VOCABULARY

III. Give the Ukrainian equivalents to the following words and word – combinations:

root-knot nematodes, to be subject to attack, losses, long growing seasons, certain species, northern, may freeze, infested, root-lesion, different crops, to break down the cells, to deposit eggs, to decline in vigour, healthy roots, to damage tissues, to control pests, female bodies, to hatch in the soil, fruit quality, dying of leaves, twigs, spiral, plant feeders, leaf-beetle larvae, beneath, similar habits, elephant beetles, postplanting, during droughts.

IV. What derivatives can you make with the words? Define the parts of speech they belong to.

- special
- deep
- distribute
- differ
- stimulate
- relate

- cause
- certify
- plant
- promote

V. Suggest an appropriate antonym for each of the following words from the text:

unknown

- imperceptible
- top
- gain
- height
- rarely
- the same
- thrive
- diseased
- minor
- exclude
- weak
- frost
- rainfall

VI. Explain the meaning of the terms:

- pest
- species
- bark
- root-lesion
- cell

VII. Complete the following sentences of the text with an appropriate word from the list. Make sure you use the correct form:

seedlings, masses, feed, ornamental, destructive, seeds, mistletoe, sending, crown, deciduous, stunted, types.

Mistletoe

Mistletoes are semiparasitic seed plants that ... on trees and obtain water and mineral salts by ... rootlike structures (haustoria) into vascular tissue of the inner bark. There are three important ... : American (*Phorodendron* species), European (*Viscum album species)* and dwarf (*Arceuthobium* species). All produce sticky ... spread by birds. American mistletoe is best known for its ... and sentimental uses at Christmastide. The leafy, bushy evergreen ... , up to one metre or more in diameter, appear on tree branches. They are most conspicuous after ... leaves have fallen.

The European ... is similar in habit and appearance to its American relative. Tree branches infected by mistletoes may become ... or even die.

Dwarf mistletoe is common on and very ... to conifers in forests. ... and young trees may be stunted, deformed, or killed. Conspicuous witches'-brooms form in the ... or spindle-shaped swellings (later cankers) in limbs and trunk.

VIII. Confirm or contradict the following statements using the introductory phrases given on page:135

1. Root-knot nematodes induce on branches.
2. Root-lesion nematodes break down the cells as they feed.
3. Affected roots begin to decline in vigour.
4. Lesions don't form on the root as fungi and bacteria enter damaged tissues.
5. The speck-sized golden cysts that dot infested plant roots are the remains of male bodies.
6. A chemical given off by plant roots stimulates hatching of the eggs.
7. Infested nursery stock can distribute nematodes widely.
8. Leaf and bulb nematodes cause light losses in ornamental bulb crops.
9. Most of the beetles and weevils harmful to human are phytophagous.
10. The long-horned beetles bore into stems, trunks, roots and cones of the trees.

CHECK YOUR GRAMMAR

IX. Fill in the gaps below with a suitable preposition.

for, to, from, along, on, beyond, of, into, in, with

Dwarf mistletoes occur scattered ... conifer limbs and small branches. After the mistletoe has grown internally ... about a year, the branch may start to form a witches'-broom. Four ... five years elapse before the yellow ... brown ... olive-green shoots form fruits. The sticky seeds are shot with explosive force ... the fruit ... horizontal distances ranging ... 5 ... more than 18 metres (16 ... more than 59 feet); this is one ... the most remarkable methods ... seed discharge among plants. Once seeds adhere ... a branch, they germinate ... young bark and penetrate ... the host tree vascular system. Control ... mistletoes ... individual trees involves removal ... infected branches a foot or more ... any evidence ... the parasite before the fruits ripen.

X. Arrange the words to form sentences:

1. widely, dodder, of, more, distributed, are, one hundred, than, species.
2. around, the leafless, and, host, yellow-orange, twine, a number, thread-like, garden, stems, plants, of.
3. draw, dodder, together, may, plants, until, formed, and, a, patch, downward, is, orange, yellowish.
4. usually, the first, area, less, metres, the infested, is, across, three, than, year.
5. with, distributed, seed, dodder, field, as, widely, a contaminant, is.

6. by, controlled, properly, is, dodder, certified, planting, cleaned, seed.
7. sprinkled, the dried, with, and, patches, fuel, are, burned, oil.

XI. Ask questions to the following sentences:

1. A: …?
   B: Root-knot nematodes induce gall-like swellings on roots.
2. A: …?
   B: Losses are often heavy especially in warm regions.
3. A: …?
   B: Ornaments become infested through nursery stock.
4. A: …?
   B: Root-lesion nematodes penetrate roots.
5. A: …?
   B: Fungi and bacteria enter damaged tissues.
6. A: …?
   B: Typical symptoms are a slow decline, yellowing and dying of leaves and dieback of twigs and branches.
7. A: …?
   B: Yes, it does. The burrowing nematode attacks trees and ornamental.
8. A: …?
   B: Leaf nematodes cause severe losses in orchids, chrysanthemums, begonias and ferns.
9. A: …?
   B: Various species of weevil larvae or adults bore into trunks, stems and seeds.
10. A: …?
    B: Control measures for nematodes and beetles, include rotation with nonhost plants, growing of resistant varieties and species, use of certified, nematode-free nursery stock, and use of soil fumigants (nematicides) as preplanting and postplanting treatments.

XI. Find in the text sentences with Gerunds and define their functions.

DEVELOP YOUR COMMUNICATIVE SKILLS

XII. Read and translate the dialogue. Title it revealing its main idea.

Jack: Hello, Ben!
Ben: Hello, Jack!
Jack: Where are you going to?
Ben: I am going to the university library to prepare a report about parasitic weeds for students` conference.
Jack: What are these weeds called?
Ben: They are called *witchweeds.*
Jack: Where are they distributed?

Ben: They are distributed in Asia and South Africa.
Jack: What do the weeds parasitize?
Ben: They parasitize the roots of many hostplants.
Jack: What may their serious infestation cause?
Ben: It may cause plants to be severely stunted, wilt and turn yellow or brown, thus reducing the acre yield. Witchweed robs the host of water and food.
Jack: How can the weeds be controlled?
Ben: Control measures should include application of selective herbicides before seeds are produced, rotation with a resistant crop and keeping plantings free of weed grasses that may serve as hosts.
Jack: I think it`s a very interesting and important theme. There is no doubt that your report will be one of the best. Good luck!
Ben: Thank you! Bye!
Jack: See you soon!

XIII. Make a summary to the text.

XIV. Read, translate the verse and title it.

(by Rivraf)

Living in their mad homicidal world beneath the soil
munching devouring consuming, antennae probing and strobing
the multi-legged strangers weed and seed and feed beyond our sight.
They are fellow travellers with you and I, these aliens.
Acculturated to the rocky underbelly, cellars deep and dark
cracks and crevices, harsh and hot terrains,
fallen trees, below beyond between
hidden from site they chomp and munch and breed.
Some strut that underworld bearing hardened shields fortified like tanks.
There too, tiny five-eyed monsters sit slyly spying prey to sup.
Built into many the tools to grasp and tear
they stun and poison
some shoot deadly darts, sticky glue, and silk threads that entomb
pokers, pinchers, prodders, their stores are filled with hardware.
When wandering beyond their borders and falling into ours,
we jump for fear of them, despite their size and ours.
Women scream (not all) and men respond brutally (again, not all)
chasing and killing the interloper
Sometimes they are eaten!
And yet I know these hairy leggy scary things exist as I exist
Their claim to life as good as mine
I think about their place primordial, and believe they fear my deadly ways.

Two worlds existing side by side, one tame one wild.
But which one?.
They live in the dinosaur age. Can we be dinosaurs?
Those tiny creatures crawling blade to blade, grass twenty times taller than they
chewing fighting killing entwining, epic battles fought.
We do not exist on equal scale with them
Countless species proliferating there, and spinning webs here
I see them down there now churning and chewing and turning the soil
…. helping the worms …
…. who are they …?

TASK FOR SELF-STUDY
TEXT 1
IMPORTANCE OF PLANTING TREES

Part A

1. Read the text and retell it according to your own plan

Since the very beginning trees have given us the gift of life's essentials, such as food and oxygen. Many generations passed and we discovered other many uses of trees and exploited them for our survival. They are so rich in value and significance that their uses have only increased as to satisfy the needs created by our modern lifestyles. To begin with, the wood from the trees was used as fuel and the fruits were consumed by humans. The shade was used to escape heat and fire to escape cold.

As we evolved and started having modern problems, trees yet remained the same to our modern problems. Trees can be cut down on energy and conserve a lot of electricity if planted in the right place and they provide you with the richest oxygen available in the atmosphere. However, we overlook these benefits. We cut the very trees that give us so much to live with and then mull over the fact that nature is being unfair. Well, we need to respect Mother Nature and value the great advantages that trees bless us with every day.

A tree, in its entirety has the ability to contribute each of its parts to sustain life. From its leaves to the roots and its bark, every part of a tree has something to offer and has profound value. To make you well-equipped with the benefits, here is a breakdown of the categories of perquisites that trees provide us.

Ecological and Environmental Significance

Trees greatly contribute to their environment by providing oxygen, supporting wildlife, improving air quality, conserving water, preserving soil, and climate amelioration. By only performing its primary function of photosynthesis, it contributes more than it takes. Trees take in the carbon dioxide in the air and produce oxygen for living, breathing organisms around it. A study suggests that an acre of forest can produce up to 4 tons of oxygen by absorbing 6 tons of carbon dioxide that can cater to around 20 people for a year.

Not only trees but shrubs and turf also have their own role to play on this process. They purify the air by absorbing the pollutants such as carbon monoxide, nitrogen dioxide, and sulfur dioxide. Once they have come in contact with the trees, the pouring rain washes all the pollutants away. Through this process, the air in the atmosphere is regulated and maintained, all thanks to the trees. Climate change and control are also one of the essential functions of trees. They moderate the effects of sun, rain, and wind in order to keep the climate in control. The beaming energy of the sun is absorbed and filtered by the leaves that help to keep a cool temperature around it.

The most important function that they perform is keeping greenhouse gases. So trees can lower the air temperature, maintain low levels of carbon dioxide, and

thereby reducing the greenhouse effect in the atmosphere. Apart from that, they also conserve the warmth by acting as a shield to winds, heavy rain, sleet, and hail. Therefore, trees can manage and influence wind speed and direction in order to maintain a balanced atmosphere.

Be it above the surface or below, trees have a pivotal role to play in the ecosystems in which they live. The far-reaching roots of the trees help the soil be in place and counter erosion. Trees absorb the rainwater and store it that reduces runoff and sediment deposits after heavy storms.

The herbivorous organisms only thrive on leaves and fruits provided by the trees. Many animals such as elephants, koalas, and giraffes consume leaves for nourishment. The sweet nectar is for the birds, bats, and other insects. Fruits are consumed by animals.

Many animals, birds, and squirrels reside in them and are happy to dwell in the leaves-covered trees to stay away from predators. Trees are an important facet of our ecology and have a place for every living creature in the world.

Part B

1. **Read and translate the text**

Social and Community Value

Trees play an essential part of every community and one must make huge efforts to maintain it that way. You might have observed that your streets, parks, playgrounds, and backyards are lined up with trees due to their medicinal and life-giving properties. Human settlements are incomplete without trees as they create a peaceful and calming environment. The quality of your life can be determined by the number of trees around them.

Trees bring natural elements and wildlife habitats into the urban settlements and make them worth living. The shade provided by trees during the day is used by all of us for family picnics and afternoon outdoor activities. The presence of trees in a community can definitely elevate the importance of planting trees and the quality of life. Many old trees stand strong as the community's pride and serve as historic landmarks. The commercial buildings and pavements cause heat island effects on the atmosphere and the presence of trees can deflect the sunlight and reduce the heat island effect to a great extent.

Therefore, it is extremely pivotal to grasp the value of planting trees and contribute it to the society you live in. There have been many instances, wherein trees are cut brutally to the ground to make space for more buildings. But we need to understand that without trees, settlements will fail to be self-sufficient and they will decay with the course of time. What sense does it make to grow them and cut them down to build a life? It is like cutting down the oxygen to save a dying patient. More and more people need to understand the importance of planting trees and join as one to fight against cruel deforestation procedures.

Personal and Spiritual Value

Trees play a very personal and important part of our lives. There are many reasons why we love trees and planting trees but the most important reason is that

trees provide us with two of life's most essentials, food, and oxygen. Trees are both ravishing and majestic to look at. Different species of trees have varied appearances with respect to their shapes, forms, textures, and vibrant enchanting colours.

Individual trees change their appearance as the seasons come and go. Trees have so many good qualities which make them the most useful nature gift but their best quality is their ability to provide oxygen that is very essential for human survival. Some of the advantages of planting trees are that they provide food, protection, and homes for many birds and mammals. People must understand the importance of planting trees and how it helps our environment in so many ways. Trees are often associated with pleasant, calm, and relaxed feelings.

Trees play a major role in developing one's childhood and record the history of the family as they grow and develop beside you and your family. People emotionally connect with the trees that they plant and instantly create a bond with them. We get personally attached to the trees that we like and see every day. Because of these strong bonds that we have with trees, there are multiple groups and organizations across the world that solely deal with protecting and saving large and historic trees from the risks of our modern developments.

Trees in certain countries also have spiritual and religious value as they consider trees next to gods and also worship them on certain occasions. Therefore it can now be understood that trees play a vital role in shaping our environment and also how important it is to plant trees. Trees have many sentimental values that are immeasurable.

Part C

1. Make a summary to the text.

Practical and Commercial Value

Trees have always been the reason for the subsistence of life on earth. Throughout our existence, trees have given us more than just life but also the means to sustain it. Another reason why every day should be a tree plantation day is that they have practical and commercial uses too. Wood procured from the trees was among the first fuel discovered by human and is still widely used by many people for cooking and heating. It is an ancient practice that still holds ground.

Apart from that, trees provide timber that can be used for the construction of buildings, manufacturing furniture, tools, equipment for sports, and many other household items that you use on a day to day basis.

And let us not forget about the sweet fruits that trees provide, for personal consumption and commercial usage. Apples, oranges, mangoes, many other fruits and nuts that trees provide us are a tasty gift given by the mighty trees to us. Every part of a tree can be used for many things, such as the bark of certain kind of trees can be made into a cork and is a great source of chemicals and medicines.

You might be familiar with quinine and aspirin, these are common pills that are made out of tree bark extracts. Further, the inner part of the bark is said to contain latex, which happens to be the main ingredient for making rubber. All in

all, trees have a great commercial value and we use to exploit it to an extent where they lose their natural freshness. Due to commercialization, trees are fed fertilizers to produce more which results in their decaying.

It is vital to understand the importance of planting trees. Trees perform photosynthesis and are a living organism as well, hurting them or cutting them down for selfish human reasons has to stop and we need to act on it as if every day is a tree plantation day.

Property and Economic Value

Trees, individually have a great value and contribute to savings as well but a collection of trees that is well- maintained can make a real economic impact. The most direct way in which trees help economically is through cutting energy costs. A house that is well shaded by trees will have low cooling costs than any other house.

Similarly, by acting as a windbreak, heating costs can also be lowered with the help of trees, preferably deciduous trees that can allow the sun to pass through and keep your house warm. Proper placement of trees around your house can keep your space cool in summer and warm in winter while helping you save up to 20-50 % on energy. Trees also increase the value of any property.

A well-designed house with pre-placed trees will have greater monetary worth than a house with no trees. The value of a well-landscaped home with mature healthy trees can be as much as 10% higher than a similar home with no or little landscaping.

Apart from these, there are also some indirect economic advantages of trees. If you preserve your energy usage, then utility companies will have less demand from the infrastructure. This in turn will reduce the operating costs that will be passed on to the consumer. Overall, economically, trees save a lot of money and effort if you value their significance in your living.

TEXT 2
MEDICAL THERAPEUTIC BENEFICIAL SERVICES OF PLANTS IN URBAN ENVIRONMENT

1. Read the text and answer the following questions:

1.What effects of urban vegetation on human health can be?

2. Do green environments included into hospital facilities have beneficial effects on patients?

3. Is the practice to use medicinal plants old?

4. Did the therapeutic role of gardens in hospitals become less in the twentieth century?

5. Can the patients in hospital rooms with a window view of trees better recover from surgery than others laying without a view of green areas?

6. What does a healing garden provide?

The effects of urban vegetation on human health can be direct or indirect. Direct benefits are those contributing to ameliorate life conditions of residents (e.g., reducing exposure to dangerous temperatures or pollutants); indirect benefits encompass other aspects of the physical human health, bringing people together in open spaces and spend time outdoor, where to meet, exercise, and practice sport activities, thus contributing to personal wellness and improving social connections. Indirect benefits also refer to improvements in the restoration of cognitive functions in response to viewing nature, to enhancement of cultural services, such as natural heritage, aesthetic value, "sense of place". Ultimately, plants in urban environment contribute to generate an idealized feeling for nature increasing psychological, health and social well-being.

Green environments included into hospital facilities (green plants and flowers, as well as water and other natural elements), are thought since long time to have beneficial effects on patients, despite the fact that the first report about a measurable effect of nature on health appeared relatively recently. This belief likely started because of the use of medicinal plants. This practice is more than 100,000 years old both in Eastern and Western cultures. For example, in European Middle Age monasteries until the nineteenth century the healing process was completely dependent on plants and herbs cultivated in enclosed gardens (cloisters). The therapeutic role of gardens in hospitals became less and less prevalent during the twentieth century, until the link between nature and healing was totally lost. Main changes occurred from 1950 to 1990, when the therapeutic value of access to nature disappeared from hospitals in most western countries. Hospitals were built like office buildings where air conditioning replaced natural ventilation and outdoor terraces and balconies disappeared; green areas succumbed to car streets and parking lots. By the end of the century, this scenario changed again and the prevalent role of gardens in recovering from stress and illness is now acknowledged in several study cases. Since 1984 some medical articles have been published, reporting that patients in hospital rooms with a window view of trees can better recover from surgery than others laying without a view of green areas. A healing garden provides general benefits, thus serving as a restorative resource and an ecosystem service, helping patients, visitors, and staff alike to cope better with stress experienced in connection with their own or others' illness. It is therefore somehow surprising that caretaking constructions built after industrial revolution in Europe often do not include appropriate green spaces and infrastructures.

The therapeutic value of plants in general, and of trees in particular, is highlighted by the so called "*healing gardens*," i.e., landscapes that allow for the improvement and restoration of an individual's mental and physical health. These gardens are appositely established in proximity or within hospitals and other healthcare facilities. They are addressed not only to patients, but also to visitors, staff, caregivers, themselves not physically ill, who might value a garden as a place of restoration. The concept of "Healing Garden" comprises both the place—the

garden—and the process—the possibility for recovering health—, which intertwine each other.

TEXT 3
NEGATIVE FEATURES OF TREES AND INTERACTIONS WITHIN URBAN AREAS
Part A
Emission of Substances That Can Be Released By Plants Into the Environment

1. Make up dialogues on the base of the text.

Appreciating the positive role and function of plants in urban areas seems somehow a straightforward issue that goes beyond any kind of controversial opinions. Why then urban forests, parks and gardens are not more widely planned and exploited worldwide? Indeed, a few negative interactions between plants (especially trees) and urban settings do occur, and are of concern (often exaggerated or misconceived) by residents, city-planners and policy-makers. Easy examples are damages or accidents caused by tree falling in urban environment, or by means of transportation (automobiles, motorcycles, bicycles) accidentally impacting on large trees that pave streets and roads.

We will try to summarize some possibly negative plant features when growing in urban environments as it follows.

Several plant species commonly widespread in the urban areas produce and release in the environment substances that can be either toxic to humans, or can interfere with atmospheric chemistry and physics.

Some frequently planted species in urban and peri-urban green areas and streets worldwide are among the main agents of allergies that can adversely affect human health. They include cultivated trees (e.g., cypress, poplar) and wild weeds and herbs (e.g.,*Parietaria* spp.). Allergic reactions to pollen or other substances released by plants (from irritation of the eyes and skin to severe asthmatic reactions) are becoming common among urban residents. Such allergies might have a great impact on health and generate environmental and socio-economic costs.

Moreover, emission of Biogenic Volatile Organic Compounds (BVOCs) by plants plays a crucial role in biosphere-atmosphere interactions. BVOCs (especially isoprenoids, which are produced and emitted during the day) react with other compounds released in the atmosphere as consequence of human activities. The result of this reaction may have a cleansing effect on the atmosphere, or more often can cause some increment of aerosols and particles, therefore contributing to negatively affect air quality. Many tree species that are favourites in urban settings for their rapid growth emit a range of BVOCs (e.g., poplars and deciduous oaks are strong isoprene emitters, while live oaks are major emitters of monoterpenes). BVOC impact on the urban atmosphere depends on anthropogenic emissions. However, BVOC emissions also scale across species, taxonomic status and other

“life history traits” and should be accurately monitored when associated to anthropogenic pollution. Scientific literature on BVOCs and their importance both in rural lands and urban areas is rich and comprehensive.

In addition to interfering with the atmospheric chemistry, BVOCs play also an important role in interactions between plants and animals, which are usually determined by both visual and olfactory signals. BVOC rapid scavenging by reaction with anthropogenic emissions, and the formation of a range of secondary volatile compounds which do not serve the same purpose as primary BVOCs, can therefore disturb and interrupt plant-animal communication and mutual interaction, also affecting plant signaling consequent to stress endurance.

PART B
HINDRANCE OF PEOPLE MOBILITY

1. Read the text and discuss its main idea.

The presence of large old plants may, in some cases, bring to negative consequences in urban environments. City residents usually are disturbed by plant aging processes (e.g., trees dropping dead branches or deadwood falling on the ground), and tall trees near houses may cause shading (e.g., winter shade of evergreen trees) or problems for building maintenance, e.g., clogging drainage pipes with falling leaves. Moreover, large branches falling from trees are a hazard for public safety sometimes causing injuries and death of people who are accidentally hit. Tree fall is becoming more and more frequent and worrisome because of increasing tree age, and insufficient maintenance of city green areas but also because exposure to stress induced by climate change (both abiotic and biotic) make trees more vulnerable. Finally, plants growing near traffic areas can decrease road and traffic light visibility and increase the risk for traffic accidents, and falling leaves may contribute to make worse road conditions, especially when combined with bad weather events (e.g., making slippery roads and pavements during and after rainfalls).

Trees play an important role in controlling water regime and reducing wind damage. However, their potential in urban storm water and wind management also depends on the species and the life stage. If winds are too strong, plants oscillate until branches, or the whole trees, fall or are even uprooted. It is important to understand how plants have adapted to their wind environment and evaluate the impact wind damage can have on individual plants and plant communities in urban ecosystems, including an assessment of economic importance of wind damage. Trees shedding leaves, particularly older and bigger ones, can better survive severe winter wind storms. However, stem or branch injuries, which facilitate insects and fungi attacks, reduce the mechanic resistance of trees to strong wind and threaten the life of plants and the benefit they are supposed to provide. Despite the social value and the potential catastrophic impact of urban tree falling (e.g., building damage, human deaths or injuries, and impact on service such as electricity and

transport) urban trees have been less studied than trees growing in forests far from cities.

PART C
DAMAGES TO URBAN ARTIFACTS AND MONUMENTS

1. Make a summary to the text.

Archaeological and historical sites are often integrated in urban environments where stone monuments and vegetation (from trees to mosses), and microorganisms, interact. Indeed, depending on composition, exposure, and porosity of the substrate, plant and microflora communities can grow on different habitats, both vertical and horizontal, such as walls, ruins, rocky surfaces, sculptures, and stone and marble artifacts.

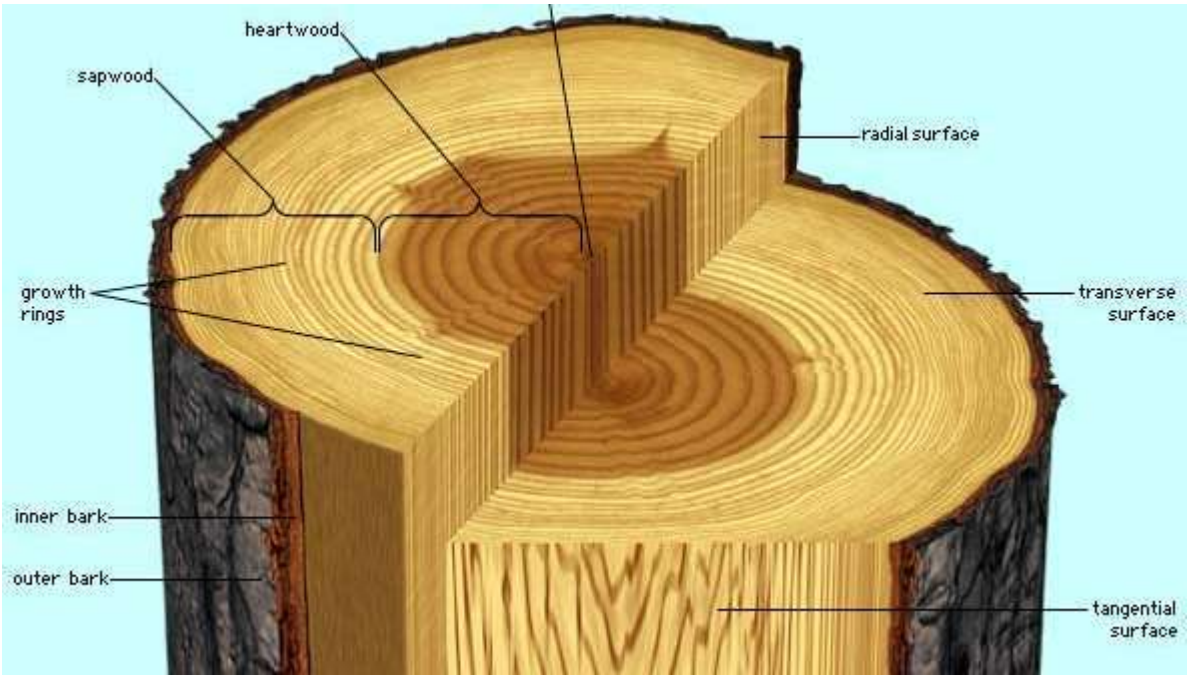
In rock decay processes, both physical and chemical mechanisms are involved. The first step of decay is stone alteration caused by synergic physical actions (rain, wind, sunlight, and freezing and thawing cycles). Consequently, the stone surface becomes progressively rough and characterized by the formation of micro fractures. The result is a loss of cohesion of stone material and the general weakening of the superficial structural strength, which makes stones a suitable living environment for plants and microorganisms. Growth of living organisms may degrade heritage monuments, leading to aesthetic and structural deterioration. Esthetic damages, such as color and/or shape modification, are caused by biofilm formation; mechanical and chemical damages occur at the surface as well as in the inner zone of the artifacts and can induce monument decay.

Damage to stones caused by living organisms is often referred to as bioweathering or "biodeterioration". Under particular climatic conditions, such as high humidity, fungi are extremely erosive and may penetrate inside stone, marble, and antique glass, and cyanobacteria, algae and lichens may also contribute to the weathering of stone. Some organisms, particularly those interacting with higher plants (e.g., at the root system level), have a high biodeterioration potential, which leads to the formation of pits and causes problems for the conservation of cultural heritage. Among higher plants, trees may bring to most negative consequences to historic monuments. Tree-stone interactions occur at belowground and aboveground level. Belowground, trees influence soil characteristics (hydrology, chemistry, structure) through the root system, which can develop both in depth and laterally for several meters. If tree roots grow in mortars between stones (the zones with lower resistance) they may cause cracking and damages to monuments, and further stone weathering. In archaeological sites where buildings have been buried and rebuilt in piles over the centuries, as is the case in Rome, tree roots can damage the walls because of the short distance between the vaults of ancient buildings and the present ground level. Tree stability may also be threatened by poor root anchorage to unstable stones; fall of trees as consequence of strong winds may cause serious injuries to monuments. Moreover, tree crowns may obscure the view of the whole site and alter its context and landscape. Plants growing too close

to buried monuments, e.g., catacombs or temples may cause detachment of frescos or damage to walls.

TEXT 4
TREE STRUCTURE

1. Describe tree structure using the information given in the text.



A transverse slice of tree trunk depicts major features visible to the unaided eye in transverse, radial, and tangential sections.

Immediately adjacent is a cylinder of ground tissue; in the stem the outer region is called the cortex and the inner region the pith, although among many of the monocotyledons (an advanced class of angiosperms, including the palms and lilies) the ground tissue is amorphous and no regions can be discerned. The roots of woody dicots and conifers develop only a cortex (the pith is absent), the innermost layer of which comprises thick-walled wall cells called endodermal cells.

The final tissue system of the primary plant body is the vascular tissue, a continuous system of conducting and supporting tissues that extends throughout the plant body. The vascular system consists of two conducting tissues, xylem and phloem; the former conducts water and the latter - the products of photosynthesis. In the stems and roots the vascular tissues are arranged concentrically, on the order of cylinder series. Each column, or cylinder, of primary vascular tissue develops the primary xylem towards the inner aspect of the column and the primary phloem towards the outer aspect. The multiple vascular cylinders are arranged throughout the cortex, either in an uninterrupted ring between the cortex and pith or separated from each other by ground tissues. In some monocotyledons the vascular cylinders are scattered throughout the stem.

Regardless of their arrangement, however, the multiple vascular columns form strands from the leaves to the roots, moving water and nutrients where they are most needed.

TEXT 5
TREE HEIGHT GROWTH

1. Read the text and retell it according to your own plan.

The two primary determinants of height growth are the number of height growth units (the node plus its subtending internode) produced during each growing season and elongation of the internodes. This process is sensitive to environmental factors such as water availability, soil quality, and climatic variation, as well as to the time of year when height growth units are initiated and when they elongate. This is correlated with variation in growth hormone production by expanding buds and leaves.

Most north temperate trees form their leaves during the development of the terminal buds of the previous year to some degree. In these species the number of height growth units for the year is determined to a great extent during the previous year. For example, those of the grand fir (*Abies grandis*) in the area of Vancouver are preformed in October, so that at spring bud break those height growth units elongate and develop; then a new bud is initiated in July. Thus, the environmental conditions between July and October affect the number and properties of the height growth units that grow out during the current year. Since the leaves are the source of carbohydrates required for wood and bark formation, the climate of the previous year also affects the diameter growth of the current year. Examples of preformers are most pines, fir, hickory, spruce, Douglas fir, beech, and oak. Some trees are neoformers, because they form most or all of their leaves during the current year of growth. Examples of this are birch, chestnut, poplar, willow, larch, tulip tree, and some tropical pines. Seedlings will often be neoformers and then become preformers as adults.

The monopodial form of tree growth is maintained by the dominance of the apical buds over the lateral buds. The healthy apical bud produces a sufficient hormonal influence over the lateral buds to keep them suppressed; however, some species abort the terminal bud either annually, as in the basswood (*Tilia americana*), or occasionally, as in the American birch (*Fagus grandifolia*). In these cases, the new terminal growth originates from a lateral branch, causing sympodial growth.

Besides terminal buds and axillary buds formed in the axils of leaves, buds may form outside the apical meristem. This is called adventitious growth. When a bole of a tree that has been shaded for a number of years is suddenly exposed to light, new buds, called epicormic buds, may be initiated. Epicormic buds may be adventitious in origin or formed from dormant axillary trace buds. In many cases, buds may grow out those which were formed by or outside the shoot meristem but became dormant until induced by environmental factors. Rather unique

adventitious buds may develop on roots and grow out as shoots. These are called root suckers; the process is called suckering.

There is also variation in the number of bud flushes per year in temperate as well as tropical trees. Trees like the preformer eastern white pine (*Pinus strobus*) have a single flush per year followed by formation of a dormant terminal bud. Other species have several flushes per year, but each flush is followed by formation of a terminal bud.

Finally, there are species that have a terminal bud but then extend height growth unit formation throughout the growing season until setting a terminal bud with some of the following year's leaves at the end of the growing season. Some species, such as lodgepole pine (*Pinus contorta*), are polycyclic; they have several flushes from a single bud during the growing season.

Height growth is terminated at the end of the growing season by factors such as the length of day. Occasionally, mild fall weather may induce buds that normally would not flush until the following spring. These are often termed lammas shoots.

Obviously, there is a limit to the height of trees. One observation is that the tallest and most massive trees are found in moist habitats, such as the Pacific Northwest of the United States and tropical rainforests. This suggests that the process of lifting water to the tops of trees may be a major limitation to the development of tree height.

TEXT 6
ADAPTATIONS OF TREES

I. Read the text and put questions to the following answers:

1. A:… ?

   B: The environmental factors affecting trees are climate, soils, topography, and biota.

2. A:… ?

   B: Each species of tree adapts to these factors in an integrated way.

3. A:… ?

   B:Each subpopulation adapts to decrease in temperature by modifying the optimum temperature.

4. A:… ?

   B: Many tree species that survive in unfavourable habitats grow better in more-favourable habitats if competition is eliminated.

5. A:… ?

   B: Competition within a species is often most intense because the individuals compete for the same environmental resources.

6. A:… ?

   B: The ability of a tree to coexist with other members of the species in a given habitat may depend on the diversification of the space and resources they require.

7. A:… ?

B: The niche for a plant species is the set of environmental conditions that permits a given species to exist based on its morphological, anatomical, cytological and physiological capacities.

8. A:… ?

B: Competition between trees is more severe under limiting conditions (water, nutrients, or light) than it is under toxic conditions.

9. A:… ?

B: Trees may respond to their environment chiefly by morphological and physiological responses.

The environmental factors affecting trees are climate, soils, topography, and biota. Each tree species adapts to these factors in an integrated way—that is, by evolving specific subpopulations adapted to the constraints of their particular environments. As discussed above, the major factor is the decrease in temperature with increasing elevation or extremes in latitude. Each subpopulation adapts to this by modifying the optimum temperature at which the all-important process of photosynthesis takes place.

Many tree species that survive in unfavourable habitats actually grow better in more-favourable habitats if competition is eliminated. Such trees have a low threshold for competition but are very tolerant of extremes. For example, the black spruce (*Picea mariana*) is found in bogs and mountaintops in the northeastern United States but cannot compete well with other trees, such as red spruce (*P. rubens*), on better sites. Consequently, in the White Mountains of New Hampshire in the northeastern United States, red spruce is found at the base of the mountains and black spruce at the top, with some development of subspecies populations (hybridization) at intermediate elevations.

Competition within a species (and in some cases genus) is often most intense because the individuals compete for the same environmental resources. Since trees are unable to move in search of resources, competition for available space and resources can be important. Competition aboveground centres on light, space, and symbionts (largely pollinators), while that below ground is over water, space, nutrients, and symbionts (microorganisms such as mycorrhizae and nitrogen-fixers).

The ability of a tree to coexist with other members of the species in a given habitat may depend on the diversification of the space and resources they require. In extreme environments, such as are found on mountains and in the subarctic, survival depends on the physical factors of the environment, whereas in more-moderate habitats biotic factors become increasingly important. Flexibility and efficiency of resource use then become more important in determining survival and reproduction.

The concept of species' niche relates the species or individual to the totality of its environment. The niche for a plant species is the set of environmental conditions that permits a given species to exist based on its morphological, anatomical, cytological, and physiological capacities.

For a given species there are limiting values for each environmental factor; they define the niche. Habitats change over time, but changes in species are not as rapid or drastic as those of habitats. In addition to changes that take place within chronological time, tree species and forests change during developmental time—for example, seedlings of trees such as a white pine (*Pinus strobus*) are generally more tolerant of shade than are the adult forms of the species.

Competition between trees is actually more severe under limiting conditions (water, nutrients, or light) than it is under toxic conditions. Under toxic pollution levels, the tree may be damaged by the surplus of a single toxic element or condition, and the species least susceptible will be the most successful. Plants that can most fully exploit a habitat tend to dominate it, and, since trees have evolved trunks that allow them access to the aerial environment and massive root systems that permit them to infiltrate the subterranean environment, they dominate much of the biosphere. Trees are at a disadvantage only in drier areas, in Alpine and Arctic environments, and in competition with humans.

The number of tree species within a forest tends to increase as they approach the Equator. This is due to various environmental factors, including decreased stress in terms of light, temperature, water, and length of the growing season. The productivity and heterogeneity of the habitats also increase in these situations. Moreover, the frequency of disturbance (e.g., storms, floods, landslides, and fires) is greater, as is the response to the disturbance, which also contributes to species diversity in tropical forests.

Trees may respond to their environment in a number of ways, chiefly by morphological and physiological responses as well as by the reallocation of available nutrients and water to those organs in most need. There are usually both genotypic and phenotypic aspects to such physiological and morphological adaptations. Moreover, there is a dynamic equilibrium between genetic stability (the capacity of individuals to produce offspring adapted to the parental environment) and genetic variability (the capacity to produce offspring with requirements that are different from those of their parents). Genetic variability produces some offspring with a greater potential to adapt to new habitats and also to changes induced by the disturbance of the original habitat.

TEXT 7
TREE BARK

I. Say what new information you have obtained from the text. Use it preparing your report for a students' conference.

Most tree species have a bark that is unique in structure and appearance; in fact, many trees can be identified by the characteristics of their bark alone. In some species the bark looks similar throughout the life of the plant, while in others there are dramatic changes with age.

The term *tree bark* refers to the tissues outside the vascular cambium. The inner bark is composed of secondary phloem, which in general remains functional in transport for only one year. A second type of lateral (nonapical) meristem, called

the cork cambium, develops in some of the cells in the older phloem and forms cork cells. The cork cells push the old secondary phloem cells toward the outer margins of the stem, where they are crushed, torn and eventually slough off. All tissues outside the cork cambium constitute the outer bark, including the nonfunctional phloem and cork cells. The cork may develop during the first year in many trees and form exfoliating bark, while in others, such as beeches, dogwoods, and maples, the bark may not exfoliate for several years. In cases of delayed formation, the outer covering of the stem, the periderm or the epidermis, must enlarge and grow to keep pace with the increase in stem diameter.

A bark minimizes water loss from the stems, deters insect and fungal attack, and can be a very effective protector against fire damage, as is demonstrated by the high fire resistance of redwood and giant sequoia trees, which have a massive bark.

The cork cambium provides an effective barrier against many kinds of invaders; however, in being so resilient, it also cuts off the outer secondary phloem and tissues from the rest of the wood, effectively killing it. Thus, the outer bark is made up entirely of dead tissue.

The pattern of cork development is the main determinant of bark appearance. In some barks the cork cambium and cork tissues are laid down in a discontinuous and overlapping manner, resulting in a scaly bark type of (pines and pear trees); in other barks the pattern is continuous and in sheets (a paper birch and a cherry). Barks show various patterns intermediate between these extremes.

The cork cambium primarily produces a single cell type, the cork cells; however, the walls may be thick or thin. A birch bark peels because it has alternating layers of thick- and thin-walled cork cells. A birch bark also has numerous pores on the bark, called lenticels, and these are also associated with cork formation because they provide openings for gas exchange. In most cases, they form at the location of stomates.

A bark varies from the smooth, copper-coloured covering of the gumbo-limbo (*Bursera simaruba*) to the thick, soft, spongy bark of the punk or cajeput, tree (*Melaleuca leucadendron*). Other types of a bark include the commercial cork of the cork oak (*Quercus suber*) and the rugged, fissured outer coat of many other oaks; the flaking, patchy-coloured barks of sycamores (*Platanus*) and the lacebark pine (*Pinus bungeana*); and the rough shinglelike outer covering of shagbark hickory (*Carya ovata*).

TEXT 8
FLORICULTURE

1. **Read the text and confirm or contradict the following statements according to the text. Use the table given on page 135.**

1. Floriculture has long been an important part of horticulture.
2. Flowers and pot plants are largely produced in plant-growing structures in tropical climates.
3. The flower grower must provide precise environmental control.

4. The floriculture industry doesn't involve the grower, who mass-produces flowers for the wholesale market.

5. Florists market flowers to the public.

6. The development of airfreight has decreased interregional and international competition.

7. The industry of landscape horticulture is grouped into growing, maintenance, and design.

8. Growing of plants for landscape is called selection.

9. The nursery industry is often expanded to include ornamental bulb crops.

10. Most nursery crops are not ornamental.

11. The type of nursery plants grown is connected with location.

12. Wholesale, retail, and mail-order operations are included into the nursery industry.

13. Many nurseries also develop design of the planting in addition to furnishing the plants.

Floriculture has long been an important part of horticulture, especially in Europe and Japan, and accounts for about half of the nonfood horticultural industry in the United States. Because flowers and pot plants are largely produced in plant-growing structures in temperate climates, floriculture is largely thought of as a greenhouse industry; there is, however, considerable outdoor culture of many flowers. The industry is usually very specialized with respect to its crop; the grower must provide precise environmental control. Exact scheduling is imperative since most floral crops are seasonal in demand. Because the product is perishable, transportation to market must function smoothly to avoid losses.

The floriculture industry involves the grower, who mass-produces flowers for the wholesale market, and the retail florist, who markets to the public. The grower is often a family farm, but, as in all modem agriculture, the size of the growing unit is increasing. There is a movement away from urban areas, with their high taxes and labour costs, to locations with lower tax rates and also towards more favourable climatic regions (milder temperature and more sunlight). The development of airfreight has emphasized interregional and international competition. Flowers can be shipped long distances by air and arrive in fresh condition to compete with locally grown products.

The industry of landscape horticulture is divided into growing, maintenance, and design. Growing of plants for landscape is called the nursery business, although a nursery refers broadly to the growing and establishment of any young plant before permanent planting. The nursery industry involves production and distribution of woody and herbaceous plants and is often expanded to include ornamental bulb crop corms, tubers, rhizomes, and swollen roots as well as true bulbs. Production of cuttings to be grown in greenhouses or for indoor use (foliage plants), as well as the production of bedding plants, is usually considered part of floriculture, but this distinction is fading. While most nursery crops are

ornamental, the nursery business also includes fruit plants and certain perennial vegetables used in home gardens, for example, asparagus and rhubarb.

Next to ornamental trees and shrubs, the most important nursery crops are fruit plants, followed by bulb crops. The most important single plant grown for outdoor cultivation is the rose. The type of nursery plants grown depends on location; in general (in the Northern Hemisphere) the northern areas provide deciduous and coniferous evergreens, whereas the southern nurseries provide tender broad-leaved evergreens.

The nursery industry includes wholesale, retail, and mail-order operations. The typical wholesale nursery specializes in relatively few crops and supplies only retail nurseries or florists. The wholesale nursery deals largely in plant propagation, selling young seedlings and rooted cuttings, known as "lining out" stock, of woody material to the retail nursery. The retail nursery then cares for the plants until growth is complete. Many nurseries also execute the design of the planting in addition to furnishing the plants.

TEXT 9
BULB CROPS

I. Read the text and speak about one of the bulb crops grown in Ukraine.

The bulb crops include plants such as the tulip, hyacinth, narcissus, iris, daylily, and dahlia. Included also are nonhardy bulbs used as potted plants indoors and summer outdoor plantings such as amaryllises, anemones, various tuberous begonias, caladiums, cannas, dahlias, freesias, gladioli, tiger flowers, and others. Hardy bulbs, those that will survive when left in the soil over winter, include various crocuses, snowdrops, lilies, daffodils, and tulips.

Many bulb crops are of ancient Old World origin, introduced into horticulture long ago and subjected to selection and crossing through the years to yield many modern cultivars. One of the most popular is the tulip. Tulips are widely grown in gardens as botanical species but are especially prized in select forms of the garden tulip (which arose from crosses between thousands of cultivars representing several species). Garden tulips are roughly grouped as early tulips, *Breeder's* tulips, cottage tulips, *Darwin* tulips, lily- flowered tulips, *Triumph* tulips, *Mendel* tulips, *Parrot* tulips, and others. The garden tulips seem to have been developed first in Turkey but were spread throughout Europe and were adopted enthusiastically by the Dutch. The Netherlands has been the centre of tulip breeding ever since the 18-th century, when interest in the tulip was so intense that single bulbs of a select type were sometimes valued at thousands of dollars. The collapse of the "tulipmania" left economic scars for decades. Today the Netherlands remains the chief source of tulip bulbs planted in Europe and in North America. The Netherlands has also specialized in the production of related bulbs in the lily family and provides hyacinth, narcissus, crocus, and others. The Dutch finance extensive promotion of their bulbs to support their market. Years of meticulous growing are required to yield a commercial tulip bulb from a seed.

Thorough soil preparation, high fertility, constant weeding, and careful record keeping are part of the intensive production, which requires much hand labour. Bulbs sent to market meet specifications as to size and quality, which assure at least one year's bloom even if a bulb is supplied with nothing more than warmth and moisture. The inflorescence is already initiated and the necessary food is stored in the bulb. Under less favourable maintenance than that prevailing in the Netherlands, a subsequent year's bloom may be smaller and less reliable; it is not surprising therefore that tulip-bulb merchants suggest discarding bulbs after one year and replanting with new bulbs to achieve maximum yields.

TEXT 10
A FOREST HYMN

(by William Cullen Bryant)

I. Read the verse and define its main thought. Do you like forests? Why "yes" or "no"?

The groves were God's first temples. Before man learned
To hew the shaft, and lay the architrave,
And spread the roof above them, before he framed
The lofty vault, to gather and roll back
The sound of anthems; in the darkling wood,
Amidst the cool and silence, he knelt down,
And offered to the Mightiest solemn thanks
And supplication. For his simple heart
Might not resist the sacred influences,
Which, from the stilly twilight of the place,
And from the gray old trunks that high in heaven
Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs,
That our frail hands have raised? Let me, at least,
Here, in the shadow of this aged wood,
Offer one hymn - thrice happy, if it finds
Acceptance in His ear.
Father, your hand
Has reared these venerable columns, you
Wove this verdant roof. You looked down
Upon the naked earth, and, forthwith, rose
All these fair ranks of trees. They, in thy sun,

Budded, and shook their green leaves in the breeze,
And shot towards heaven. The century-living crow,
Whose birth was in their tops, grew old and died
Among their branches, till, at last, they stood,
As now they stand, massy, and tall, and dark,
Fit shrine for humble worshipper to hold
Communion with his Maker. These dim vaults,
These winding aisles, of human pomp and pride
Report not. No fantastic carvings show
The boast of our vain race to change the form
Of your fair works. But you are here - you are filled
With solitude. You are in the soft winds
That run along the summit of these trees
In music; you are in the cooler breath
That from the inmost darkness of the place
Comes, scarcely felt; the barky trunks, the ground,
The fresh moist ground, are all instinct with you.
Here is continual worship; nature, here,
In the tranquility that you do love,
Enjoys your presence. Noiselessly, around,
From perch to perch, the solitary bird
Passes; and yon clear spring, that, midst its herbs,
Wells softly forth and wandering steeps the roots
Of half the mighty forest, tells no tale
Of all the good it does. You have not left
Yourself without a witness, in these shades,
Of thy perfections. Grandeur, strength, and grace
Are here to speak of thee. This mighty oak---
By whose immovable stem I stand and seem
Almost annihilated - not a prince,
In all that proud old world beyond the deep,
He wore his crown as lofty as he
Wears the green coronal of leaves with which
Your hand has graced him. Nestled at his root
Is beauty, such as blooms not in the glare
Of the broad sun. That delicate forest flower
With scented breath, and look so like a smile,
Seems, as it issues from the shapeless mould,
An emanation of the indwelling Life,
A visible token of the upholding Love,
That are the soul of this wide universe.

My heart is awed within me when I think
Of the great miracle that still goes on,

In silence, round me - the perpetual work
Of thy creation, finished, yet renewed
Forever. Written on thy works I read
The lesson of thy own eternity.
Look! all grow old and die - but see again,
How on the faltering footsteps of decay
Youth presses - ever gay and beautiful youth
In all its beautiful forms. These lofty trees
Wave not less proudly that their ancestors
Moulder beneath them. Oh, there is not lost
One of earth's charms: upon her bosom yet,
After the flight of untold centuries,
The freshness of her far beginning lies
And yet will lie. Life mocks the idle hate
Of his arch enemy Death – even, seats himself
Upon the tyrant's throne – the grave,
And of the triumphs of his ghastly foe
Makes his own nourishment. For he came forth
From your own bosom, and will have no end.

There have been holy men who hid themselves
Deep in the woody wilderness, and gave
Their lives to thought and prayer, till they outlived
The generation born with them, nor seemed
Less aged than the hoary trees and rocks
Around them; and there have been holy men
Who deemed it were not well to pass life thus.
But let me often to these solitudes
Retire, and in your presence reassure
My feeble virtue. Here its enemies,
The passions, at your plainer footsteps shrink
And tremble and are still. Oh, God! when You
Scare the world with falling thunderbolts, or fill,
With all the waters of the firmament,
The swift dark whirlwind that uproots the woods
And drowns the village; when, at Your call,
Rises the great deep and throws himself
Upon the continent, and overwhelms
Its cities - who forgets not, at the sight
Of these tremendous tokens of Your power,
His pride, and lays his strivies and follies by?
Oh, from these sterner aspects of Your face
Spare me and mine, nor let us need the wrath
Of the mad unchained elements to teach

Who rules them. Be it ours to meditate,
In these calm shades, Your milder majesty,
And to the beautiful order of the works
Learn to conform the order of our lives.

TEXT 11
GARDEN LANDSCAPING IDEAS – 10 STEPS TO LANDSCAPE A GARDEN FROM SCRATCH

I. Read the text and discuss ten steps to landscape a garden.

This guide to garden landscaping is a sound starting point when transforming your outdoor space from scratch – whether you're a pro or a total novice. Because creating a garden that is beautiful and satisfying, is more than a haphazard process. And anyone who has successfully landscaped a garden in their time is sure to agree. If you've come this far, you are likely to be working on a garden in your forever home, or at least, in the place that you happily call home for now. To really feel the benefits of your garden space, you'll need to follow some ground rules to ensure the most successful results.

It's a case of working with your foundations so that your planting and other cosmetic finishes can fall into place far more attractively. From weeding, to ground levelling, the best landscaping plants to use and which trees to consider, these garden landscaping ideas and tips will set you up for success.

1. Assess your site and your garden design

This is a crucial area that you should largely have covered when creating your garden design to understand the space you work with. The main reason of this is that you'll try to identify any issues so that you can prepare your efforts and materials accordingly – which will save you time and money in the long run.

This is what to consider:

- any rubbish to remove
- ground condition: levelling
- any awkwardly situated trees: likely to obstruct walkways or get in the way of groundwork
- any existing planting: hedges, garden beds and so forth
- any existing structures or features in place to remove or work with: fencing, garden rooms, water features, garden paths
- drainage: the state of the space after a downpour, any particular areas that become waterlogged
- top soil: the current state of any existing and will any be required
- find all the garden ideas in one place for inspiration on the final look you want.

2. Decide whether to diy or hire a garden landscaper

The key here is to know your limits and your budget. Planting, installing off-the-peg water features, adding a new gravel path or lawn, laying decking and garden fencing are within the scope of the keen amateur; however, walling, laying expensive stone pavers, concrete rendering and electrical work should be carried out by professionals for a quality, safe finish, even if you have a small plot.

3.Clear the site

This means tending to weeds (everyone's favourite job), overgrowth and getting rid of any garden waste. Visible rubbish is easy to remove, but using a pick (if the soil is compacted), or a garden rake and disturbing the soil can help release any rubble to be removed below.

This can be a tough job but it is completely necessary, especially if you're planning for lots of planting and vegetable growing. Big chunks of rubble make it harder for plants to establish and can potentially block drainage access also.

Determine whether this will be a light job and easy to do yourself, or if you need to hire a specialist.

4. Level the ground

This is a vital task as without a level ground, any landscaping materials such as patio and decking can't go down.

If you have a small garden space then you may be able to level the ground yourself using a rake. Use the teeth to break up large chunks of soil, while the back can also be used to smooth the surface by running it in a forwards and backwards motion to evenly distribute the soil.

If you have a big space where the soil is very compacted, or if you are working with a very sloped garden, then you may need to consider some professional help. A subtle change in level can help make a smaller garden seem larger, but sloped grass is undesirable as it can become slippy and unsightly very quickly. Terracing is probably the best way to work with a sloped garden, and it will allow you to have different levels of interest in your space.

Do bear in mind, however, that significant excavations are expensive. There’s the soil to remove and retaining walls are needed (to stop soil washing away), so you'll usually need to call in help from a professional structural engineer which can mean landscaping costs will add up.

5. Select hard landscaping materials that will stand the test of time

Identifying and exploring potential materials are more enjoyable parts of landscaping a garden.

While performance, durability and ease of maintenance are keys with all materials used in a garden setting, you should choose natural-looking surfaces that complement your home and design style. Earthy grey, deep honey brown and rustic dull red suit both period and new houses.

To successfully link your indoor and outdoor spaces, choose a similar material that was used in the room linked to the garden – just make sure it’s weatherproof. And, otherwise, garden designers will usually keep things simple by sticking with four different materials. Here are some options:

- **Patio paving.** There are lots of options available – from expensive York stone to concrete imitations, brick and granite.
- **Decking.** It can be a good choice where wooden flooring is used inside the house – very well suited in contemporary homes. Timber, oak and even teak can be perfect for a busy garden area as they are durable and stable materials that can deal with heavy footfall. Your decking will need a good pressure wash every once in a

while to keep algae and any slipperiness at bay, but it's sure to keep your garden looking fine for years to come.

- **Garden gravel**. It is an ideal material to use in both modern and period garden settings. It's versatile and can be used to edge a patio, to create more themed space or you could even lay a gravel path which is a cost-effect garden path idea.

- **Concrete flooring**. It will give you a great, contemporary finish and is a brilliant way to create uniformity between the outside and inside of your home.

- **Granite sets.** They can make an impact, and as they are typically used in driveway design so they will last for years to come.

6. Plan for wet ground and control damp

The ground can increase drainage, and if you install paving, this will help disperse water furthermore.

An important point to note is that your top soil level shouldn't surpass the damp-course of your home or other garden outbuildings to avoid running the risk of damp in any interior spaces. Six inches below should be recommended for a top level, including any materials on top like gravel etc.

If your land has waterlogging issues, then you may need to consider adding drains.

7. Plan your planting

This is the fun part, and plants, trees and any shrubbery should come next on the list, ahead of adding any garden lawns. The type of garden plants you choose, of course, depends on your garden design and the overall feel that you want to create in your outdoor space, but it also depends on the type of soil you have and on your garden aspect. Generally, a mixture of trees, flowers and evergreen shrubs will work well, creating year round interest so be sure to nod to wildlife with a mixture of garden plant ideas.

8. Think about zoning different areas in your garden

Zoning is one of the best garden landscaping ideas. It will make more use of all types of garden space: in a spacious cottage garden or in a small garden setting. Zoning can help define an outdoor kitchen, vegetable plot or family outdoor living space and so on – here is how to go about it like a professional:

- **Choose different hard landscaping and floor surfaces**. It gives an opportunity to differentiate between the dining, lounging and play areas. Obvious options include a stone material for the dining space, decking for the lounging area, and bark or grass for the play area.

- **Use different colours on fencing or walls.** It will create separate zones. White is a good backdrop for lounging areas that you want to feel bright and sunny, deep green is good for making play areas blend into the background, while deep shades, such as blue or aubergine make dining areas be comfortable during long summer evenings and is one of our favourite garden fence ideas around.

- **Let planters do the talking.** Plants can help define zones too, especially if you go for a strong colour theme by area. So, if your lounging space has a white

wall behind it and light-coloured decking, choose white flowers. If your dining space has a dark-coloured decking and aubergine walls, go for deep purple plants.

- **Architectural planting.** It can be used to divide up zones. A line of shapely box plants, set into a low wall, takes up very little space but creates a strong visual division between the lounging and dining areas. Or, group tall, tropical-looking plants at the far end of a dining space to disguise a play area beyond. Consider growing a vertical garden.

- **Don't neglect vertical space.** Living walls, screens, arbours, pergolas and trellis all provide garden privacy and somewhere to train flowering climbers for visual interest. Paint them to match your scheme; or, if you want your planting to do the talking, choose a neutral, natural paint shade for them, such as olive green or pale grey.

9. Add the final touches

You should start adding final touches to water features including any ponds that need filling. This is also when you can start to fill raised beds for your kitchen garden and so on. You'll be able to sow your lawn, or lay any turf around it to let it establish.

10. Tidy up

You may rather trim up, as once your grass has established you can mow it to your desired shape and make a start on your lawn edges. If you don't have a lawn then move onto the decorative aspects of your garden design to fulfil all of your outdoor space needs.

TEXT 12
FUNCTIONS AND CONCERNS OF GARDEN AND LANDSCAPE DESIGN

I. Read the text and discuss it in pairs.

Garden and landscape design is the development and decorative planting of gardens, yards, grounds, parks, and other types of areas. Garden and landscape design is used to enhance the settings for buildings and public areas and in recreational areas and parks. It is one of the decorative arts and is allied to architecture, city planning, and horticulture.

The vegetated landscape that covered most of the Earth's continents before human began to build still surrounds and penetrates even the largest metropolises. Efforts to design gardens and to preserve and develop green open space in and around cities are efforts to maintain contact with the original pastoral, rural landscape. Gardens and designed landscapes, by filling the open areas in cities, create a continuity in space between structural urban landscapes and the open rural landscapes beyond. Moreover, gardens and designed landscapes have a special type of continuity in time. Buildings, paintings, and sculpture may survive longer than specific plants, but the constant cyclical growth and change in plants provide a continuous time dimension that static structures and sculpture can never achieve.

Garden and landscape design is a substantial part but by no means all of the work of the profession in landscape architecture. Defined as “the art of arranging land and the objects upon it for human use and enjoyment,” landscape architecture also includes site planning, land planning, master planning, urban design, and environmental planning. Site planning involves plans for specific developments in which precise arrangements of buildings, roadways, utilities, landscape elements, topography, water features, and vegetation are shown. Land planning is for larger-scale developments involving subdivision into several or many parcels, including analyses of land and landscape, feasibility studies for economic, social, political, technical, and ecological constraints, and detailed site plans as needed. Master planning is for land use, conservation, and development at still larger scales, involving comprehensive areas or units of landscape topography or comprehensive systems such as open space, park-recreation, water and drainage, transportation, or utilities. Urban design is the planning and designing of the open-space components in urbanized areas; it involves working with architects on the building patterns, engineers on the traffic and utility patterns, graphic and industrial designers on street furniture, signs, and lighting, planners on overall land use and circulation, economists on economic feasibility, and sociologists on social feasibility, needs, and desires. Environmental planning is for natural or urbanized regions or substantial areas within them, in which the impact of development upon land and natural systems, their capacity to carry and sustain development, or their needs for preservation and conservation are analyzed exhaustively and developed as constraints upon urban design and master, land, and site planning. Within this framework of comprehensive survey, study, analysis, planning, and design of the continuous environment, garden and landscape design represents the final, detailed, precise, intensive refinement and implementation of all previous plans.

Ideally, all of these planning and design phases follow one another closely in a continuous sequential process, but this rarely happens. Various levels of planning and design are performed by different people at different times; often the more-comprehensive phases are not performed at all or are performed in an oversimplified manner. The wise gardener or landscape architect, therefore, always begins with a careful analysis of conditions surrounding the project.

Garden and landscape design deals with the treatment of land areas not covered by buildings, when those areas are considered important to visual experience, with or without utilitarian function. Typically, these land areas are of four types: those closely related to single buildings, such as front yards, side yards, and backyards, or more-extensive grounds; those around and between groups of buildings such as campuses, civic and cultural centres, commercial and industrial complexes; those bordering and paralleling transportation and utility corridors such

as parkways, freeways, waterways, power easements; and park-recreation open-space areas and systems. These areas may be of any size, from small urban courtyards and suburban gardens to many thousands of acres of regional, state, or national parks. Although usually conceived as vegetated green spaces on natural ground, they can include also playgrounds, urban plazas, covered malls, roof gardens, and decks, which may be almost entirely formed by construction and paving.

Garden and landscape design, therefore, works with a wide range of natural and processed materials capable of holding up well in the specific local climatic conditions of the site. These materials include earth, rock, water, and plants, either existing on the site or brought in; and construction materials such as concrete, stone, brick, wood, tile, metal, and glass.

ORAL INTRODUCTORY PHRASES TO CONFIRM OR CONTRADICT STATEMENTS

It seems to me I think (suppose, consider) On the contrary As to me To my mind Most likely As far as I know (remember) From my point of view There is no doubt I am (not) sure Maybe (perhaps) I can (not) assume that I hope, I am not mistaken I doubt Hardly Naturally…….	that's right (wrong) to say I (dis) agree with the statement it's a true (false) statement I shouldn't say so it's far from the truth it's beyond the truth it goes without saying	because… as ….

INTRODUCTARY PHRASES TO MAKE SUMMARIES TO TEXTS:

1. The text is titled …
2. It is written by … (The author of the text is …)
3. The text is about … (is devoted to … , is concerned with … , describes … , deals with … , considers … , contains … , touches upon … , discusses … , reviews … , emphasizes …)
4. The author starts … (notes … , states … , writes … , points out that … , mentions …)
5. It should be noted that … (stressed that … , pointed out that … , emphasized that … , mentioned that …)
6. There is no doubt that …
7. The following conclusion can be drawn …
8. This text made me think about …

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Навчальне видання
Шульга Ірина Валентинівна

АНГЛІЙСЬКА МОВА

Навчальний посібник
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