

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЧЕРНІГІВСЬКИЙ НАЦІОНАЛЬНИЙ ТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ

ENGLISH FOR FORESTRY

**Методичні вказівки
з англійської мови професійного спрямування
для самостійної роботи студентів
спеціальності 205 «Лісове господарство»**

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ВСТУП

Самостійна робота студента є однією з форм навчального процесу та основним засобом опанування навчального матеріалу в час, вільний від аудиторних занять. Комплексний підхід до самостійної роботи студентів денної форми навчання сприяє поглибленню та закріпленню знань, вмінь, набутих під час практичних занять, оволодінню навичками самостійного пошуку додаткового навчального матеріалу, якісній підготовці до практичних занять, до написання рубіжних модульних робіт.

Методичні вказівки складено відповідно до навчальної програми підготовки бакалаврів спеціальності 205 «Лісове господарство». Запропоновані матеріали призначені для самостійної роботи студентів першого року навчання. Кожний урок передбачає поетапне самостійне опрацювання теми і містить текст з фаху, необхідний мінімум професійної лексики, різноманітні вправи, спрямовані на закріплення лексичного матеріалу та розширення словникового запасу, завдання для розвитку мовленнєвих умінь та навичок. Окремим блоком подаються граматичні вправи, які можна використовувати для повторення, закріплення або активізації набутих навичок, а також тексти для додаткового читання. Запропоновані завдання множинного вибору, на визначення правильності/неправильності твердження, на заповнення пропусків, на зіставлення або встановлення відповідності можна виконувати як на практичному занятті, так і самостійно, користуючись відповідями для самоперевірки.

Принцип добору та подачі завдань, від найпростіших до більш складних, дозволяє студентам вдосконалювати професійно-орієнтовану іншомовну комунікативну компетенцію, залучати креативне мислення та критично підходити до оцінювання власних знань.

Урок1

Botanical classification of wood

Trees, being plants, fall into the botanical classification system of taxonomic groups – divisions, classes, orders, families, genera, and species. Hardwoods are included in the class called angiosperms, while softwoods fall in the class called gymnosperms. The gymnosperms are divided into seven orders, one of which is conifers which includes all commercially useful softwoods.

The angiosperms are further classified into two sub-classes of Monocotyledonous and Dicotyledonous.

Hardwoods of commercial importance belong to the Dicotyledonous sub-class. Trees, as well as other plants, are referred to most precisely by scientific names, which are composed of their genus and species: black walnut, for example, is *JUGLANS NIGRAL*. However, the common name (black walnut) is sufficient for most practical purposes. The initial following the scientific name denotes the scientist who named the plant, in this case Linnaeus, a Swedish botanist.

Необхідний мінімум професійної лексики:

1. plant – рослина
2. to fall (into) – потрапляти
3. taxonomy – таксономія, класифікація
4. division – відділ, тип (для рослин)
5. order – підряд (для рослин)
6. family - родина
7. genus (genera) – рід
8. species – вид
9. hardwoods – листяні породи
10. softwoods – хвойні породи
11. conifers – хвойні дерева
12. as well as – а також
13. to refer (to) – стосуватися
14. scientific – науковий
15. to compose – складати
16. black walnut – чорний горіх
17. common name – звичайна назва
18. sufficient – достатній
19. initial – ініціал
20. to denote – позначати
21. angiosperm – покритонасінний
22. gymnosperm - голонасінний
23. monocotyledonous – однодольний
24. dicotyledonous – двосім'ядольний

Вивчіть назви основних дерев:

1. acacia [ə'keɪ ʃ ə]	1. акація
2. white (black) locust ['ləʊkəst]	2. біла акація
3. alder ['ɔ : ldə]	3. вільха
4. ash [æʃ]	4. ясен
5. mountainash	5. горобина звичайна
6. aspen ['æspən]	6. осика
7. beech [bi: tʃ]	7. бук
8. birch[bɜ : tʃ]	8. береза
9. cedar ['si: də]	9. кедр
10. chestnut ['tʃ esnɒ t]	10. каштан
11. conifer ['kɒ nɪ fə]	11. дерево хвойне
12. crab [kræb]apple	12. яблуня дика
13. cypress ['saɪ prəs]	13. кипарис
14. deciduous tree [dɪ 'si dʒuəs]	14. дерево листяне
15. elder ['eldə]	15. бузина
16. elm [elm]	16. в'яз
17. fir [fɜ :]	17. ялиця (Abies)
18. hazel ['heɪ z(ə)l]	18. ліщина
19. hornbeam ['hɔ : nbi: m]	19. граб
20. juniper ['dʒu: nɪ pə]	20. ялівець
21. larch [lɑ : tʃ]	21. модрина
22. linden ['lɪ ndən]	22. липа
23. maple ['meɪ pl]	23. клен
24. oak [əʊk]	24. дуб
25. palm [pɑ : m]	25. пальма
26. pine [paɪ n]	26. сосна
27. pine forest	27. сосновий ліс
28. poplar ['pɒ plə]	28. тополя
29. rowan ['rəʊən]	29. горобина
30. sequoia [si 'kwɔ ɪ ə]	30. секвойя
31. silver fir [, si lvə'fɜ :]	31. ялиця біла (одноколірна)
32. silver maple	32. клен сріблястий
33. spruce [spru: s]	33. ялина, смерека
34. thuja ['θu: jə]	34. туя
35. willow ['wɪ ləʊ]	35. верба
36. weeping willow	36. верба плакуча
37. yew [ju:]	37. тис

Завдання:

1. Дайте відповіді на запитання:

- 1) What taxonomic groups of botanical classification do you know?
- 2) What Swedish botanist do you know?
- 3) What does the initial following the scientific name of a plant denote?
- 4) How many orders are the gymnosperms divided into?

5) Are the angiosperms classified into three sub-classes?

2. Додайте приєдник:

- 1) The gymnosperms are divided ____ seven orders.
- 2) Hardwoods are included ____ the class called angiosperms.
- 3) Trees are referred ____ most precisely ____ scientific names.

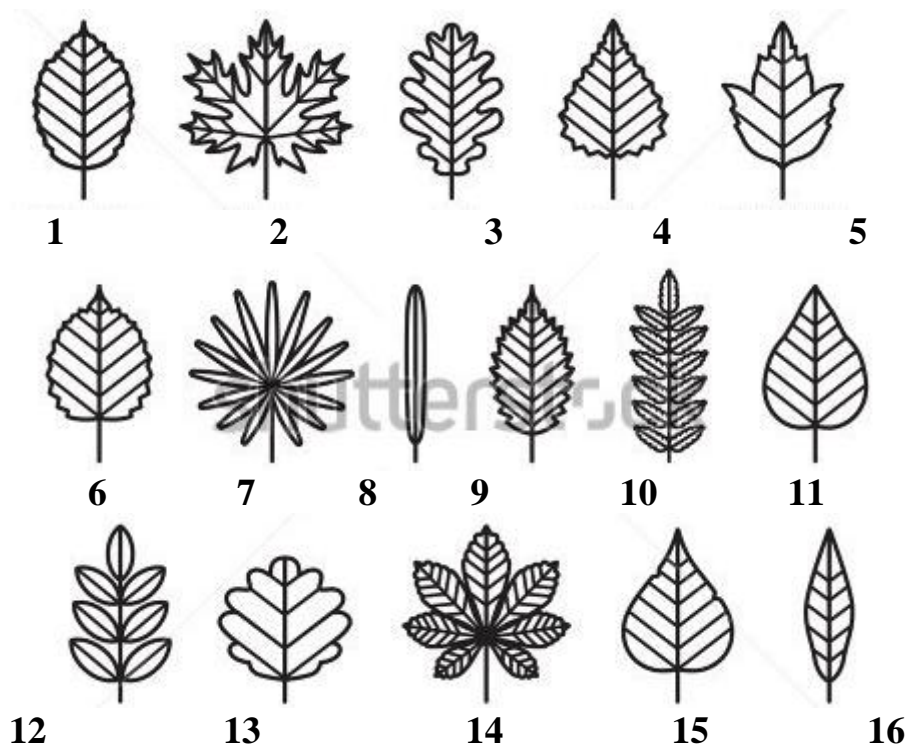
3. Утворіть нові слова, додаючи суфікси:

botany, classify, divide, commerce, taxonomy.

4. Доберіть еквіваленти до слів, позначених цифрами:

- | | |
|---------------|----------------|
| 1) plan | а) рід |
| 2) denote | б) ініціал |
| 3) commercial | в) рослина |
| 4) initial | г) промисловий |
| 5) genus | д) позначати |

5. Напишіть назви листяних дерев:



6. Напишіть назви наступних дерев англійською мовою:

Вільха, ясен, осика, акація, бук, береза, в'яз, граб, дуб, сосна, тополя, клен, верба, модрина, липа, ялина, ліщина.

7. Розташуйте слова у правильному порядку, утворюючи висловлювання про дерева (перше слово є початком речення).

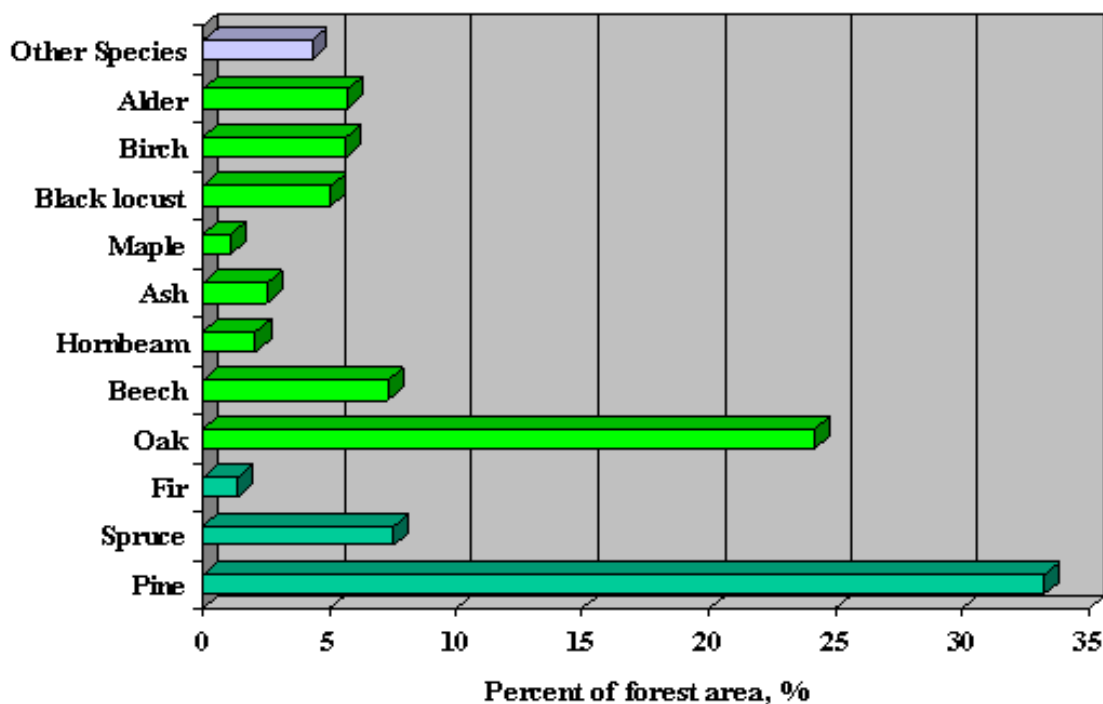
Storms / take / deeper / make / roots / trees

The trees / are / fruit / slow / bear / that / to grow / the best

Time / never / trees / is / amongst / spent / wasted / time
He / plants / himself / trees / others / that / beside / loves

8. Обговоріть з партнером та поясніть групі інформацію з вправи 7.

9. Користуючись графіком, розкажіть про види дерев, що домінують у лісах України:



Урок 2

Forests

A recent study of the various definitions of a forest found that more than 800 different definitions of a forest have been in use round the World. These definitions differ based on the emphases or concerns of different people. According to the Food and Agriculture Organization (FAO) of the United Nations, a forest is defined as “land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds“. It does not include land that is predominantly under agricultural or urban land use.

The living parts of a forest include trees, shrubs, vines, grasses and other herbaceous plants, mosses, algae, fungi, insects, mammals, birds, reptiles, amphibians, and microorganisms living on the plants and animals and in the soil. These interact with one another and with the non-living part of the environment - including the soil, water, and minerals, to make up what we know as a forest.

Forests cover 4.03 billion hectares globally, approximately 30% of Earth’s total land area. They account for 75% of terrestrial gross primary production and 80% of Earth’s total plant biomass and contain more carbon in biomass and soils than is

stored in the atmosphere. Forests are distributed across the globe. Thirty-one percent of Earth's total forest area is found in Asia (including Asian Russia), followed by 21% in South America, 17% in Africa, 17% in North and Central America, 9% in Europe, and 5% in Oceania.

Forests play an important role in the livelihoods and welfare of a vast number of people in both developed and developing countries; from urban citizens taking a recreational stroll in a nearby forest to isolated hunter-gatherers who live in and off the forest. By absorbing water and holding soil in place, forests reduce the risk of floods and mudslides that result from natural disasters such as earthquakes and hurricanes. Forests protect watersheds which supply fresh water to rivers-critical sources of drinking water.

Forests are home to 80% of the world's terrestrial biodiversity. More than 40% of the world's oxygen is produced by rainforests. More than 1.6 billion people around the world depend to varying degrees on forests for their livelihoods, not just for food but also for fuel, for livestock grazing areas and for medicine. Globally, 5% of forests are plantations generally used for commercial purposes.

Необхідний мінімум професійної лексики:

1. canopy cover – полог лісу
2. thresholds - межі
3. shrubs – чагарники
4. herbaceous plants – трав'янисті рослини
5. amphibians – земноводні
6. mosses - мохи
7. algae - водорості
8. fungi - грибки
9. insects - комахи
10. mammals - ссавці
11. gross primary production - валове первинне виробництво
12. livelihoods - засоби існування
13. stroll-прогулянка
14. hunter-gatherers - мисливці-збирачі
15. to reduce the risk - зменшувати ризики
16. mudslide – зсув
17. flood - повінь
18. watersheds - басейни річок
19. to supply - постачати
20. livestock grazing areas – ділянки для випасу худоби
21. earthquake - землетрус
22. hurricane – ураган

Завдання:

1. Дайте відповіді на запитання:

1. What is a forest according to FAO?
2. How many parts does a forest contain?

3. Which are non-living parts of a forest?
4. Why are forests important?
5. Where is our drinking water from?

2. Чи правдиві наступні твердження (Т) або (F)?

1. A forest consists of trees only.
2. Water, soil, and chemicals are the nonliving parts of a forest.
3. We can see a bacterium easily with our unaided eyes.
4. Sources of drinking water come from watersheds.
5. Different people with different perspectives define a forest in different ways.
6. Mammals are vertebrate animals that can crawl or creep on the ground.
7. Floods and mudslides are caused by natural disasters.
8. Forests are home of all animals on the earth.
9. Forest areas are the same in all countries in the World.
10. Forests account for about 30 percent of the World's land area.

3. До наступних слів доберіть з тексту слова або словосполучення, які а) мають однакове значення:

- vary(v) - point of view(n) – hazard(n)
- consist of(v) - the world(n) – remote(a)

б) відповідають наступним визначенням або поясненням:

- any plants having long, slender stems that trail or creep on the ground;
- any organisms too small to be viewed by the unaided;
- any vertebrate animals that give birth to live young and nourish the young with milk from the mammary glands;
- woody plants smaller than a tree, usually having multiple permanent stems branching from or near the ground;
- the cover formed by the leafy upper branches of the trees in a forest;
- an animal which is capable of living both on land and in water.

4. Складіть письмово 10 речень зі словами завдання 1.

5. Поставте запитання до виділених слів.

1. *People* often cut down trees for wood.
2. Historically, feudal nobility *killed* many forest animals *for food* and sometimes just *for fun*.
3. Shifting cultivation causes a lot of *forest destruction*.
4. Foresters found a *dying* bear in the forest this morning.
5. *According to the leaf longevity of the dominant species*, scientists classify forests as evergreen and deciduous.
6. *In the past*, people killed many animal species for food.
7. Foresters measure a forest *by measuring tree diameter, tree height, tree age growth rate and timber stand volume*.
8. *In 1986* the States Board of Agriculture of Maine *appointed* a committee to develop a state policy for the preservation and production of trees.

9. *Forests* reduce the risk of floods and mudslides.

10. Watersheds supply *fresh water* to the rivers.

6. Розкажіть про важливість лісу. Чи збігаються ваші думки з думками однокласників. Узагальніть точку зору групи.

7. Доповніть наступні речення за змістом:

1. A forest is an area with a high density of _____ .

2. Many of the benefits of forests are provided _____ trees.

3. Forests sometimes contain many tree species within _____ small area.

4. _____ are measured to determine the volume and growth of both the individual tree, and the entire forest stand.

5. Forests are home to many animal and plant _____ .

6. Forests are differentiated _____ woodlands by the extent of canopy coverage.

7. Forests can _____ classified in different ways and to different degrees of specificity.

8. _____ can also be classified based on the climate and the dominant tree species present.

9. Old growth forests often contain rich communities of plants and _____ .

8. Прочитайте та перекладіть текст українською мовою.

Forests are differentiated from woodlands by the extent of canopy coverage: in a forest the branches and foliage of separate trees often meet or interlock, although there can be gaps of varying sizes within an area referred to as forest. A woodland has a more continuously open canopy, with trees spaced further apart, which allows more sunlight to penetrate to the ground between them. However, as hunting forests did often include considerable areas of woodland, the word forest eventually came to mean wooded land more generally.

9. Fill in the gaps with following words:*the leaves, the canopy, occupy, trees, forests, layers, bushes, dead plants, wildflowers, oxygen*

Forests 1. _____ one third of the Earth's land area and are found on all corners of the globe. While there are a few different types of forests, all 2. _____ have 3. _____ as the dominant plant type. Forests are divided into three different 4. _____: the forest floor, the understory and 5. _____. The forest floor is comprised of soil, 6. _____ and animals and small plants such as grasses and 7. _____. The understory contains small trees or 8. _____ and is also called the shrub layer. The canopy is made up of 9. _____ and branches of the trees that dominate the forest. Assuming it lives at least 50 years, a tree exhales 6,000 pounds of 10. _____ in its life, or about 120 pounds per year.

Урок 3

Classification of the world forests

Forests can be classified in different ways and to different degrees of specificity. One such way is in terms of the biome in which they exist, combined with

leaf longevity of the dominant species (whether they are evergreen or deciduous). Another distinction is whether the forests are composed predominantly of broadleaf trees, coniferous (needle-leaved) trees, or mixed. Depending upon the species developed with the age of forests, soil found in those forests, the density of trees and history of the geological region, however, forests are divided into following main types:

- Tropical forest and Subtropical forest;
- Plantations;
- Boreal forest;
- Temperate forest;
- Seasonal or monsoon forest

1. Tropical and Subtropical Forests

Tropical and subtropical forests, also known as rainforests or tropical rainforests, are lavish and ample forests with broadleaf trees. They often include tropical and subtropical moist forests, tropical and subtropical dry forests, and tropical and subtropical coniferous forests. They are mostly found near the equator. These forests are evergreen and remain the same throughout the year. These forests form a dense and thick upper layer of foliage. Tropical forests are home to more than half of the species of animals and plants dwelling on the earth.

2. Plantations

Plantations can also be classified as a type of forest. Plantations are actually a large piece of land used for cultivation. Plantations are usually developed in tropical and subtropical regions. These crops include rubber seeds, oil seeds, sugar cane, cotton, tobacco and coffee. Plantations done for industrial purpose is called forestry. It is done to get larger amount of wood in a shorter span of time.

3. Boreal Forest

Boreal forests are also known by name Taiga. The word “Boreal” means “northern” and can be easily found on latitude 50 to 60. Temperature in these forests is usually low, as the canopy allows very low sunlight to penetrate. Low penetration of light along with low temperature is responsible for limited under story. Soil of these forests is poor-nutrient and thin. Trees like pine, spruce and fir are most likely to be found in these forests which are cold-tolerant and evergreen in nature. A number of animal species also found in these forests which includes bears, bats, woodpecker, hawks deer, fox and many other that could tolerate low temperature.

4. Temperate Forests

Temperate forests can be found on both hemispheres on latitude approximately 25 to 50 in regions of northeastern Asia, North America, western and central Europe and can be categorized as deciduous as well as evergreen. They have all four seasons: summer, spring, winter and fall. Soil of these forests is fertile and rich. Trees of these forests are broad leafed trees including those which change their foliage every year like oak, maple, beech, hemlock, cotton wood, elm and so on. Animal species found in these forests are birds, rabbits, squirrels, wolf, black bear, mountain lion and bob cat.

5. Monsoon or Seasonal Forest

These forests are also known as dry forests. These forests go through two extreme seasons: the season of heavy rainfall and a long season of complete dryness. Forests of this type can be found in Southeast Asia, West and East Africa, eastern Brazil and northern Australia. Trees of these forests include woody vines, orchid and many others like; lianas and herbaceous epiphyte, thick bamboos and tall teak trees. These forests are highly threatened in West Africa and all round the world by cultivation.

Необхідний мінімум професійної лексики:

1. leaf longevity - довжина листя
2. biome - біом
3. the density of trees - щільність дерев
4. boreal forest – північний ліс
5. temperate forest – помірний ліс
6. lavish and ample forests - щедрі й густі ліси
7. foliage – листя (мн.)
8. to dwell – жити, населяти
9. rubber seeds – насіння гуми
10. oil seeds – олійне насіння
11. sugar cane – цукрова тростина
12. to penetrate - проникати
13. poor-nutrient soil – ґрунт бідний на поживні речовини
14. limited under story – обмежений підлісок
15. cold-tolerant – витривалий до холоду
16. to tolerate low temperature – витримувати низькі температури
17. dryness - сухість
18. herbaceous epiphyte - трав'яний епіфіт
19. to be highly threatened – бути під сильною загрозою
20. monsoon forest – мусонний ліс

Завдання:

1. Дайте відповідь на наступні запитання:

1. How many main types of forest are there? What are they?
2. What are the other names of tropical and subtropical forests?
3. Where tropical and subtropical forests are most found?
4. What are plantations?
5. What are the main objectives of plantations?
6. What is the other name of boreal forests?
7. Where can boreal forests be found?
8. What animals can be found in boreal forests?
9. Where temperate forests be found?
10. What animals can be found in temperate forests?
11. What are the main characteristics of monsoon or seasonal forests?

12. Where can monsoon or seasonal forests be found?

2. Чи правдиві наступні твердження?

1. The density of trees and history of the geological region are factors that involve the classification of forests.
2. Tropical and subtropical forests are only found near the equator.
3. More than half of the species of animals and plants dwelling on the earth are found in tropical rainforests.
4. Tropical and subtropical forests are evergreen forests.
5. Plantations are used for cultivation only.
6. There are many types of crops cultivated in plantations.
7. Crops cultivated in plantations are for international or distant markets only.
8. Temperature in boreal forests is not high.
9. There is little sunlight that penetrates into the boreal forests.
10. Soil of boreal forests is very fertile.
11. Bears, bats, woodpecker, hawks deer and fox can live in places with low temperature.
12. Temperate forests are distributed in Northern and Southern hemispheres.
13. Soil in temperate forests is as rich as that in boreal forests.
14. Oak, maple, beech, hemlock, cotton wood and elm are evergreen.
15. Monsoon forests can be found in both hemispheres.
16. Most of monsoon forests in West Africa are in a threatened state.

3. До наступних слів доберіть з тексту слова або словосполучення, які а) мають однакове значення:

- too many(a) - northern(a) - canopy(n) - to live(v) - farming(n) - vine(n)

б) відповідають наступним визначенням:

- being green throughout the year;
- falling off the leaves annually at the end of growing season;
- a circle dividing a sphere or other surface into two usually equal and symmetrical parts;
- to enter or pass into or through;
- a half of a sphere;

4. Доповніть речення за змістом словами з тексту:

1. Forests where a majority of the trees lose their foliage at the end of the typical growing season are called _____ forests.
2. Evergreen forests are found mostly near the _____ .
3. Coniferous forests are found mainly in the northern _____ .
4. Little sunlight can _____ the canopy in Boreal forests
5. A forest in which there is no complete, seasonal loss of leaves is called _____ forest.

5. Поставте запитання до виділених слів:

1. *Humans* can do many things to protect habitats.
2. We should grow *more trees* to prevent erosion.
3. Man will destroy *habitats* if he continues to cut down trees.
4. People can find many types of broadleaf trees *in evergreen forests*.
5. Deforestation can destroy genetic variations *irretrievably*.

6. Доповніть текст словами: foliage, leaves, of, found, harbour, consisting
Evergreen forests

An evergreen forest is a forest 1.____ entirely or mainly of evergreen trees that retain green 2. ____ all year round. They are usually 3. ____ in areas receiving more than 200 cm of rainfall and having a temperature of 15 °C to 30 °C. They occupy about seven per cent of the Earth's surface and 4. ____ more than half of the world's plants and animals. They are found mostly near the equator. These forests are dense, mulch-layered and harbour many types 5.____ plants and animals. The trees in an evergreen forest have broad 6.____ that release excess water through transpiration.

7. Вставте в текст пропущені слова: floor, food, dropped, rain, cool, hot, vapor, summer, thunderstorms, seasons.

The climate of a tropical rainforest is very 1____ and wet. The average temperatures of a tropical rainforest are about 80 degrees F all year round with an exception of 2____ nights. The temperature of the rainforest has never 3____ below 64 degrees F. It rains about 160-400 inches each year. In a downpour, only one-third of the rain that falls hits the forest 4____. The humidity of a tropical rainforest is usually 85%. During the day it is usually 80% and at night it is usually even higher at 95%. The reason for so much humidity is that all of the sun shine forms water 5____, which forms clouds, which turn into 6____. In the rainforest 7____ are common. There are no 8____ in the rainforest, and the weather is basically the same thing everyday! It's hot, humid and rainy. It seems as if it's always 9 ____ because of this. This climate affects the plant and animal life in the rainforest because the rain and the heat help plants to flourish, which provides 10____ for animals. This has changed because of the destruction of the rainforest. Some places have turned into a desert, and many plants and animals can no longer survive.

8. Користуючись інформацією з тексту, обговоріть в парі характеристики лісів, що зустрічаються на Україні.

9. Напишіть коротку розповідь про ліси світу або України.

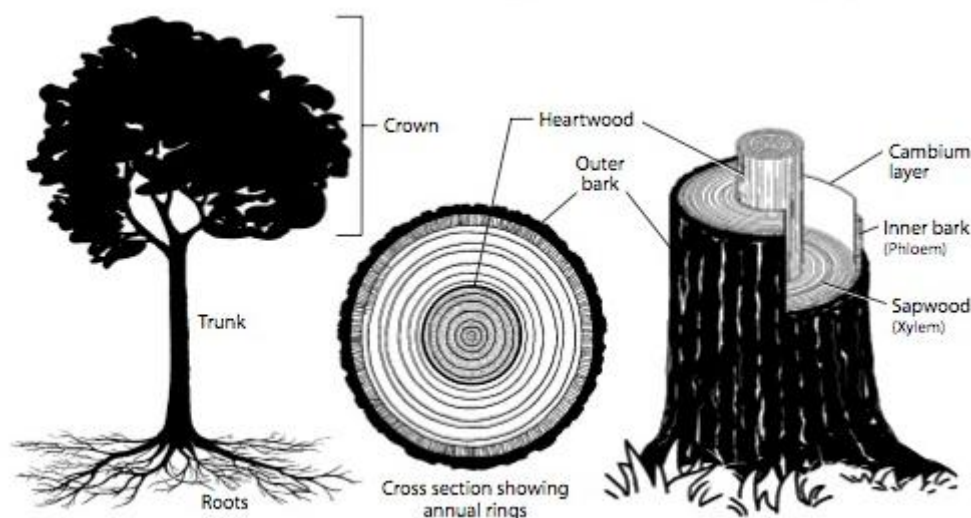
Урок 4

How a tree grows

Most trees can grow in height and width sending out shoots formed by new wood cells. They grow in height at the terminal bud of the main stem. The “candles”

of the pines are known to be the evidence of a new growth. A tree also grows in thickness (or in girth) adding coats for new wood cells. Wood layers thus developed are called annual rings. Once formed, annual rings remain unchanged in size or place they are located in. The rings could be clearly seen on the cross-section of a tree trunk, pith is in its center.

The wood section next to the bark which is often lighter than that in the center is called sapwood. It is a part of living wood through which the water taken up by the roots of a tree can pass on to the crown. Over a certain period of time sapwood is gradually substituted with heartwood due to infiltration of the chemical substance and some certain changes in the nature of cell walls. So wood becomes darker in colour and nearly lifeless. Heartwood serves to support the living parts of a tree. That is why hollow trees may still flourish and bear fruit.



The cells located between the bark and the last sapwood layer give a start to a cambium layer (true cambium). The inner side of the cambium layer can give a start to new wood growths. As for new bark it is developed from the outer side of the cambium. There is another kind of cambium which forms the outer corky bark. Like the true cambium layer, cork cambium may start a tree or form separate bark films in case older layers located nearer to the wood body are dying out.

Trees can bear flowers and are reproduced by means of seeds. When the tree enters its long winter rest, it has the next year buds already formed. The buds expand and grow until they finally open into flowers or leaves in spring.

Some trees, as the elm and the red maple, blossom and set fruit before the leaves open. Other trees wait until their leaves are partly grown to produce blossoms, while some others, such as the chestnut, do not flower until early summer. Some trees mature their seeds rapidly to scatter them early in spring. Most trees provide great quantities of seeds and their winged seeds are easily scattered by the wind. Having fallen from the tree to the ground, only one seed out of the thousands can take a root to start a new tree.

Необхідний мінімум професійної лексики:

1. grow in height (width) – рости в висоту(ширину)
2. shoot – паросток

3. woodcells – клітини деревини
4. terminalbud – верхівкова брунька
5. girth – обхват
6. annualring – річне кільце
7. cross-section – поперечний зріз
8. treetrunk – стовбур дерева
9. pith – серцевина
10. bark – кора
11. sapwood – заболонь
12. heartwood – ядра деревини
13. hollowtree – дуплисте дерево
14. flourish – цвісти
15. bearfruit – давати плоди
16. cambiumlayer – камбіальний шар
17. elm – в'яз
18. redmaple – червоний клен
19. blossom – квітнути, розпускатись
20. chestnut – каштан
21. tomatureseeds – доводити насіння до зрілості
22. toscatter (seeds) – розкидати (насіння)

Завдання:

1. Доберіть еквіваленти до слів, позначених цифрами:

- | | |
|------------------|--------------------|
| 1) root | а) поперечний зріз |
| 2) bark | б) корінь |
| 3) reproduce | в) шар |
| 4) layer | г) колір |
| 5) heartwood | д) крилатий |
| 6) pith | е) серцевина |
| 7) colour | ж) розмножуватись |
| 8) winged | з) кора |
| 9) cross-section | и) ядра деревини |
| 10) growth | к) ріст |

2. Доберіть еквіваленти до словосполучень, позначених цифрами:

- | | |
|--------------------|-----------------------|
| 1) setfruit | а) ріст у висоту |
| 2) annualrings | б) внутрішня частина |
| 3) bearflowers | в) верхівкова брунька |
| 4) aterminalbud | г) давати насіння |
| 5) growingirth | д) клітини деревини |
| 6) scattertheseeds | е) рости в обхват |
| 7) bearseeds | ж) річні кільця |
| 8) heightgrowth | з) квітнути |
| 9) woodcells | и) плодоносити |

10)the innerside

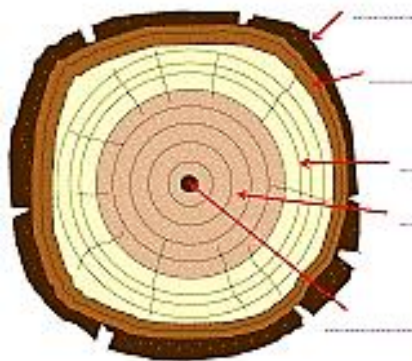
к) розкидати насіння

3. Заповніть пропуски, використовуючи слова і словосполучення:

cambium layer, terminal bud, heartwood, flowers, scattered.

1. The function of the _____ is to support the growth of a tree.
2. The inner side of the _____ forms new wood and the outer side forms new bark.
3. Seeds of many trees being winged are easily _____ by the wind.
4. Trees like many other plants bear _____ and reproduce by means of seeds.
5. The growth in height is made at the _____ of the main stem.

4. Поясніть схему поперечного зрізу деревини:



5. Дайте відповіді на запитання:

1. What are called annual rings?
2. Which way are the seeds scattered?
3. Do some trees blossom and set fruit before the leaves open?
4. What is sapwood?
5. What is the difference between sapwood and heartwood?

6. Дайте відповіді, чи правдиві наступні твердження (Т) або (F).

1. Softwoods are included in the class called angiosperms.
2. Annual rings change in size over time.
3. Over a certain period of time sapwood is substituted with heartwood.
4. Hollow trees can't bear fruit.
5. Trees don't set fruit before the leaves open.
6. Heartwood gives a start to a cambium layer.
7. When the tree enters winter rest it has the next year buds formed.
8. Cork cambium can form separate bark films.

7. Поставте запитання до виділених слів.

1. Trees are reproduced *by means of seeds*.
2. Heartwood serves to support *the living* parts of a tree.
3. Some trees mature *their seeds* rapidly.
4. A *new bark* is developed from *the outer* side of the cambium.
5. *The annual rings remain* unchanged in size or place they are located in.

8. Складіть план до тексту та перекажіть текст.

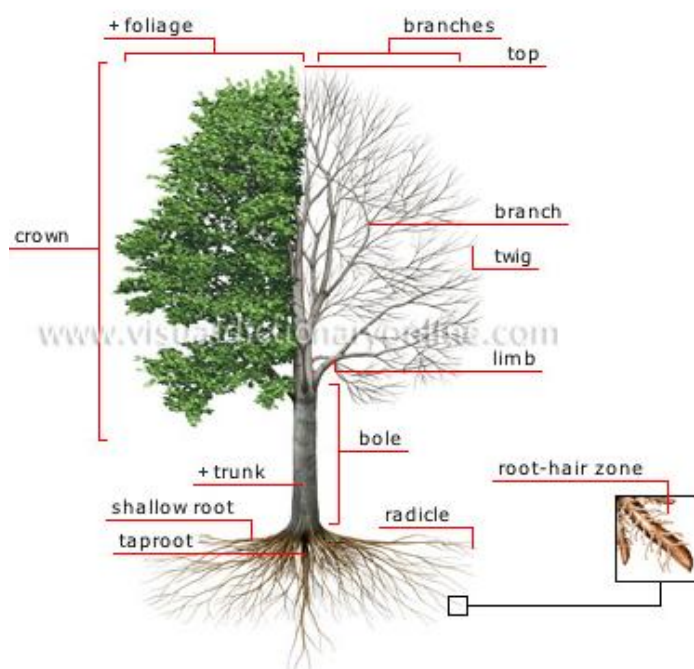
Урок 5

Parts of a tree

Roots serve to anchor and supply trees with water and essential mineral salts. The young roots furnish water and nourishment from the soil, the older ones hold the tree in place. The roots are classified into surface roots and tap-roots, depending on their shape and the depth they go into the ground. Some trees, as the birch or the spruce, have surface roots, the others have tap-roots only. As for the roots of oak or walnut they can go into a great depth if the land is too dry. Most of the trees like the maple or ash are known to have two kinds of roots.

A stem (it is also called a trunk or a bole) supports a crown and supplies it with water and mineral substances. A tree stem consists of outer bark, inner bark, cambium, sapwood, heartwood and pith. Bark serves as a protective cover to the cambium layer located between the inner bark and sapwood. Sapwood is the living wood portion to be found next to the bark layer.

A crown consists of twigs and branches which bear buds, leaves, flowers and fruit. The function of the leaves is to give oxygen off. Carbon being retained and combined with soil water, feeding substance for a tree is provided. A process of tree growth is known as assimilation. If foliage is removed or light is not provided, the tree will weaken and gradually die.



Trees grow in at least three different directions height (stem), depth (roots), width (crown) to increase in volume, in quality and in value. This sort of increase is sometimes called increment: volume increment, quality increment and value increment. Most people believe the trees to grow from early in spring till late in autumn. According to recent studies most of the growth takes place in a relatively short period. In many forests the height growth is completed in springtime in 35 days or less. Other trees, however, continue their growing in height for a longer period.

Необхідний мінімум професійної лексики:

1. anchor trees – утримувати дерева
2. supply with mineral salts – забезпечувати мінеральними солями

3. furnish/nourishment – постачати живлення
4. surface roots – поверхневі корені
5. tap-roots – глибинні корені
6. birch – береза
7. spruce – ялина
8. oak – дуб
9. maple – клен
10. ash – ясен
11. bole – стовбур
12. protective cover – захисне покриття
13. twig – гілочка
14. foliage – листя
15. increment – приріст

Завдання:

1. Доберіть еквіваленти до слів, позначених цифрами:

- | | |
|----------------|--------------|
| 1) serve | a) береза |
| 2) ash | b) живлення |
| 3) birch | c) листя |
| 4) crown | d) клен |
| 5) supply | e) ясен |
| 6) nourishment | f) гілочки |
| 7) maple | g) стовбур |
| 8) twigs | h) постачати |
| 9) bole | i) крона |
| 10) foliage | j) слугувати |

2. Доберіть еквіваленти до словосполучень, позначених цифрами:

- | | |
|----------------------------------|---------------------------------|
| 1) surface roots | a) постачати деревину |
| 2) supply with nourishment | b) складатись з гілок і гілочок |
| 3) living portions | c) утримувати дерево на місці |
| 4) consist of branches and twigs | d) скидати листя |
| 5) provide with wood | e) утримувати дерево |
| 6) remove foliage | f) слугувати як захисний шар |
| 7) hold the tree in place | g) приріст якості |
| 8) anchor trees | h) постачати живлення |
| 9) quality increment | i) поверхневі корені |
| 10) serve as a protective cover | j) живі частини |

3. Складіть загальне, спеціальне, альтернативне і розділове запитання до речень :

Bark serves as a protective cover to the cambium layer.

Trees grow in at least three different directions.

Forests are disappearing as trees are burnt or cut down.

4. Використовуючи суфікси *-tion*, *-ful*, *-th*, утворіть іменники та прикметники від дієслів: use, power, combine, transport, protect, grow.

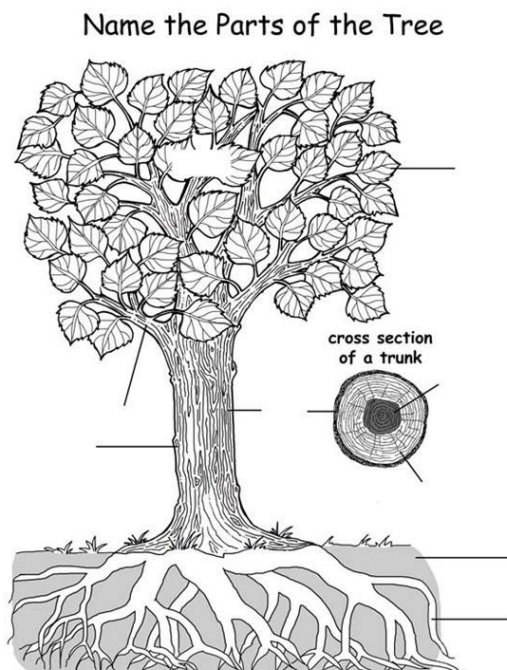
5. Поєднайте частини речення відповідно до змісту тексту.

- | | |
|----------------------------------|---|
| 1. Bark serves as | a) ...three different directions height, depth, width |
| 2. If foliage is removed | b) ...water and nourishment from the soil. |
| 3. Most trees have a combination | c) ...a growing tree protection. |
| 4. The function of the leaves is | d) ...of two kinds of roots. |
| 5. The young roots furnish | e) ...to give oxygen off. |
| 6. A stem supports a crown and | f) ...the tree will gradually die. |
| 7. Trees grow in at least | g) ...supplies it with water and mineral substances. |

6. Поєднайте слова з визначеннями.

- | | |
|-----------|---|
| 1 branch | a) a flat thin green part of a tree that grows on a branch |
| 2 crown | b) the leaves of a plant or tree |
| 3 bark | c) the wide circular top part of some types of trees |
| 4 foliage | d) a round hard place in a piece of wood where a branch grew |
| 5 trunk | e) a part of a tree that grows out of its trunk with leaves on it |
| 6 twig | f) the hard substance that covers a tree |
| 7 blossom | g) a large branch on a tree |
| 8 limb | h) the main part of a tree that the branches grow out of |
| 9 leaf | i) a very small branch |
| 10 knot | j) a flower on a tree or all the flowers on a tree |

7. Напишіть основні частини дерева.



8. Знайдіть 12 слів, які позначають частини дерева.



9. Доповніть речення відповідно до змісту тексту.

1. Trees have three main parts ...
2. The upper part of the tree with the branches is called ...
3. The crown consists of ...
4. Roots absorb ... from the soil and ... in the ground.
5. Roots often spread much farther than ... of the tree.
6. The trunk, or stem, of a tree supports ... and gives the tree its shape and strength.
7. The trunk, branches and twigs of the tree are covered with ...
8. The trunk divides into spreading ..., giving the crown a rounded shape.
9. Trees grow in at least three different directions ...

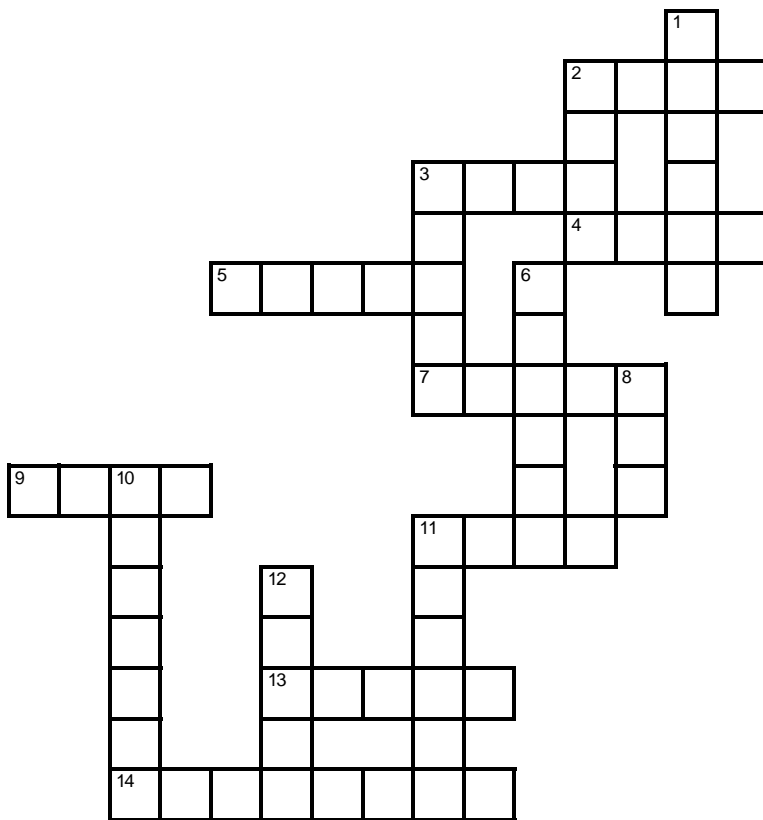
10. Заповніть кросворд.

Across

2. These insects often pollinate trees. (4)
3. A building material that comes from trees. (4)
4. This can grow into a new tree. (4)
5. Apples, oranges, or bananas. (5)
7. The part of a tree that attaches it to the ground and soaks up water. (5)
9. Where the seed of a pine tree is. (4)
11. The skin of trees. (4)
13. The thick part of a tree. (5)
14. Trees need this to make food. (8)

Down

1. These gather sunlight to make food for trees. (6)
2. Flowers just before they open. (4)
3. Trees soak this up through their roots. (5)
6. A colorful part of some trees that later makes seeds or fruit. (6)
8. The sticky liquid inside a tree. (3)
10. The leaves of a pine tree. (7)
11. The part of a tree where leaves are. (6)
12. The leaf of a flower. (5)



11. Заповніть текст запропонованими словами. Два слова є зайвими.

crown, parts, soil, seeds, branches, photosynthesis, knot, leaves, nutrients, shape, energy, roots

For the most part, there are five 1) _____ that make up a tree.

Roots

This is the part of the tree that is underground. Their function is to keep the tree from tipping over, and mainly to collect water and 2) _____ from the 3) _____.

Trunk

This part provides the shape of the tree and supports the 4) _____. The trunk also acts as a distributor of water, sugar, and nutrients between the 5) _____ and the leaves.

Branches

The branches help the flow of water, sugar, and nutrients. They also provide the support for the 6) _____ making up the crown.

Leaves

When they are green, leaves are converting 7) _____ from the sun into food (sugar). This process is called 8) _____.

Crown

Many times you can identify a tree just by looking at the 9) _____ of its crown. Making up the top of the tree with leaves and 10) _____, the crown provides shade for the roots and works very hard during the process of photosynthesis.

12. Прочитайте текст. П'ять речень вилучені з тексту. Виберіть частини А-Ф, щоб заповнити пропуски 1-5. Одне речення не підходить до змісту тексту і є зайвим.

Every spring the tree grows taller as a new set of branches develops at its top, and wider as buds develop along the older branches, twigs and tips. Soft tissue inside the buds is protected from damage by a tough covering of moisture-saving bud scales. Trees produce flowers or cones that hold fertilized seeds. **1** _____. Within each seed is the soft tissue that is the basis a new tree. Seeds have a tough coating that protects them during dispersal to their new home. Branches and twigs support the leaves, holding them up to receive the sun's light and warmth. **2** _____. The trunk is the main stem of the tree. It supports the crown of branches, leaves/needles and transports food and water throughout the tree. The tough, outer bark protects the tree from heat, cold, moisture loss and injury. **3** _____. Beneath the inner bark is a thin layer called the cambium that each year develops new cells of inner bark on its outer wall and new sapwood cells on its inner wall. The sapwood carries water from the roots up to the leaves/needles. **4** _____. The roots act as an anchor, holding the tree firmly in place. **5** _____. It draws nutrients to the tree and protects the soil from erosion. Small root hairs grow out from the roots to absorb water and minerals from the soil.

A.The soft inner bark carries food from the leaves and needles to all living parts of the tree.

B.In late summer or fall, they are scattered by wind, water and wildlife.

C.They grow and spread out underground from the root tips, forming a huge network.

D.Leaves and needles are the food factories in the tree's crown.

E.As the tree grows, old inner layers of sapwood die and become heartwood, a rigid fiber that gives the tree its strength.

F.They also produce buds that form new twigs, leaves and flowers.

13. Складіть план та перекажіть текст.

Урок 6

Wood deterioration

Because it is an organic material, wood is subject to several forces of deterioration, including decay, insects, weathering, mechanical wear, and fire. In some cases, wood can be rendered practically useless by one or more of these agencies, while in less severe cases, the wood is only damaged enough to degrade it from a high – quality to a lower – quality product. However, it should be noted that deterioration occurs only under conditions favourable for a particular type of deteriorating force. If wood is kept dry and / or treated with suitable preservatives, it will last indefinitely.



Decay in wood is caused by fungi, a group of ‘lower’ plants. They contain no chlorophyll and hence do not produce their own food but grow within or upon other materials. The decay caused by fungi was not known until 1874, when proof was presented by Robert Harting, a German pathologist.

Wood is subject to decay as trees, logs, and manufactured products in storage and surface.

Although there are literally dozens of separate species of fungi which attack or inhabit wood, they are classified for practical purposes into groups according to the appearance of the wood affected or their physical and chemical action on wood. On this basis, the three major groups of fungi are those which cause decay, including brown rot, white rot, and soft rot, as well as wood – staining fungi, and surface moulds.

Необхідний мінімум професійної лексики:

1. organic – органічний
2. besubjectto – піддаватися
3. deterioration – руйнування
4. decay – гниття
5. insect – комаха
6. weathering – руйнування, вицвітання (під впливом атмосферних умов)
7. wear – знос
8. renderuseless – робити непридатним
9. damage – ушкоджувати, псувати
10. degrade – погіршувати
11. itshouldbenoted – слід зазначити
12. occur – траплятися, відбуватися
13. favourable – сприятливий
14. deteriorate – руйнувати, погіршувати, псувати
15. treat – обробляти
16. preservative – захисний засіб
17. fungi – гриби, грибки
18. proof – доказ
19. present – представляти
20. log – колода
21. manufacture – виробляти

- 22. storage – зберігання
- 23. inhabit – населяти
- 24. rot – гниття, гниль
- 25. mould – пліснява, цвіль; пліснявий(цвілевий) гриб

Завдання:

1. Заповніть речення необхідними прийменниками:

- 1. Wood is subject to several forces _____ deterioration, including decay, insects, weathering, mechanical wear and fire.
- 2. If wood is kept dry and treated _____ suitable preservatives, it will last indefinitely.
- 3. It should be noted that deterioration occurs only _____ conditions favourable for a particular type of deteriorating force.
- 4. Decay in wood is caused _____ fungi, a group of 'lower' plants.
- 5. Fungi, which attack or inhabit wood, are classified _____ groups.

2. Утворіть множину іменників та розподіліть їх на 3 групи:

log, product, group, quality, condition, insect, agency, dozen, plant, material

3. Доберіть еквіваленти до слів, позначених цифрами:

- | | |
|---------------|--|
| 1) storage | a) пліснява, цвіль |
| 2) weathering | b) гниття |
| 3) degrade | c) спричиняти |
| 4) decay | d) зберігання |
| 5) inhabit | e) ушкоджувати, псувати |
| 6) storage | f) населяти |
| 7) damage | g) руйнування (під впливом атмосферних умов) |
| 8) rot | h) погіршувати |
| 9) mould | i) зберігання |
| 10) cause | j) гниль |

4. Дайте відповіді на запитання:

- 1 What kind of deterioration is wood subject to?
- 2 What is decay in wood caused by?
- 3 Do fungi produce their own food?
- 4 What did Robert Harting prove?
- 5 What are the three major groups of fungi which caused decay?

5. Поєднайте слова з визначеннями: decay, deterioration, degrade, fungus, weather

- 1) the action or process of becoming impaired or inferior in quality;
- 2) to change in color, condition, etc., because of the effects of the sun, wind, rain, etc., over a long period of time;
- 3) any one of a group of living things that often look like plants and live on dead or decaying things;

- 4) to make the quality of (something) worse;
 5) the natural chemical change that causes the slow destruction of something.

6. Поєднайте частини речення відповідно до змісту тексту.

- | | |
|---|---|
| 1. If wood is kept dry and treated with suitable preservatives, | a) ... decay, insects, weathering, mechanical wear, and fire. |
| 2. Wood is subject to several forces of deterioration, including | b) ... do not produce their own food. |
| 3. Deterioration occurs only under conditions | c) ... the appearance of the wood affected. |
| 4. Fungi are classified for practical purposes into groups according to | d) ... it will last indefinitely. |
| 5. Fungi contain no chlorophyll and | e) ... favourable for a particular type of deteriorating force. |

7. Заповніть текст запропонованими словами. Три слова є зайвими.

conditions, fungi, deterioration, qualities, plants, moisture, materials, decay, supply, temperature, attack, insects, agents

Wood is subject to 1) _____ by a variety of agents. Damage ranges from relatively minor discolorations caused by 2) _____ or chemicals to more serious 3) _____ and insect 4) _____. Biological deterioration is found principally in the form of 5) _____ and fungi. Many other environmental 6) _____ (for example, light and heat) are causes for decay of wood. Natural decay contributes to the 7) _____ of nutrients for other 8) _____ and animals. Continuous biological decay depends upon four 9) _____. They are a supply of oxygen, a supply of 10) _____, a supply of food, a moderate 11) _____ range.

8. Прочитайте текст і поєднайте абзаци з малюнками.

1. A wood-decay fungus is any species of fungus that digests moist wood, causing it to rot. Some species of wood-decay fungi attack dead wood, such as brown rot, and some, such as *Armillaria* (honey fungus), are parasitic and colonize living trees.

A



2. Wood-decay fungi can be classified according to the type of decay that they cause. The best-known types are brown rot, soft rot, and white rot. Each produce different enzymes, can degrade different plant materials, and can colonise different environmental niches. Brown-rot fungi break down hemicellulose and cellulose. As a result of this type of decay, the wood shrinks, shows a brown discoloration, and cracks into roughly cubical pieces. The fungi remove cellulose compounds from wood and hence the wood becomes brown colour.

B



3. Soft-rot fungi secrete cellulase, an enzyme that breaks down cellulose in the wood, and decay the trunk and/or roots of living trees. This leads to the formation of microscopic cavities inside the wood, and sometimes to a discoloration and cracking pattern similar to brown rot. Soft-rot fungi do not tend to be able to decompose matter as effectively as white-rot fungi: they are less aggressive decomposers.

C



4. White rots break down lignin and cellulose and commonly cause rotten wood to feel moist, soft, spongy, or stringy and appear white or yellow. White-rot fungi break down the lignin in wood, leaving the lighter-colored cellulose behind; some of them break down both lignin and cellulose.

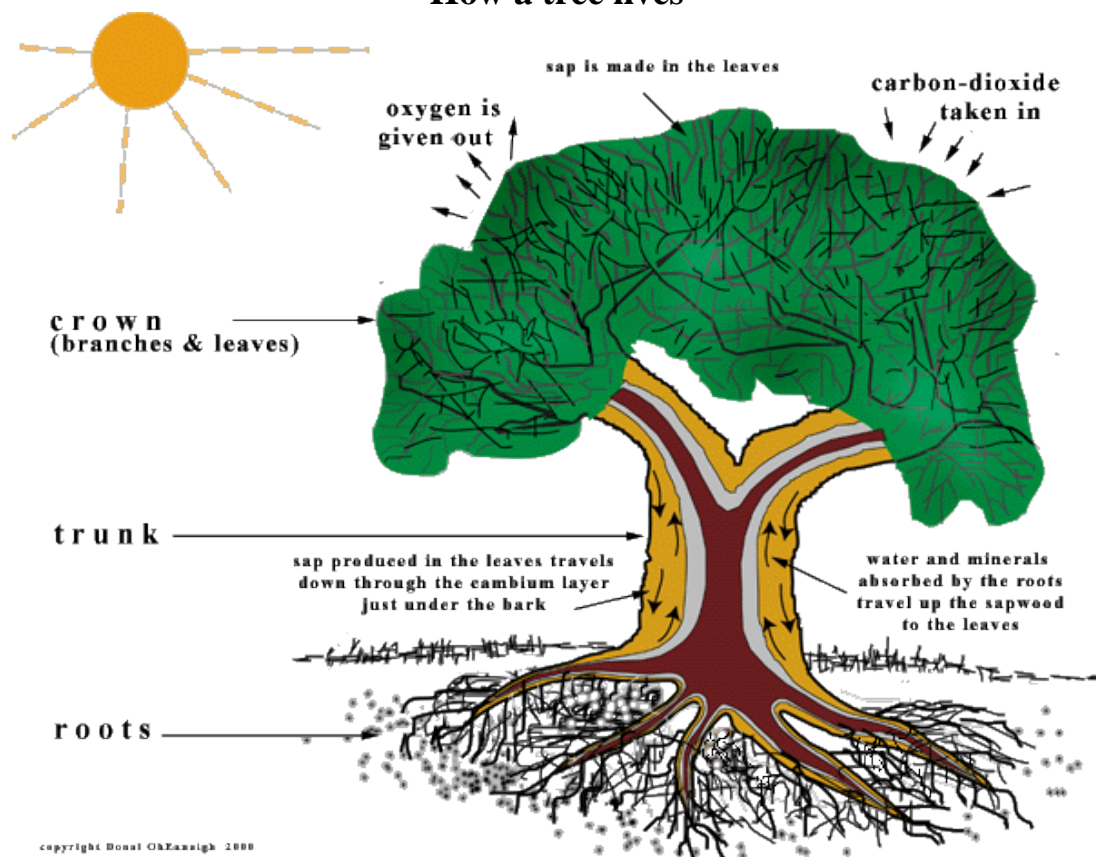
D



9. Складіть план та перекажіть текст “Wooddeterioration”.

Урок 7

How a tree lives



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Woody plants usually grow on a single stem ranging in height from 20 to 300 feet or more depending on the species and conditions of their growth. Any tree can be divided into the following parts: roots holding the tree in place and taking up soil

water and mineral substances from the ground; a trunk or a stem supporting the tree crown and supplying it with water and mineral substances; a tree crown carrying out the reproduction processes.

The substances a tree is fed with are derived from soil and air. Mineral substances are collected by the roots extended down into the ground. There are root hairs at the ends of the rootlets and roots to reach out for water and soil nutrients from the ground. Water and nutrients are moved upward to the leaves through numerous channels in the roots, trunks and branches.

The function of leaf cells is to produce a feeding substance for a tree. It is obtained from carbon dioxide which is then broken up into oxygen and carbon. Oxygen left away, carbon, under the influence of sunlight and chlorophyll, are combined with oxygen and hydrogen of water. This is the way for new chemical compounds of nitrogen and other water substances to be formed. Having been processed in the leaf cells the raw materials are sent to the tree roots, its stem and crown where they are either used at once or stored away for later use.

Like all other plants and animals, trees can 'breathe'. The breathing process goes on both day and night. The breathing is produced by leaves. Tiny openings in the bark are called lenticels.

Необхідний мінімум професійної лексики:

1. woody plant – деревна рослина
2. condition of growth – умови росту
3. root – корінь
4. hold in place – утримувати на місці
5. soil water – ґрунтова вода
6. mineral substance – мінеральна речовина
7. crown – крона
8. reproduction process – процес відтворення (розмноження)
9. rootlet – корінець; проросток
10. root hair – кореневий волосок
11. soil nutrients – поживні речовини ґрунту
12. leaf cell – клітина листка
13. carbon dioxide – вуглекислий газ
14. oxygen – кисень
15. carbon – вуглець
16. chlorophyll – хлорофіл
17. hydrogen – водень
18. nitrogen – азот
19. raw materials – сировина
20. store away – зберігати
21. breathe – дихати
22. lenticel – сочевичка, пара в стеблі або корені

Завдання:

1. Доберіть еквіваленти до слів, позначених цифрами:

- | | |
|-------------------|----------------|
| 1) крона | a) cell |
| 2) живитися | б) breathe |
| 3) хлорофіл | c) sunlight |
| 4) водень | d) oxygen |
| 5) сочевичка | e) crown |
| 6) сонячне світло | f) chlorophyll |
| 7) речовина | g) feed |
| 8) клітина | h) hydrogen |
| 9) дихати | i) lenticel |
| 10) кисень | j) substance |

2. Доберіть еквіваленти до словосполучень, позначених цифрами:

- | | |
|---------------------------|----------------------------|
| 1) treereproduction | a) рухатися вверх |
| 2) rawfoodmaterials | b) сировина для живлення |
| 3) numerous channels | c) утримувати на місці |
| 4) soil particles | d) частинки ґрунту |
| 5) move upward | e) поглинати ґрунтову воду |
| 6) take up soil water | f) чисельні канали |
| 7) hold in place | g) розмноження дерева |
| 8) break up into elements | h) мінеральні речовини |
| 9) living parts of a tree | i) розпадатися на елементи |
| 10) mineral substances | j) живі частини дерева |

3. Визначте, які з речень не відповідають змісту тексту:

1. The raw materials are processed in the leaves.
2. Mineral substances are collected by the roots.
3. Mineral substances are collected by the roots
4. A crown is the most important part of a tree.
5. The substances a tree is fed with are derived only from soil.

4. Перекладіть слова і підкресліть зайве слово:

carbon, lenticel, oxygen;
cavity, lamella, layer;
rootlet, nitrogen, roothair.

5. Розташуйте слова у правильному порядку, щоб утворити речення.

1. **A tree** /the substance / through / using / leaves / breathes / chlorophyll, / that makes / green /its leaves.
2. **Plants**/ take in / essential / their roots / to / and / other / use /nutrients / water.
3. **Plants** / light / energy / use / dioxide / to make / from / carbon / water / and / sugars.
4. **Plants** / chlorophyll / minerals / photosynthesis / and / go / need / through / to

produce.

5. **Plant leaves** the sun / light energy / which have / contain / that absorbs / from / chloroplasts/ chlorophyll.

6. Заповніть текст запропонованими словами. Три слова є зайвими.

carbon dioxide (2), photosynthesis, energy, breathe, respiration, leaves, water, cells, environment, releases (2), oxygen, absorb, nutrients

The process a tree uses to 1) ___ is called photosynthesis. Photosynthesis is the process that converts 2) ___ from light sources into organic chemical energies such as sugar. The leaves 3) ___ the light energy and use it to convert 4) _____ and water minerals into 5) _____ and carbohydrates. The oxygen 6) ___ into the atmosphere, where it benefits all life on the planet.

Respiration, the opposite of 7) _____, is another part of the breathing process. It occurs constantly in the tree's 8) _____. Respiration uses up stored oxygen and releases 9) _____, energy and water into the atmosphere. While trees do not technically breathe, respiration is comparable to inhaling air into the lungs, and photosynthesis is comparable to exhaling. Even though 10) _____ does not directly benefit the 11) _____, trees still absorb far more harmful carbon dioxide than they release, thanks to the process of photosynthesis. A medium-sized tree 12) _____ the same amount of air required for a human being to breathe.

7. Прочитайте текст. П'ять речень вилучені з тексту. Виберіть частини А-Е, щоб заповнити пропуски 1-5. Одне речення не підходить до змістутексту і є зайвим.

In places like the UK, with a seasonal climate, most growing activity occurs in spring and summer. 1 _____. On the outer side of the cambium new cells are added to the phloem; the part of the tree responsible for transporting sugars, produced by the leaves to other parts of the tree.

2 ___ The xylem cells made in spring are wide with thin walls. 3 ___ Toward the end of the growing season the cambium produces xylem cells that are narrow, with thicker walls. The tree needs less water at this time of the year because growth activity is slowing. 4 ___ All the xylem cells produced by the cambium during the year contribute to the outward growth of the tree.

As summer ends, trees stop growing and divert their resources to produce new buds in preparation for next year's leaves. 5 ___ Evidence of this annual growth cycle can be clearly seen in growth rings on a cut tree trunk.

A. Instead the tree needs to produce strong, dense wood to help support its new growth so the cells continue to narrow and thicken until the autumn.

B. The tree releases the oxygen into the air.

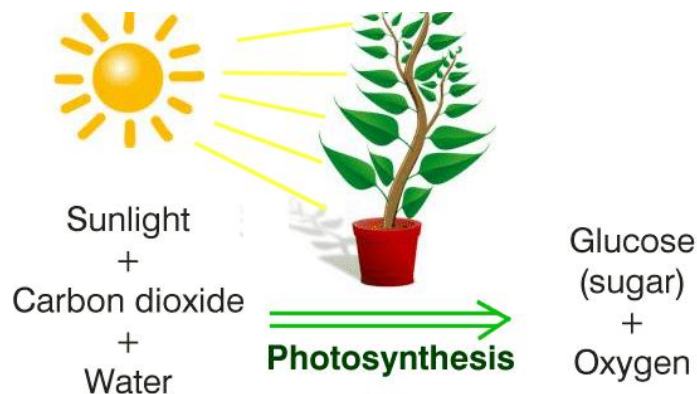
C. In every growing season the cells of the cambium divide to produce layers of new cells.

D. During late autumn a reduction in daylight hours and temperature signals the tree to enter a state of dormancy.

E. These wide cells help the tree transport large volumes of water from the roots to the trunk and branches to support the growth of new leaves and flowers.

F. On the inner side of the cambium new woody cells are added to the xylem.

8. Опишіть процес фотосинтезу.



9. Опишіть процес росту дерева.

10. Прочитайте вірш. Визначте його основну думку.

I am as strong as a tree,
standing tall and grounded.
The roots of my past
are planted firmly
within the Earth.
The leaves of my Present
are ever changing,
And I learn so much
with each colour they turn,
the fazes of life are infinite.
The branches of my Future

are extending upwards
and outwards in all directions.
And as I grow, I become more
Expanded in knowledge.
The beauty of a tree and
the gentle sway it makes,
create the seeds for tomorrow
all the while, reflecting to us
how to live each day,
with simplicity and grace.
By Jennifer D. Sonier

Урок 8

Ecology: a general overview

Прочитайте питання, що стосуються поняття «екологія», та дайте відповідь: Так / Ні / Не знаю. Потім прочитайте текст та перевірте свої відповіді.

1. Ecology is a science.
2. It deals with living organisms.

3. It also deals with the environment of living organisms.
4. Climate, solar insolation and geology influence the environment.
5. Ecology is also called 'ecological science'.
6. Ecology makes use of other sciences.

You can say 'yes' to every question in the questionnaire above. Ecology is the science that studies the number of living organisms in the environment and how they are distributed. It also studies how the quantity and distribution of organisms are influenced and in turn influence their interactions with the environment. The environment of an organism includes factors such as climate, solar insolation, geology and the other organisms that share its habitat. Ecology is also called 'ecological science' and it is multi-disciplinary: this means that it draws on other branches of science, such as biology, geology, geography, meteorology, chemistry and physics.

Необхідний мінімум професійної лексики:

1. to act - діяти
2. to affect - впливати
3. aim – мета
4. behavior - поведінка
5. to break down – розривати, порушувати
6. compartment - складник
7. to deal with – мати справу з
8. to draw on – намалювати, підходити
9. earth - земля
10. environment – навколишнє середовище
11. fertilizer - добриво
12. food chain – харчовий ланцюг
13. goal - мета
14. to make up - утворити
15. outer layer – зовнішній шар
16. to result in – мати за результат
17. relationship - взаємозв'язок
18. to share – поділяти, ділитися
19. soil – ґрунт
20. species – види живих організмів
21. tissue – тканина
22. value - цінність

Завдання:

1. Прочитайте текст ще раз й виберіть правильний варіант.

1. Ecology studies:
 - a. the quantity of organisms in the environment;
 - b. how organisms are distributed;
 - c. both of these.

2. Ecology is also called ...
 - a. meteorology.
 - b. ecological science.
 - c. physics.
3. Ecology makes use of...
 - a. other sciences.
 - b. the environment.
 - c. solar insulation.

2. Розподіліть слова за відповідними природничими науками:

minerals, atoms, living organisms, cells, rocks, history of the Earth, chemical bonds, rivers, lands

Biology	Geography	Geology	Chemistry
---------	-----------	---------	-----------

3. Доповніть діалог виділеними словами та відтворіть:

at different levels, the dynamics of population, the sphere of water, behavioural ecology, about ecology and its sub-disciplines, the sphere of air, you can also examine communities of species

Interviewer: Mr Hale, could you tell us something(1) _____?

Mr Hale: Well, as you know ecology has a great number of sub-disciplines. Some are more complex than others. For example, physiological and(2) _____ focuses on the adaptations of the individual to his environment; population ecology examines(3) _____ of a single species; community ecology studies the interactions between species in an ecological community. Ecosystem and landscape ecology are even more complex.

Interviewer: Can ecology be studied(4) _____?

Mr Hale: Yes, of course. If you study the population level, you focus on individuals of the same species, but(5) _____, ecosystem or biosphere levels.

Interviewer: Can you explain how the outer layer of the planet Earth can be divided?

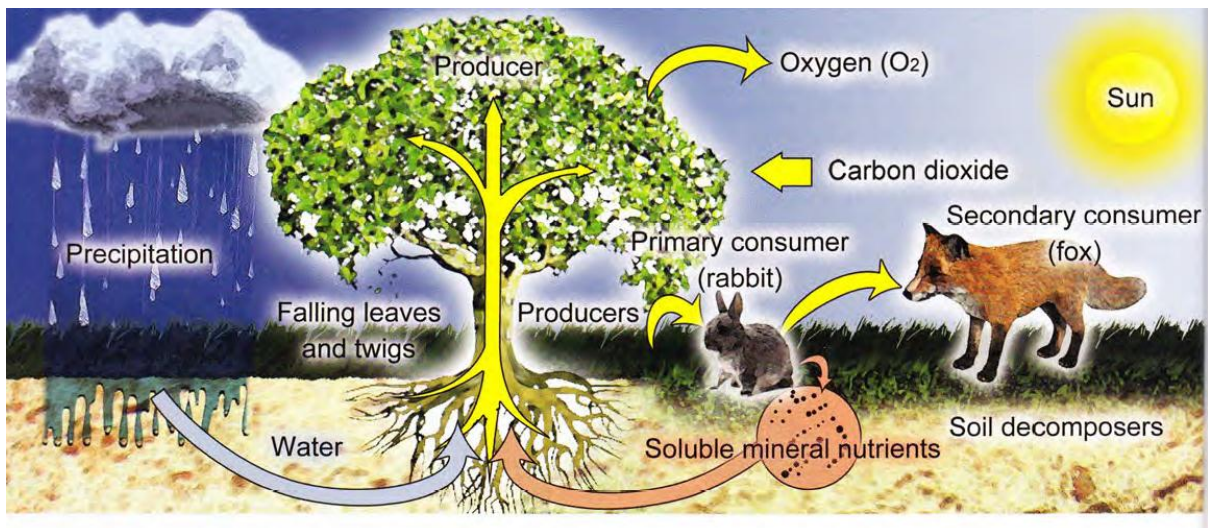
Mr Hale: Yes, there are basically three compartments: the hydrosphere is (6) _____, the lithosphere is the sphere of soil and rocks and the atmosphere is (7) _____.

Interviewer: And what about the biosphere?

Mr Hale: Well, that's the sphere of life. In short, it is the part of our planet occupied by life.

4. Розгляньте малюнок та дайте відповіді на запитання.

1. Do you know what a food chain is?
2. Do you think that you are part of it?



5. Прочитайте текст про харчовий ланцюг й перевірте свої відповіді:

Every living organism has a constant relationship with every other element in the environment. An **ecosystem** is a situation where there is interaction between organisms and their environment. An ecosystem can vary in size: it can be a pond, a field, a piece of dead wood or a rainforest. In an ecosystem, species are connected by food chains. A **food chain** begins when energy from the sun is captured by plants and trees (primary producers) through photosynthesis. Then primary consumers (herbivores) eat plants and later secondary and tertiary consumers (carnivores) eat primary consumers. The energy they create by eating and digesting is lost as waste heat. When animals and plants die, very small bacteria break down their tissue (decomposition) and the chemicals that make up those living organisms are released into the soil and act as fertilisers to help green plants to grow. In this way the food chain starts all over again.

6. З'єднайте обидві частини речення:

- | | |
|---|--|
| 1. A food chain begins | a. release chemicals into the soil during decomposition. |
| 2. Carnivores are | b. help green plants to grow. |
| 3. Herbivores are | c. primary consumers. |
| 4. When they die, living organisms | d. secondary and tertiary consumers. |
| 5. The chemicals released into the soil | e. when plants and trees capture energy from the sun. |

7. Поясніть своїми словами, як відбувається процес харчового ланцюга.
In this ecosystem there is interaction between ...

8. Прочитайте текст про екологію людини та екосистему й доберіть назву для кожного параграфу.

- Human beings and the ecosystem
- What human ecology is about
- Are human beings different?

1. Ecology often studies ecosystems without humans in them. In fact humans consider themselves as a separate, unnatural component different from other species of animal in many ways. But we are the species that has the greatest impact on the changes in ecology today.

2. The main difference between humans and other species is that we are conscious beings and we express our ambitions and aspirations through our relationship with the natural world. Our knowledge, principles, values and goals affect our behaviour. And we are also influenced by the society, culture, communities. As a consequence, cooperation and conflict between individuals and groups have an impact on our biosphere.

3. Human ecology deals both with the influence of human beings on their environment and with the effect of the environment on human behaviour. It also investigates their strategies to adapt to different situations as they understand their impact on each other better.

9. Дайте відповіді на запитання.

1. Why do humans sometimes consider themselves different from other species?
2. What are the main differences between human beings and other living beings?
3. What are we influenced by? What are the consequences?
4. What does human ecology deal with and investigate?

10. Напишіть твір про екологію. Дотримуйтесь наступних пунктів:

- What is ecology? • What does it study? • How is it a multidisciplinary science?
- What are its sub-disciplines? • How do food chains work? • What is human ecology?

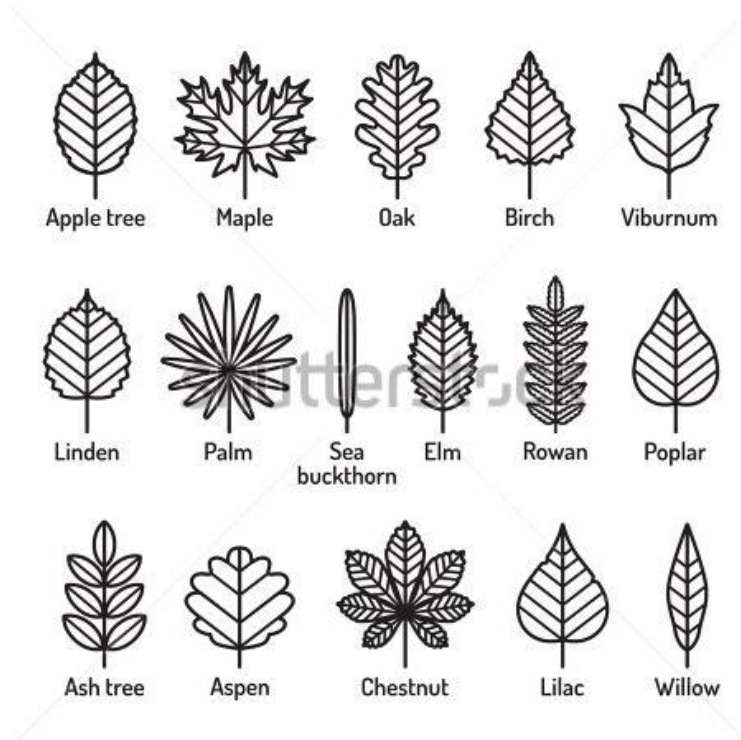
11. Заповніть текст запропонованими словами. Два слова є зайвими.

becoming, miss, at risk, natural, awful, need, wildlife, close, pay, environment

The 1) ____ truth is that many species are in danger of 2) ____ extinct unless 3) ____ conservation societies are supported by all of us. We must not 4) ____ the opportunity to help animals which 5) ____ protection, and we have to 6) ____ attention to which species are 7) _____. The experience of seeing wild animals at 8) _____ quarters will convince all of us that they need as much help as we can give them.

Ключі Урок 1

Завд. 5



Завд. 7

Storms make trees take deeper roots.

The trees that are slow to grow bear the best fruit.

Time spent amongst trees is never wasted time.

He that plants trees loves others beside himself.

Урок 2

Завд. 9

1.occupy; 2. forests; 3. trees; 4. layers; 5. the canopy; 6. dead plants; 7. wildflowers; 8.bushes; 9. the leaves; 10. oxygen.

Урок 3

Завд. 6

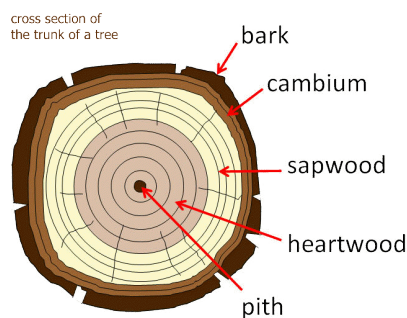
1.consisting; 2. foliage; 3 found; 4. harbor; 5. of; 6. leaves

Завд. 7

1.hot; 2.cool; 3.dropped; 4.floor; 5.vapor; 6.rain; 7.thunderstorms; 8.seasons; 9.summer; 10.food.

Урок 4

Завд. 4



Завд. 6

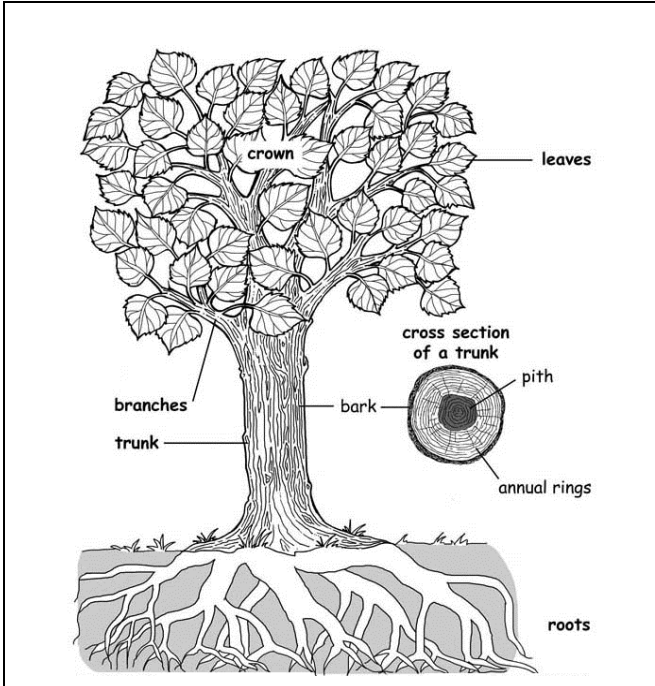
1. F; 2. F; 3. T; 4. F; 5. F; 6. F; 7. T; 8. T.

Урок 5

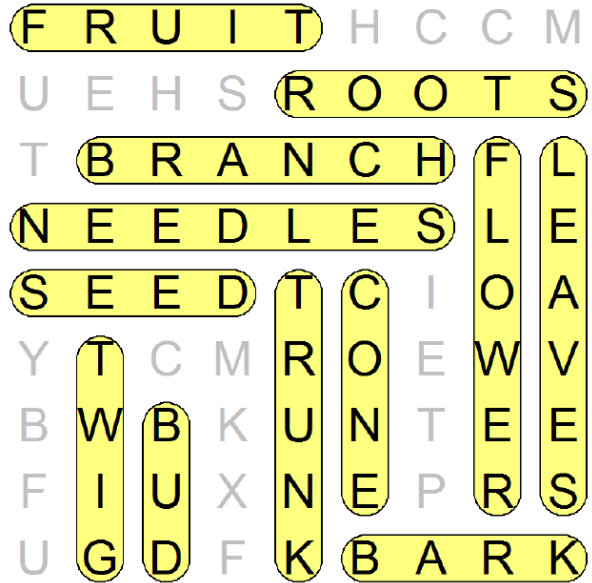
Завд. 6

1 e 2 c 3 f 4 b 5 h 6 i 7 j 8 g 9 a 10 d

Завд.7



Завд.8



Завд.10

Across 2 bees; 3 wood; 4 seed; 5 fruit; 7 roots; 9 cone; bark; 13 trunk; 14 sunlight

Down 1 leaves; 2 buds; 3 water; 6 flower; 8 sap; 10 needles; 11 branch; 12 petal

Завд.11

1 the leaves (the crown) , the trunk (stem) and the roots

2 the crown

3 leaves and branches

4 water and nutrients, anchor the tree upright

5 the crown

6 the crown

7 bark

8 branches

9 height, depth, width

Завд.12

1) parts 2) nutrients 3) soil. 4) crown 5) roots 6) leaves 7) energy 8) photosynthesis 9)

shape 10) branches

Завд.13

1 B 2 F 3 A 4 E 5 C

Урок 6

Завд.5

- 1 deterioration
- 2 weather
- 3 fungus
- 4 degrade
- 5 decay

Завд.7

- 1) deterioration 2) fungi 3) decay 4) attack 5) insects 6) agents 7) supply 8) plants 9) conditions 10) moisture 11) temperature

Завд. 8

- 1 B2 D3 A4 C

Урок 7

Завд.5

1. A tree breathes through its leaves using chlorophyll, the substance that makes leaves green.
2. Plants use their roots to take in water and other essential nutrients.
3. Plants use light energy to make sugars from carbon dioxide and water.
4. Plants need minerals to produce chlorophyll and go through photosynthesis.
5. Plant leaves contain chloroplasts, which have chlorophyll that absorbs light energy from the sun.

Завд.6

- 1) breathe 2) energy 3) absorb 4) carbondioxide 5) oxygen 6) releases 7) photosynthesis 8) cells 9) carbondioxide 10) respiration 11) environment 12) releases

Завд. 7

- 1 C2 F3 E4 A5 D

Урок 8

Завд. 11

- 1) awful 2) becoming 3) wildlife 5) need 6) pay 7) at risk 8) close

Grammar

Present Simple & Present Continuous

1. Complete the conversation. Put *does, is* or *has* into the gaps.

A My sister ___ very clever.

B What _____ she do?

A She ___ a teacher in a primary school.

B Where _____ she live?

A She ___ a lovely house in the country.

B _____ she married?

A Yes. Her husband's name ___ Ray.

B _____ she have any children?

A Yes. A girl called Mary. She _____ eight years old.

She _____ a lot of friends.

2. Put *am, is, are, do, does* into the gaps.

a) I _____ a doctor.

b) _____ he like his job?

c) Where _____ they live?

d) _____ she a student?

e) Why _____ you want to learn English?

f) We ___ at home.

g) What _____ he do at weekends?

3. Expand the following into sentences in order to make true statements with *doesn't* or *don't* where necessary.

water / boil / at 100°C

Water boils at 100°C

rice / grow / on trees

kangaroos / live / in Spain

plants / need / water to grow

rain / fall / from clouds

cows / lay / eggs

elephants / eat / meat

fish / walk / on land

the sun / set / in the east

bees / give milk

wool / come / from sheep

4. Complete the sentences with *is/isn't, are/aren't, does/doesn't, do/don't*.

1. Where _____ he from?

2. They _____ at home. They _____ at work.

3. She _____ tired but she _____ want to go to bed.

4. Where _____ you live?
5. 'What time _____ the shop close?' 'I _____ know.'
6. How much _____ a hamburger and chips?
7. He _____ a doctor. He flies a plane.
8. My parents _____ very kind.
9. _____ she have a sister?
10. What time _____ it?

5. Put the words in the correct order to make sentences.

- a) always / France / to / go / we / spring / in
- b) you / in / do / an / work / office ?
- c) languages / many / you / know / do / how ?
- d) you / time / do / up / what / get ?
- e) your / what / wife's / is / name ?
- f) like / their / does / sport / daughter ?
- g) she / to / goes / usually / at / bed / 11.00 / about.
- h) sometimes / tennis / on / play / I / Saturdays.
- i) where / on / do / go / you / holiday ?
- j) you / what / in / do / do / the evenings ?

6. Use the verbs in the correct form.

- 1) Please, be quiet. I _____ (try) to concentrate.
- 2) Look! It _____ (snow).
- 3) Why _____ (you / look) at me like that?
- 4) Excuse me, I _____ (look) for a phone box. Is there one near here?
- 5) I want to lose weight. I _____ (not eat) anything today.
- 6) Why _____ (you / wear) your coat today? It's very warm.
- 7) I _____ (not / work) this week. I'm on holiday.

7. Read the dialogue and complete it together with your partner.

What are they doing?

A: Hello, Linda. Is Jack here?

B: No, he isn't.

A: Is he working today?

B: No, he isn't working today.

He's ... (where?)

A: What is he doing?

B: He's ...

A: What are you doing?

B: I'm ...

8. Underline the correct form.

1. A: What language *are you speaking / do you speak*?
- B: English, French and Italian.
2. A: What's that song *you listen to / you're listening to*?
- B: It's called "Angels." Good, isn't it?

3. A: *What are you reading / do you read?*
 B: It's an article about holidays in Switzerland.
4. A: *Do you smoke / Are you smoking?*
 B: No, thank you. I stopped smoking two years ago.
5. A: *Why are you laughing / do you laugh?*
 B: It's your face. You look so funny!
6. A: *does your brother play / Is your brother playing any sport?*
 B: Yes. Football in the winter, tennis in the summer and swimming all year.

9. Put the verbs in brackets into the correct form of the present continuous or the present simple.

- 1 A: Where's James?
 B: He _____(play) football in the garden right now.
- 2 A: Bill _____(dance) very well.
 B: Yes, he's a good singer, too.
- 3 A: Lucy is very busy.
 B: Yes. She _____(work) very hard these days.
- 4 A: What _____(you/do) on Saturdays?
 B: I clean the house and go shopping.
- 5 A: Why _____(you/pack) your suitcase?
 B: Because I _____(fly) to Paris tomorrow morning.
- 6 A: Fred _____(not/know) how to swim.
 B: That's because he's only three.
- 7 A: Max looks very fit.
 B: Yes. He _____(take) a lot of exercise these days.

10. Read the text and put the verbs in brackets into the present simple or the present continuous.

Michael McIntosh 1) *..is...* (be) a very busy man. Every morning, he 2) _____(leave) home at 8 o'clock, and 3) _____(go) to his office. He 4) _____(usually/have) meetings until lunchtime, and in the afternoon, he 5) _____(often/visit) the people of Madewell. He really 6) _____(enjoy) talking to people. At the moment, he and his team 7) _____(organise) his election campaign. There are elections in June and he 8) _____(hope) to persuade lots of people to vote for him. Next month, he 9) _____(go) to London to meet the Prime Minister. They 10) _____(have) a meeting to discuss future plans for Madewell.

11. Each sentence has a mistake. Find it and correct it.

*Example: Where your sister work? Where **does** your sister work?*

- I'm go to the cinema tonight.
- How much you earn in your job?
- That's my husband over there. He stands near the window.
- What you doing in the evening?
- Sorry. You can't speak to Jenny. She's have a bath.

- f) Peter's a businessman. He's work all over the world.
g) At the moment Peter's work in Russia.

12. Put the verbs in brackets into the present simple or the present continuous.

1. Jason ...*is not coming*... (not/come) with us this evening.
2. What _____(this sign/mean)?
3. We _____ (usually/meet)at the sports centre every Wednesday afternoon.
4. Greg _____ (train) for the nextOlympic Games.
5. Michael Burns is very rich. He _____(own) a department store.
6. John and Mary _____(play)chess at the moment.
7. Peter _____(not/usually/have) bacon and eggs for breakfast.
8. My father _____(buy) a newspaper every day.
9. Mr and Mrs Dean _____(not/go) to Mexico tomorrow.
10. _____(Pierre/speak) English?"No, but he _____(speak) French.'

Future Simple & be going to

1. What will life be in the 22nd century? Look at the prompts and make sentences using *will* or *won't*, as in the example. Think of some sentences of your own.

- 1) People / live longer + *People will live longer.*
- 2) Robots / do most of the work +
- 3) People / use electric cars –
- 4) Pollution / disappear +
- 5) People / die of serious diseases –
- 6) Children / stop going to school –
- 7) People / go on holiday to the moon +
- 8) Scientists / clone people +

2. Make true sentences using *will* or *won't*.

Example: I / go out tonight *I think/I don't think I'll go out tonight.*

- I / be a millionaire one day
- It / snow tomorrow
- I / go shopping this afternoon
- My English exam / be difficult
- I / pass the exam easily
- I / get a new job
- I / be at home this evening

3. Underline the correct verb form in the sentences.

Example: 'Oh, dear. I'm late for work.' 'Don't worry. *I'm going to give / I'll give you a lift.'*

- a) 'I've got a headache.' 'Wait a minute. *I'll get / I'm going to get* you an aspirin.'

- b) 'Why are you putting on your coat?' 'Because *I'll take / I'm going to take* the dog for a walk.'
- c) 'Are you and Alan still going out together?' 'Oh, yes. *We'll get married / we're going to get married* next year.'
- d) 'Did you phone Peter about tonight?' 'No, I forgot. *I'll do / I'm going to do* it now. What's his number?'
- e) 'Have you booked your holiday?' 'Yes, we have. *We'll go / we're going* to Italy.'
- f) 'I haven't got enough money to pay for my ticket.' 'It's OK. *I'll lend / I'm going to lend* you some.'

4. Fill in the gaps with the correct form of *will* or *be going to* and the verb in brackets.

1. A: Why are you buying flour and eggs?
B: Because I _____(make) a cake.
2. A: I have decided what to buy Mum for her birthday.
B: Really. What _____(you/buy) for her?
3. A: Did you ask Jackie to the party?
B: Oh no! I forgot! I _____(ask) her tonight.
4. A: Could I speak to Jim, please?
B: Wait a minute. I _____(get) him for you.
5. A: What are your plans for the weekend?
B: I _____(spend)some time with my friends.
6. A: What are you doing on Friday night?
B: Oh, I _____(probably/stay) at home with my family.
7. A: Have you tidied your room yet?
B: No, but I promise I _____(do) it this afternoon.
8. A: Look at that boy!
B: Oh yes! He _____(climb) the tree.
9. A: Jason is very clever for his age.
B: Yes. He says he _____(become) a doctor when he grows up.
10. A: I'm too tired to cut the grass.
B: Don't worry! I _____(cut) it for you.

Future Simple, Present Simple, Present Continuous

1. Put the verbs in brackets into *the future simple, the present simple or the present continuous*.

1. A: I _____(see) Roger at seven o'clocktonight.
B: Really? I thought he was out of town.
2. A: _____(you/do) anything on Fridaymorning? B: No, I'm free.
3. A: I _____(go) to the cinema. There's anew film on. Do you want to come with me? B: What time _____(the film/start)?
4. A: Helen _____(have) a party theday after tomorrow _____(you/go)?

- B: As a matter of fact, I haven't been invited.
5. A: The new exhibition _____(open)on April 3rd and_____ (finish) onMay 31st.
B: I know. I _____(go) on the first day.
6. A: Aunt Maggie_____(come) to visit ustomorrow.
B: I know. What time_____(she/arrive)?
7. A: Excuse me, what time_____(the train/leave)? B: At half past three, madam.
8. A: Michael Jackson_____(give) aconcert at the Olympic Stadium next week.
B: I know. I _____(want) to get a ticket.
9. A: I'm really thirsty.B: I _____(get) you a glass of water.
10. A: Are you looking forward to your party?
B: Yes. I hope everyone_____(enjoy) it.
11. A: How old is your sister?
B: She _____(be) twelve next month.
12. A: What are you doing tonight?
B: I _____ (probably watch) TV after dinner.

Past Simple

1. Underline the correct answer.

- a) The artist Pablo Picasso **was** French/Spanish.
- b) The 1970s group Abba **were**from Germany/Sweden.
- c) Franz Kafka **was** a famous musician/writer.
- d) From 1994 to 1999, Nelson Mandela **was** the President of South Africa/Zimbabwe.
- e) The Spice Girls **were** popular in the 1990s/in the 1970s.
- f) Marie Curie **was** born in Warsaw/Paris.
- g) John Lennon and Paul McCartney **were** both originally from London/Liverpool.
- h) Marilyn Monroe's real name **was** Norma Jean Baker/Jean Harlow.

2. Read about the famous people. Complete the questions and short answers.

Mark Twain	Charlie Chaplin	The Marx Brothers	Anna Pavlova
American writer	Film actor	American	Russian dancer
- born 1835	- born London 1889	comedians –	- died 1931
- died 1910	- died Switzerland	all born in Germany	
	1977		

- 1) _ Mark Twain a painter? _____
- 2) _he American? _____
- 3) _ Charlie Chaplin born in America? _____
- 4) _he an actor? _____
- 5) _the Marx Brothers born in the USA? _____
- 6) _they comedians? _____
- 7) _ Anna Pavlova Russian? _____
- 8) _she a singer? _____

3. Complete the sentences with the past forms of the verbs in brackets.

1. Nelson Mandela ___ (spend) twenty-seven years in prison. Before that, he ___ (be) a lawyer.
2. Abba ___ (write) most of the songs in English. They ___ (sell) millions of records in the 70s and 80s.
3. John Lennon and Paul McCartney first ___ (meet) at a party when they ___ (be) students.
4. Marilyn Monroe ___ (change) her name before she ___ (become) famous.
5. Marie Curie and her husband Pierre Curie ___ (discover) radium. She ___ (win) the Nobel Prize twice, in 1903 and again in 1911.
6. Pablo Picasso ___ (leave) Spain in 1904. He ___ (live) in France for most of his life. He ___ (die) in 1973.

4. Read the text and, in pairs, ask and answer questions as in the examples.

Tim Berners-Lee was born in England, but he lives now in the USA. In 1989, Tim had a very important idea. He invented the World Wide Web (www!)

Tim went to school in London. His parents both worked with computers, so it isn't surprising that he loved computers from an early age. When he was eighteen, he left school and went to Oxford University, where he studied Physics. At Oxford, he became more and more interested in computers, and he made his first computer from an old television. He graduated in 1976 and got a job with a computer company in Dorset, England. In 1989, he went to work in Switzerland, where he first had the idea of an international information network linked by computer and he decided to call it the World Wide Web. In 1994, he went to live in the United States, where he now works. In 1995, he wrote an article in *The New York Times* where he said "The World Wide Web is a Universe of Information: it is for everyone." His idea of a web, where people from all over the world can exchange information, is now real.

a) Tim Berners-Lee/be born/in the USA?

Student A: Was Tim Berners-Lee born in the USA?

Student B: No, he wasn't. He was born in England.

b) he/invent/www?

Student B: Did he invent www?

Student A: Yes he did.

c) his parents/ work with computers?

d) he/go to Cambridge University?

e) he/make his first computer from an old television?

f) he/graduate in 1967?

g) he/go to work in Germany?

h) he/decide to call an international information network What Where When?

i) he/go to live in Canada in 1994?

j) he/ write an article in *The New York Times*?

5. Finish the dialogue.

A: Hi!

B: Hello!

A: Did you have a good weekend?

B: Yeah, it was OK. I didn't do much really, just sat at home relaxing. How about you?

A: Oh, I had a fantastic weekend!

B: Oh, really. What did you do?

A: Well, ...

Present Perfect Simple & Past Simple

1. Use the prompts to make sentences in the Present Perfect Tense.

1. I/not finish/my study/yet

I haven't finished my post-graduate study yet.

2. I/already/read/twenty pages of the book

3. You/ever/give an interview?

4. How long/you/know each other?

5. She/never/take part in any scientific conference

6. They/publish/ three articles on this topic

7. He/not do/ anything exciting this week

8. She/have/four different jobs during the last ten years

9. How many times/you/be married?

10. He/just/start/his own company

2. Work with a partner. Choose from the list and make dialogues like the example.

Example: be/America?

A: Have you ever been to America?

B: No, I haven't. I've never been there / Yes, I have.

A: When did you go?

B: Two years ago. I went to New York with my family.

read/a book in a foreign language?sleep/in the open air?hear/an opera?win/a competition?meet/anyone famous?lose/your jobsee/a horror movie/

3. Underline the correct tense, Present Perfect or Past Simple.

a) The Earth *existed/has existed* for more than 4000 million years.

b) Dinosaurs *have lived/lived* on Earth for 160 million years.

c) Humans *have been/were* on the planet for just 50 000 years.

d) For thousands of years, people *thought/have thought* that the world was flat.

e) The first Australians – the Aborigines – *have lived/lived* there for about 40 000 years.

f) People in Europe *have only known/only knew* about Australia for about 400 years.

g) For many years, the USA *has been/was* a British colony.

4. Put the verbs in brackets into the Present Perfect Simple or the Past Simple.

A: Hello, Billy. I 1) haven't seen (not/see) you for a lot of time.

B: Yes, I 2) _____ (be) very busy recently.

A: Really? Tell me what you 3) _____ (do) since we last 4) _____ (see) each other.

B: Well, I 5) _____ (get) my degree last month and then I 6) _____ (move) house.

A: When 7) _____ (you/move)?

B: Last week, but I 8) _____ (not/unpack) everything yet.

A: I 9) _____ (phone) you on Tuesday but there 10) _____ (be) no answer.

B: I 11) _____ (be) busy at my new house then.

A: Never mind, I only 12) _____ (want) to invite you to a party next week at my house.

B: Great! Thank you.

5. Complete the story. Put the verb in Brackets into the Present Perfect or Past Simple tense.

A sad story of a sad man

One Sunday evening two men a) _____ (meet) in a London pub. One of them was very unhappy.

'Life is terrible, everything in the world is really boring,' he said.

'Don't say that', said the other man. 'Life is marvelous! The world is so exciting! Think about Italy. It's a wonderful country. b) _____ you ever _____ (be) there?'

'Oh, yes. I c) _____ (go) there last year and I d) _____ (not like) it.'

'Well, e) _____ you _____ (be) to Norway? f) _____ you ever _____ (see) the midnight sun?'

'Oh, yes. I g) _____ (go) in 1984 and I h) _____ (see) the midnight sun. I i) _____ (not enjoy) it.'

'Well, I j) _____ just _____ (return) from a safari in Africa. k) _____ you _____ (visit) Africa yet?'

'Yes, I l) _____ (go) on safari in Africa last year and I m) _____ (climb) Mount Kilimanjaro. It was really boring.'

'Well,' said the other man, 'I think that you are very ill. Only the best psychiatrist can help you. Go to see Dr Greenbaum in Harley Street.'

'I am Dr Greenbaum,' answered the man sadly.

6. Each sentence has a mistake. Read the sentences and correct the mistakes.

1. I've seen John yesterday.
2. Have you ever eat Indian food?
3. Tom has ever been to America.
4. Have they lived in London five years ago?
5. Mary have written a lot of books.
6. She wrote a book last year?
7. I have never drank champagne.
8. They have just arrive home.
9. John just bought a guitar.
10. I haven't yet done my homework.

Present Perfect Continuous

1. Write down sentences using the prompts below, as in the example.

take photos/1851: People have been taking photos since 1851

listen to the radio/1894, ride bicycles/1791, travel by plane/1903, print books/1450
use fridges/1856, use light bulbs/1878, store food in tins/1809

2. In pairs, ask and answer questions using the prompts given, as in the example.

SA: What's your favourite hobby?

SB: Painting.

SA: How long have you been painting?

SB: I've been painting since I was sixteen years old.

1.favourite hobby

2.best friend/know

3.favourite TV programme/watch

4.your address/live

5.favourite magazine/read

6.favourite football team/be a fan

7.favourite sport/play

3. Put the verbs in brackets into the present perfect continuous.

A: Hi! Liz. You look exhausted. 1) *Have you been working* (you/work) overtime again?

B: Yes, I have. I 2) ___(help) my boss to update the files in the office all week. He 3)___(read) the files and I 4) ___(write) down names, addresses, phone numbers and so on. What about you?

A: Well, I 5)___ (train) hard for the championship next week.

B: I see! 6) ___ (you/lift) weights all day long?

A: Yes, for two weeks. How's Sue? 7)___(she/study) for her exams?

B: No, she hasn't. She 8)___(go) out every evening I won't be surprised if she fails again!

Present Perfect Simple & Present Perfect Continuous

1. Put the verbs in brackets into the present perfect continuous or the present perfect simple.

A: Good evening and welcome to our show. Tonight we have Steve Connolly, the well-known director. We're glad to have you here Steve. What 1) have you been doing (do) lately?

B: Well, I 2) _____(finish) my latest film, "Double Crossing".

A: That 3) _____ (just/come out) at the cinema, hasn't it?

B: Yes. The papers 4) _____(give) it good reviews. I hope they'll like my next film too.

A: 5) _____(you/decide) what it'll be about?

B: Yes, I 6) _____(read) an exciting book over the last few weeks and I want to make it into a film. I 7) _____(not/decide) where to film it yet, perhaps Moscow.

A: Aha! Is it true that you 8) _____(recently/start) learning Russian?

B: Yes, I 9) _____(study) it for three years now and I 10) _____(visit) the country twice.

A: Steve, thank you very much for being with us, and good luck with your new film.

2. Put the verbs in brackets into the present perfect continuous or the present perfect simple.

1. A: What are Andrew and David doing?

B: They _____(work) in the garden for three hours.

2. A: Why is Sally upset?

B: She _____(lose) her bag.

3. A: I _____(always/believe) that exercise is good for you.

B: Of course, it's good to keep fit.

4. A: Emily _____(teach) maths since she left university.

B: Yes, and she's a very good teacher, too.

5. A: Fred _____(open) a new shop.

B: Really? Where is it?

6. A: This pie is delicious.

B: Is it? I _____(not/taste) it yet.

7. A: Have you found your umbrella yet?

B: No, I _____(look) for it for an hour now.

8. A: You look exhausted.

B: Well, I _____(clean) the windows since 8 o'clock this morning.

9. A: Can I have some more lemonade, please?

B: Sorry, your brother _____(just/drink) it all.

10. A: Have you got new neighbours?

B: Yes, they _____(just/move) to the area.

Past Simple and Past Continuous

1. Read the story. Put the verb in brackets into the Past Simple. They are all irregular. Complete the moral of 'The Bald Knight' at the end.

Once upon a time, a long time ago, there was a knight who, as he _____(grow) older, _____(lose) all his hair. He _____(become) as bald as an egg. He didn't want anyone to see his bald head, so he _____(buy) a beautiful, black, curly wig.

One day some lords and ladies from the castle invited him to go hunting with them, so of course he _____(put) on his beautiful wig. 'How handsome I look!' he _____(think) to himself. Then he _____(set) off happily for the forest.

However, a terrible thing happened. His wig _____(catch) on a branch and _____(fall) off in full view of everyone. How they all laughed at him! At first the poor knight _____

(feel) very foolish but then he ____ (see) the funny side of the situation, and he started laughing, too. The knight never ____ (wear) his wig again.

The moral of this story is: when people laugh at us, it is best to ...

2. The following sentences have been taken from the story. Read it again and decide where they fit.

- a)... as he was dressing in front of his mirror.
- b) He was riding along, singing merrily to himself, when he passed under an oak tree and ...
- c) They were all still laughing when they arrived back at the castle.

3. Grammar questions

What tense are all the underlined verb forms in Exercise 2?

What is the difference in meaning between the following two sentences?

He laughed when he fell off his horse.

He was laughing when he fell off his horse.

4. Underline the correct tense, Past Simple or Past Continuous.

- 1. It rained / was raining when Lord Percy went for a walk.
- 2. He wore / was wearing a thick coat and riding boots.
- 3. At 9am he walked /was walking fast along the lane to Percy Hall.
- 4. He was thinking about breakfast when he heard / was hearing a cry.
- 5. When he stopped and looked round, he didn't see / wasn't seeing anyone.
- 6. Then a gate opened and a young woman stepped /was stepping through.
- 7. Her hair was untidy, her make-up smudged and she cried / was crying.
- 8. Her dress was covered in mud and she smelt / was smelling terrible.
- 9. "My horse," she sobbed, "he threw / was throwing me in the cow field."
- 10. "May I come up to the Hall to change." Lord Percy stared at her, speechless. Finally he nodded / was nodding.

5. Use your own ideas to complete the sentences. Use the past continuous.

- 1. Matt phoned while we ...*were having dinner*
- 2. The doorbell rang while I
- 3. We saw an accident while we
- 4. Ann fell asleep while she
- 5. The television was on, but nobody

6. Put the verbs in brackets in either the past simple or past continuous tense.

- 1. While the teacher was explaining (explain) the sum on the blackboard, the children were throwing (throw) paper aeroplanes around the classroom.
- 2. Eve ____ (live) in Athens when she ____ (meet) the man who was to become her husband.
- 3. ____ you ____ (not work) at McIlroy's when they ____ (have) that terrible fire?
- 4. I ____ (hear) a strange noise just as I ____ (go) to sleep.
- 5. When the fire alarm ____ (go) off, we ____ (leave) the building as quickly as possible.
- 6. At the place where we ____ (live) before, our neighbours ____ (always/have) violent arguments late at night.

7. Fiona___(live) in New York when her first novel was published.
8. On looking out of the window, Dick___(see) it was another dreary day. The wind ___(blow) hard and big black clouds ___(gather) on the horizon.
9. While the others___(lie) on the beach, poor old Gary___(work) in the office as usual.
10. When the phone___(ring), she ___(pick) it up and___(put) it down again!
11. I___(never/understand) why you ___(always/get) to school late on Monday mornings.
12. When I___(be) a lad, we___ (always/go) to Heysham for our summer holidays. I ___(really/love) the place even though it ___(often/rain).

Present Simple, Present Continuous, Past Simple and Past Continuous

1. Put the verbs in brackets into the correct form.

1. I _____ (clean) the window when the telephone _____ (ring).
2. ‘What is that noise?’ ‘James _____ (repair) his bike at the moment.
3. He _____(read) a book when his mother _____ (call) him.
4. ‘ _____ (be) you busy?’ ‘No, what _____ (you/want) me to do?’
5. They _____ (sing) while we _____ (play) some music.
6. Susan is a nurse. She usually_____ (work) at night.
7. Steve _____ (go) fishing with his friends tomorrow.
8. ‘ _____ (you watch) the film last night?’ ‘Yes, but I _____ (not/enjoy) it.

2. Choose the correct answer.

1. The Earth_____round the Sun.
A moved B moves C is moving
2. Sarah ___ a new car last week.
A is buying B buy C bought
3. I ___ when suddenly the dog began to bark.
A study B studied C was studying
4. He _ his thesis at the moment.
A is writing B was writing C writes
5. I ___ home from work when it began to snow.
A am walking B walked C was walking
6. Jane ___ the receiver and dialed the number.
A lifts B was lifting C lifted
7. Walt Disney _____ Mickey Mouse.
A was creating B creates C created
8. We _____ for a new house at the moment.
A are looking B look C looked
9. Ted _____ his father in the garden every Sunday.
A was helping B helps C is helping
10. Mr and Mrs Dean _____to Mexico tomorrow.
A go B are going C went

11. They __ usually go on holiday in May.

A aren't B doesn't C don't

12. your neighbours move yesterday?

A Do B Were C Did

Present Simple, Present Continuous, Present Perfect, Past Simple, Past Continuous

1. Put the verbs in brackets into the correct tense, Present Perfect, Past Simple, or Present Simple.

Dennis Heal (a) _____ (be) a politician. He (b) _____ (go) to Oxford University in 1960, and in 1967 he (c) _____ (become) a Member of Parliament for the Labour Party. He (d) _____ (be) an MP since then. He (e) _____ (be) Defence Minister from 1974-1980. He (f) _____ (write) three books, including his autobiography *The Time of my Life*, and a spy story called *The Time to Run*. He is married to the artist, Edna Heal, and they have two children. They (g) _____ (live) in Oxford for 15 years, then (h) _____ (move) to London in 1980. They now (i) _____ (live) in a house in Cadogan Square in central London.

2. Write in the questions to ask about Dennis Heal.

Example

What does he do _____? He's a politician.

1) When _____? In 1960.

2) How long _____? Since 1967.

3) When _____? From 1974-1980.

4) How many _____? Three.

5) What _____? She's an artist.

6) How many _____? Two.

7) How long _____? For fifteen years.

8) When _____? In 1980.

9) Where _____? In a house in central London.

10) How long _____? Since 1980.

3. Choose the correct item.

1. We ____ on holiday next weekend.

A go B are going C goes

2. I _____ this film. Let's watch something else.

A have seen B saw C am seeing

3. We saw a bad accident as we _____ to the airport.

A was driving B drove C were driving

4. Ted ____ his car last month.

A sold B has sold C is selling

5. The sun ____ every morning.

A is rising B rises C was rising

6. I _____ my first cassette player when I was eighteen.

- A have bought B am buying C bought
 7. Donna _____ her hair. It is still wet.
 A has just washed B is washing C washes
 8. She _____ with her parents at the moment.
 A stays B is staying C stayed

Past Simple and Past Perfect

1. Read the story and complete the moral at the end.

The Farmer and his Sons

There was once an old, dying farmer (1). Before he died he wanted to teach his three sons how to be good farmers. So he called them to him and said, 'My boys, before I die I want you to know that there is a great treasure buried in the vineyard. Promise me that you will look for it when I am dead.'

The sons promised and (2) they began looking for the treasure. They worked very hard in the hot sun (3). In their minds they pictured boxes of gold coins, diamond necklaces and other such things. (4) But they found not a single penny. They were very upset. (5) But then the grapes started to appear on the vines and their grapes were the biggest and best in the neighbourhood, and they sold them for a lot of money. Now they understood (6) and they lived happily and wealthily ever after.

The moral of this story is: hard work brings ...

2. Where do the following sentences fit in the story? Put a number 1-6 next to the sentence

- as soon as their father had died,
- who had worked hard in his vineyard all his life
- what their father had meant by the great treasure,
- and all the time as they were working they wondered what their father had left for them
- They felt that all their hard work had been for nothing.
- Soon they had dug up every inch of the vineyard.

3. Grammar questions

What tense are all the underlined verb forms in Exercise 2

Which sentence is true?

- The sons looked for the treasure when their father was dying.*
- The sons looked for the treasure when their father had died.*

What is the difference in meaning between a. and b.?

4. What is the difference in meaning between the following pairs of sentences.

- When I arrived at the party, they *were drinking* champagne.
When I arrived at the party, they *had drunk* the champagne.
- When I got home, the children *went* to bed.

When I got home, the children *had gone* to bed.

c. They thanked their teacher for everything she *was doing* to help them pass the exam.

They thanked their teacher for everything she *haddone* to help them pass the exam.

d. He told me that they *were staying* at the Ritz Hotel.

He told me that they *had stayed* at the Ritz Hotel.

5. Read the situations and write sentences from the words in brackets.

1. You went to Sue's house, but she wasn't there. (she / go / out) *She had gone out.*

2. You went back to your home town after many years. It wasn't the same as before. (it / change / a lot)

3. I invited Rachel to the party, but she couldn't come. (she / arrange / to do something else)

4. You went to the cinema last night. You got to the cinema late. (the film / already / begin)

5. It was nice to see Dan again after such a long time. (I / not I see I him for five years)

6. I offered Sue something to eat. but she wasn't hungry. (she / just / have / breakfast)

6. For each situation, write a sentence ending with never... before. Use the verb in brackets.

1. The man sitting next to you on the plane was very nervous. It was his first flight. (fly) *He'd never flown before.*

2. A woman walked into the room. She was a complete stranger to me. I (see) before.

3. Sam played tennis yesterday. He wasn't very good at it because it was his first game. He (play)...

4. Last year we went to Denmark. It was our first time there. We (be there) ...

7. Join the sentences using the conjunction in brackets. Change one verb into the Past Perfect.

Example: The children went to bed. We watched television. (After)

After the children had gone to bed, we watched television.

a. I took an aspirin. My headache disappeared, (when)

b. He drove 200 miles. He stopped for a break, (after)

c. I couldn't pay for my ticket. A thief stole my wallet. (because)

d. She passed her driving test. She bought a car. (as soon as)

e. I didn't go to Italy. I learnt Italian, (until)

f. He didn't tell the policeman. He took the money. (that)

g. We didn't tell Anna. George rang, (that)

8. Put the verb into the correct form, past perfect (I had done) or past simple (I did).

1. 'Was Paul at the party when you arrived?' 'No, he _____ (go) home.'

2. I felt very tired when I got home, so I _____ (go) straight to bed.
3. The house was very quiet when I got home. Everybody _____ (go) to bed.
4. Sorry I'm late. The car _____ (break) down on my way here.
5. We were driving along the road when we _____ (see) a car which _____ (break) down, so we _____ (stop) to help.

Past Simple, Past Continuous, Past Perfect

1. In the following sentences put the verbs in brackets in either the past simple, past continuous or past perfect tense.

1. They _____ (walk) in the park when the storm broke.
2. I _____ (eat) breakfast by the time the others woke up.
3. Liz _____ (go) to the Bahamas for her holidays last year.
4. We _____ (watch) a film on TV when our guests arrived.
5. They _____ (see) the film twice at the cinema when she rented it on video.
6. She _____ (already/type) a letter when her boss arrived.
7. He _____ (sit) on the train at this time yesterday morning.
8. I _____ (hear) a strange noise just as I _____ (go) to sleep.
9. While the others _____ (lie) on the beach, poor old Gary _____ (work) in the office as usual.
10. When the phone _____ (ring), she _____ (pick) it up and _____ (put) it down again!

2. Put the verbs in brackets into the past simple, past perfect simple or past continuous.

- 1) A: Where 1) _____ (be) you last night?
 B: I 2) _____ (be) at the cinema I 3) _____ (watch) a great film when a fire 4) (break out).
 A: Oh gosh! How 5) _____ (it/happen)?
 B: Someone 6) _____ (drop) a match into a waste-paper basket.

- 2) A: I 1) _____ (lose) my keys yesterday.
 B: Where 2) _____ (you/lose) them?
 A: I don't know. I 3) _____ (go) shopping and when I got back, I 4) _____ (realize) that I 5) _____ (leave) my keys somewhere.

- 3) A: What 1) _____ (do) when I 2) _____ (call) at eight, Burt?
 B: I 3) _____ (work) in the garden because the wind 4) _____ (blow down) the fence during the night.
 A: Oh, 5) _____ (you/manage) to fix it?
 B: Yes, I 6) _____ (do) it eventually, but it 7) _____ (be) very hard work. Why 8) _____ (you/call) me?
 A: I 9) _____ (want) to tell you about the factory. It 10) _____ (close down) yesterday.

B: I know. The company 11) _____ (have) problems for a long time before they finally 12) _____(decide) to close down the factory.

Modal verbs

FUNCTION	MODAL VERBS
obligation/ necessity	You must/have to study hard. (You are obliged to...)
advice	You must/should/ought to see a doctor. (I advise you to...)
prohibition	You mustn't talk in the library. (You aren't allowed to...)
lack of necessity	They needn't/don't have to call us tonight. (It isn't necessary.)
ability	Tony can run fast. (present) When he was young, he could climb trees. (past) She was able to get into the house. (single action in the past)
permission/asking for permission	Can/Could/May I use your phone? (asking for permission) You can take my car tonight. (giving permission) You can't take photographs inside the museum. (refusing permission)
request	Can you lend me your pen, please? Could you open the door, please? Will you post the letter?
suggestion	We can/could watch a film tonight. Shall we eat out tonight?
possibility	May/might/could be ill. (It's possible)
offer	Shall I carry the shopping for you? (Would you like me to carry...)
logical assumption	He must be at work. (I'm sure she is...) She can't be at work. (I'm sure she isn't...)

1. Choose the correct answer.

1. I **C** remember to go to the bank. I haven't got any money.

A don't have to **B** needn't **C** must

2. I take your order, please?

A Will **B** Must **C** May

3. Steven read and write until he was seven years old.

A must **B** could **C** couldn't

4. you make dinner tonight?

A Shall **B** Will **C** May

5. You go to bed late during the week.

A couldn't **B** shall **C** shouldn't

6. You visit your parents more often.

A should **B** were able to **C** shall

7. we go to the cinema at the weekend?

A Must B Should C Shall

8. 'Where we meet?' 'At my place.'

A must B shall C should

9. Peter go to the dentist before his toothache gets worse.

A should B shall C can

10. You do the ironing. I'll do it instead.

A needn't B must C mustn't

11. You cross the road without looking first. It's dangerous.

A needn't B mustn't C must

2. Underline the correct word.

1 You *may/mustn't* run in the corridors. It's dangerous.

2 *Can/Should* I ask you a question?

3 *Will/Shall* we go out for lunch today?

4 You *must/shouldn't* stay at home if you are ill.

5 Tommy *can't/couldn't* tell the time when he was a baby.

6 My book *can't/mustn't be* in the house. I've looked everywhere.

7 You *might/needn't* clean the windows. I've already done them.

8 *Will/Shall* I help you?

9 You *needn't/mustn't* do the shopping. I'll do it later.

10 Sam left late for the airport this morning. He *should/could* have missed his flight.

3. Fill in the gaps with an appropriate modal verb.

1) Peter is eight years old. He ____ read and write.

2) You are tired. _____ I do the cooking tonight?

3) She _____ swim when she was ten years old.

4) It's cold in here. _____ you close the window, please?

5) He _____ study hard for his exams.

6) Susan _____ to walk because she has broken her leg.

7) _____ you bring me a glass of water, please?

8) Wow! Look at that man in the beautiful car. He _____ be very rich.

9) _____ I show you something, sir?

10) You _____ go to the doctor. You'll be all right.

11) Policemen ____ wear a uniform.

12) You _____ throw litter in the street.

13) You _____ go until you finish eating.

14) I _____ phone Alan. I haven't spoken to him for a long time.

15) _____ I use your phone?

4. Underline the correct word(s) in bold.

A: Good morning. How 1) **can/must** I help you, sir?

B: I'd like to book a room for tonight, please.

A: Certainly sir.

B: How much does a single room cost for one night?
A: £35, sir. Payable in advance.
B: What! 2) **Do / have to/ Could I** pay right now?
A: Yes, I'm afraid you 3) **need/must** pay in advance, sir.
B: Really. Well! 4) **Do I have to/ Shall I** pay in cash?
A: No, you 5) **mustn't/needn't** pay in cash. You 6) **could/can't** pay by credit card if you prefer.
B: This is a bit unusual. I 7) **may/must** look in my wallet to see if I have enough cash with me.
A: You 8) **couldn't/don't have** to hurry, sir. Take your time.
A: Good morning. Here's the key. 9) **Could/Must** I leave my luggage here until twelve o'clock, please?
B: Of course. 10) **May/Need I** ask if you enjoyed your stay?
A: Oh yes. I 11) **can/must** write down the phone number, so that I can stay here again.
B: You 12) **mustn't/don't need to** do that, sir. I 13) **have to/can** give you our card.
A: Oh, thank you very much. Goodbye.
B: Goodbye.

Тексти для додаткового читання

A Silent War between Plants and Insects

1. Прочитайте текст та випишіть усі шляхи, за допомогою яких рослини захищаються від комах.

It looked like a dying forest. Even though it was summer, some trees were bare of leaves. Almost every branch and twig of the maple and oak trees was crawling with Tussock moth caterpillars. Watching the caterpillars munch their way through the leaves might lead one to conclude that the plants are helpless victims. Since trees cannot move, they seem to have no defense against their ravenous enemies. Moreover, some insects resemble sticks, twigs or leaves and it is very difficult for predators to spot them. Stick insects invading plants get their name from the way they camouflage themselves.

However, new knowledge about plant reactions shows that plants actually do take an active role in fending off invaders. Plants fight their enemies in ways that cannot be seen. They produce sophisticated chemical weapons which they can use in a variety of ways. In fact, chemicals produced by plants are more effective in controlling insect populations than any chemicals produced by people.

Some of the chemical defense mechanisms of plants are quite unusual. For example, the sugar maple tree provides a chemical guessing game for leaf-eating insects. The maple produces groups of leaves all over the tree that differ in chemical content. Some leaves contain large amounts of tannins or other chemicals that are poisonous to insects. Some leaves are rich in nutrients, while yet other groups of leaves are so low in nutrients that they do not provide adequate nourishment for the insects. Hungry insects in this tree must crawl actively all over the tree to find sufficient food. This action makes it much more likely that the insects themselves will be eaten by predators.

Another tactic for depriving insects of food is used by different tree species such as oak, alder, or willow. When leaves of these trees are eaten by insects, the leaves that grow back have large amounts of tannins and other poisons that discourage further attack. Even more amazing is the fact that other trees in the area seem to be warned of the danger of attack. Scientists think that nearby trees might be able to detect gaseous chemicals released by destroyed leaves.

Trees are not the only kind of plants that fight back against insect attacks. Other plants, such as daisies and marigolds, produce chemicals that become deadly only after the insects have eaten the leaves and are exposed to light. Some of these chemicals react in sunlight to cause chromosome abnormalities that result in the death of the insects.

The next time you see a plant with chewed leaves, think about the leaves that did not get eaten. Perhaps they will remind you that plants have many defensive actions that cannot be seen in their silent war with insects.

2. Прочитайте текст ще раз та опишіть детально кожну тактику захисту.

Concepts of Tree Disease

1. Прочитайте твердження та висловіть свою згоду (Т) або незгоду (F):

1. Diseases may be caused by both biotic and abiotic factors.
2. It is not necessary to know the cause of a tree disease.
3. The process of determining the cause of a tree disease is known as diagnosis.
4. Visible evidence of a tree disease is either a symptom or a sign.
5. The environment can't enhance or retard the development of tree diseases.
6. A fungus on an ailing tree is an evidence of the tree's disease.
7. Some fungi may be beneficial to trees.

2. Прочитайте текст та дізнайтеся правильні відповіді.

Disease, as it pertains to trees, may be defined as a sustained and progressive impairment of the structure or function of any part of a living tree. Diseases are caused by a variety of factors or agents which are divided into two general groups: non-living (abiotic) and living (biotic). Biotic agents are called Pathogens. Generally, it is essential to know the specific cause or causes of a tree disease to determine:

- (a) what course of remedial action (treatment), if any, might be effective,
- (b) the prognosis for survival and recovery of the diseased tree.

Accurate identification of specific causes of tree diseases is important, if not essential for preventing or avoiding repeat problems in the future.

Determining the cause of tree disease can be compared to the work of a detective. This process is commonly known as diagnosis. One begins by examining the available evidence and considering all related circumstances. Visible evidence used in the diagnosis of disease is typically classified as either a symptom or a sign. Symptoms are the abnormal characteristics expressed by a diseased tree (e.g., dieback, foliage discoloration, decay, galls, wilting, etc.). A sign is the physical presence of a causal agent (e.g., fungus, parasitic plant, an empty herbicide container, etc.). Related circumstances are often extremely important in properly diagnosing a tree disease problem. For example, has the tree been exposed to severe or unusual weather conditions? Has there been a history of site disturbance such as building or road construction near the tree? What is the history of tree removal or thinning in the area (particularly important in forest stands)? Has the tree been fertilized lately? What are the predominant soil or drainage features in the area? Have any chemical spills occurred in the area? Has any herbicide been used? Is there a source of an air pollutant nearby?

The role of the environment in the development of tree disease cannot be overemphasized. It is important to understand that in every situation, environmental influences such as temperature, moisture, and soil conditions influence the biology of the tree, the activity of the pathogen or causal agent, and thus the development of disease. Disease development may be enhanced or retarded by changes in the surrounding environment, but the environment will influence disease. In fact, many tree diseases are more a function of environmental influences (e.g., abiotic factors) than they are of specific pathogens. In other cases, certain pathogens are able to cause disease only because of prevailing environmental influences.

The appearance of a suspicious looking fungus on or near an ailing tree may be a result, not a cause, or it may be totally unrelated to the tree's disease. Many fungi develop only on dead or dying trees and are not pathogens. These fungi are saprophytes and are living on dead tree tissues or organic debris as opposed to pathogens which usually gain their sustenance from living trees as parasites.

Other fungi, especially certain mushroom or toadstool types, are actually beneficial to trees. Many of these types of fungi form highly specialized, mutually beneficial associations called mycorrhizae with the roots of living trees. In these associations the fungi receive sugar and other dietary essentials from the trees, and in return enhance the tree's ability to extract phosphorus and other nutrients from the soil.

Careful application of these simple principles and concepts, together with a basic understanding of the growth or site requirements of trees being examined, provides even the novice with a sound approach for identifying many of the causes of tree disease. However, not all disease problems can be identified in the field, not even by trained experts. Some diseases require detailed laboratory analyses for positive identification of specific causal agents. The following page provides brief and simple descriptions of some of the most common diseases affecting Florida's important tree species. The use of these descriptions, together with appropriate consultation of trained specialists should provide the interested forester, landowner, arboriculturalist, etc. with a reasonable base of information for dealing with tree disease problems.

There are many ways to catalog or categorize tree diseases. **Foliage Diseases.** This group includes leaf spots, anthracnoses, blights, foliage rusts, needle casts (of conifers), powdery mildews, sooty molds, leaf blisters and others. But discolored, wilted, stunted, or dropping leaves are often indicative of problems other than foliage diseases. Common discoloration symptoms include yellowing or chlorosis, and reddening. Leaf tissue discoloration is progressing toward the midrib and petiole with a "water soaked" zone between live and dead tissue. **Stem Diseases.** This group is diverse and includes galls (hard, tumor-like growths of infected plant or tree tissue), cankers (infections of and necrosis of cambial tissues resulting in stem or branch girdling and depressed or flattened areas on infected stems), decays (the enzymatic destruction of heart-wood or sapwood tissues, typically by basidiomycetous, mushroom- or conk- forming fungi) and vascular wilts (infections whereby pathogens invade and occlude or render dysfunctional the vascular elements of their hosts' xylem tissues). Fungal activity interrupts the tree's normal physiological processes, and a severely infected tree will most likely die. Trees that do not die will remain weak and become more susceptible to wind damage. **Root Diseases.** A vast array of infections ranging from feeder root necrosis to vascular occlusions and root rots (decays) that, depending upon disease type and severity, interfere with nutrient and water uptake, tree growth and survival, and tree stability. **Forest Tree Nursery and Regeneration Diseases.** A dissimilar grouping of a variety of diseases (and related issues), that are characteristically limited or pertinent or problematic in forest tree nurseries and forest regeneration settings.

3. Розкажіть про основні ознаки захворювань листя та стебла.

Florida Forest Health Fundamentals

1. Прочитайте текст та спробуйте розкрити значення поняття «здоров'я лісу».

The Society of American Foresters has adopted a working definition of forest health as "the perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigour, presence of unusual levels of insects or disease, and resilience to disturbance" and it recognizes that "perception and interpretation of forest health are influenced by individual and cultural viewpoints, land management objectives, spatial and temporal scales, the relative health of the stands that comprise the forest, and the appearance of the forest at a point in time".

Forest health is not the same thing as tree health. A sick and dying tree, but it does not necessarily represent a health problem for the forest. In fact, dead and dying trees are perfectly normal parts of a healthy forest.

In healthy northeastern forests, for every increase in one inch diameter class, there are generally 20% fewer trees on a given piece of ground. In other words, as trees in a healthy forest grow and age, "one in five's got to die" as the trees progressively get larger, inch by inch. Percentages and actual numbers vary with tree species, geographic locations, etc., but the trend remains the same. This should not be particularly surprising. The land has an inherent and finite "carrying capacity", and as trees get larger and larger, the land supports fewer and fewer trees. This fundamental reality is an important factor as we attempt to understand and deal with forest health issues.

Forests characterized by off-site species or genetically undesirable trees, overstocking (too many trees), a preponderance of old declining (dying) trees, excessive mid-story vegetation or fire fuels (woody debris, flammable species, etc.) are, by most accounts, unhealthy. Off-site species grow poorly and lack vigour. Some genotypes or varieties of even the "right species" of trees are more susceptible to certain diseases than others. Overstocking results in intra-specific competition for light, nutrients, and water and reduces tree vigour. Some old declining trees are prime habitat for certain pests (e.g., southern pine beetles) that build up populations therein and subsequently spread to neighboring healthy trees and forests.

Excessive mid-story vegetation can negatively affect habitat for some desirable wildlife species (e.g., red cockaded woodpeckers). Further, mid-story vegetation competes for moisture and nutrients, often increasing the vulnerability of desired over-story trees to certain undesired pests (e.g., southern pine beetles). And, excessive mid-story vegetation and flammable fuels create high hazard fire scenarios. In forest stands with such fuel loads and fuel "ladders", wildfires and prescribed burns are frequently more damaging to trees, sometimes inviting additional damages or even death to trees by secondary pests such as bark beetles and certain root disease fungi.

Healthy forests not only assure us of sustainable wood production, they are vital for fresh air, wildlife habitat, clean water, enjoyable outdoor recreation and

quality of life. Unhealthy forests have been major contributors in recent years to Florida's disastrous wildfires and unprecedented outbreaks of southern pine beetles. In fact, more often than not, catastrophic wildfires and southern pine beetle outbreaks are simply fevers and sweats, symptoms of unhealthy forests, not the cause. To the extent that unhealthy forests and forest conditions remain, and to the extent that we focus on treating symptoms (e.g., killing beetles, putting out fires) while neglecting the underlying causes of the problems (i.e., unhealthy forest conditions), we can expect more damaging wildfires and more pest outbreaks. And, contrary to the thinking of some, a "hands off" approach is not now a suitable option for developing and maintaining healthy forests in Florida. Historic land use and decades of fire exclusion have resulted in an abundance of now aging, overcrowded, early successional tree and plant associations which frequently constitute unhealthy forest situations. These realities, now exacerbated by threats posed by non-native invasive pest plants, increasing acreages of pest/disease-susceptible pines, and Florida's sprawling wild land urban interface with its associated forest fragmentation and groundwater draw down demand for intervention. Intelligent and active forest resource management is essential.

2. Прочитайте текст та дайте відповіді на наступні запитання:

1. What is the definition of forest health adopted by the Society of American Foresters?
2. Why is forest health not the same thing as tree health?
3. What does the phrase "one in five's got to die" mean?
4. What are unhealthy forests characterized by?
5. Why is excessive mid-story vegetation not very good for forest health?
6. What are the major causes of wildfires and insect outbreaks in Florida?

3. Знайдіть у тексті та выпишіть ключові слова, які допоможуть розповісти про здоров'я лісу взагалі.

Forestry in Germany

1. Перед прочитанням тексту спробуйте передбачити, про що йтиметься в тексті, користуючись твердженнями нижче:

1. Forest cover in Germany
2. Forest protection in Austria
3. Ownership of forestland in Germany
4. International classification of vegetation
5. Development of sustainable forest production in Germany
6. Famous German forest scientists
7. Current problems of German forestry
8. European highly valuable protected areas

2. Дізнайтеся з тексту, чи ви мали рацію.

After the last Ice Age (some 12,000 years ago) in Germany soil and climatic conditions led to the development of a dense forest cover mainly dominated by

beech. This species is very shade tolerant so that it can grow up under an umbrella of other species. Finally it suppresses the other species by overgrowing and shading them on all average soils. Only on very dry, wet, rich or poor soils other species like oak, maple, ash, cherry, poplar, willow, pine, or, in the higher mountains spruce and fir, have a chance.

During the last two millennia the original dense forest cover was reduced due to clearings for agriculture to about 30%. The remaining forests were dramatically influenced and regionally destroyed by different users.

For the rural population forests had always been necessary to meet their basic needs. Timber for house construction, fuel wood, game, medical plants and, very important: food and litter for their pigs, goats, horses and cows. Until the 19th century this pasture needs and also the need of good construction timber led to a preference of oak instead of the naturally dominating beech. In the last two centuries then widely degraded forest land was reforested with spruce and pine for several reasons: the seeds of these species are easier to store than acorns and beech nuts, afforestation with softwoods therefore are much cheaper than with hardwoods on bare grounds and exploited soils these softwood species grow much better, softwood timber better meet the needs of industrializing economy.

Due to the historical development today 46% of the forest area in Germany is still privately owned, mainly by farmers and their families. The average size of their parcels is only 5 hectares. Nearly no forest is owned by the industry.

The development of a sustainable forest production on a scientific basis began in Germany nearly 300 years ago. One main driving force for this was mining. The ruling nobles became aware that the production of gold, silver, copper and salt was strongly related to the availability of timber and fuel wood. So they started to consider forests not only as hunting grounds but also as sources of wealth and income. The first schools of forestry therefore were founded in mining regions as in Ilseburg 1763.

The principle of sustained yield was originally based on the realization that the amount of wood a forest can supply is not inexhaustible. It may only be utilized on a scale which corresponds to its natural rate of growth, if a continuous and permanent wood harvest of roughly constant volume is to be assured. From the very beginning of forest planning, this basic idea played a decisive role. At the end of the 18th century it found expression in the classic formulation of G.L.Hartig: "All wise forest management must ... have woodland valued ... and endeavour to utilize them as much as possible, but in such a way that later generations will be able to derive at least as much benefit from them as the present generation claims for itself." The concept of sustained yield and permanence, which was formerly applied only to the production of timber, has been extended to cover all the functions of the forest, that is to say its commercial, protective and recreational functions, and is the guiding principle of all forest measures. Before the "industrial revolution" began Germany was widely deforested. During the last 200 years foresters "rebuilt" the forests. Since then spruce has been dominating most mountainous areas in Germany.

In northern and eastern Germany and on poorer soils in southern Germany pine stands were planted. Here up to the 19th century sods from the woods had been used as fertilizer for corn growing and mainly sheep and goat grazing destroyed the regeneration of forest trees. That

led on sandy sites to the development of an infertile heathland or even sand dunes.

A basic precondition for a sustainable timber production was the measurement of forest areas and trees. Several sciences started to deal with forestry matters. Finally Germany became the cradle of forest sciences. The success of the reforestation and conservation efforts was obvious. Many pioneers went to other countries all over the world and initiated or influenced the development of forestry and forest service there. Famous examples are:

- Heinrich David Wilckens (1763-1832), who became the first professor for forestry in Schemnitz.

- Carl Ludwig Obbarius (1780-1860), who was a forest warden from the Hartz mountains and disciple of Hartig and Cotta. He was appointed to build up a forest school of the ore companies in Sweden and directed it almost until his death in 1860.

- Dietrich Brandis (1824-1907), who laid the foundations of sound forest management in India.

- Carl A. Schenck (1868-1955), who founded Biltmore Forest School, the first forestry school in the United States.

The reforestations in Germany during the last two centuries often resulted in pure and even aged stands of spruce or pine. These monocultures often suffered from storm or snow damage, sometimes followed by bark beetle attacks. Since 1980, in addition, trees lost their vitality or even died in some regions due to the emissions from power stations and cars.

As a result of this bad experiences and due to the fact, that forests became more and more important for recreation, water delivery and nature conservation, today forests in Germany are becoming more mixed and uneven aged. Typically in Germany all forests are assigned to timber production, even those within the urban fringes intensively used for recreation.

3. Порівняйте ліси Німеччини та України. Вкажіть на основні розбіжності.

Sustainable Forest Management in Germany

1. Прочитайте текст і зверніть увагу на те, як у Німеччині впроваджується збалансоване управління лісами.

For more than 200 years now the principle of sustainability has been the basic principle followed by the forestry sector in Germany. Over this period of time forest management has developed on the basis of widely distributed ownership and in the framework of changing legal and economic circumstances. Accordingly, our understanding of sustainability today refers to all the functions of forests:

- the earning of income for forest owners and the supplying of raw materials to the wood-processing industry (economic function);

- nature conservation (protective function);
- public recreation (recreational function);

At the latest since the UN Conference on Environment and Development held in Rio de Janeiro in 1992 (UNCED) the need for global conservation of forests has become a more prominent issue at government level. The statement of forest principles approved in Rio de Janeiro sparked international activity to formulate criteria and indicators for sustained forest management.

The following criteria were approved at the European Ministerial Conference on the Protection of Forests held in Helsinki in June 1993:

1. Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles.

Forest area. The development of forest management has led to productive forests, although temporary setbacks occurred as a result of war-related overuse. Today forests cover 30% of the land area of Germany, involving a total surface area of 10.8 million hectares, a rather large figure for a highly industrialized country. As a result of the reforestation of farmland the forest area in Germany has increased by around 500,000 hectares since 1950.

Ownership structures. The responsibility of more than 1.3 million forest owners for the long-term conservation of forests as a natural resource is firmly rooted in Germany and sustained forest management is a long established tradition. 47% of the forests are privately owned (this includes forest land slated for privatization in the eastern German Lands),

19% are owned by cities or other local authorities, and 34% are owned by federal and Lands governments (federal government – 4%, Lands governments – 30%).

Forestry legislation. Legislation and established forestry practices protect forest land from overuse or other forest damaging activities. Clear cut land or land on which selective logging has been carried out are reforested or supplemented within an appropriate period of time. All forest land in Germany is protected under current forestry laws.

Timber stock and annual growth. As a result of sustained forest management large timber stocks have been built up over the past few decades. The average stock amounts to 270 cubic metres of growing stock per hectare and is still increasing. The average annual increment of wood amounts to about 6 cubic metres per hectare, whereas the average annual felling removals are only 4 cubic metres per hectare.

Contribution to the fixation of carbon. Between 1.5 and 2 billion tons of carbon (5.5 – 7.3 billion tons of carbon dioxide) are stored in Germany's forests. The annual amount of carbon fixated as a result of wood increase of 6 cubic metres per hectare amounts to 1.5 tons of carbon per hectare (a total of around 16 million tons of carbon or around 59 million tons of carbon dioxide). Assuming a further increase in the forest area of approximately 150,000 hectares by 2005, the newly created forests should fixate an additional amount of approximately 2 million tons of carbon dioxide annually. The approximately 4 cubic metres of wood harvested per hectare fix around

1 ton of carbon or around 3.8 tons of carbon dioxide per hectare. Overall wood utilization accounts for around 40 million tons of fixated carbon dioxide annually.

2. Maintenance of forest ecosystems' health and vitality.

Sustainable forest management is balancing economic and ecological requirements. Forest management is carried out extensively making use of natural growth forces. It is the type of land use with the greatest proximity to nature. Soil structure and fertility are conserved in the course of the production cycle.

Damage caused by air pollution. As a result of air pollution Germany's forests are exposed to numerous detrimental factors that result in direct and indirect damage to trees and soil. In addition, the nutrient cycle of forests is disturbed by high nitrogen ingress rates (nitrates and ammonium). At many locations between 30 and 40 kg of nitrogen are deposited per hectare each year, which is between two and five times more than forests need for growth. Forest management cannot influence the ingress levels of these substances. With a view to obtaining a more precise picture of the situation with regard to forest soils the German federal government carried out a country wide study of forest soil conditions which was published in 1997.

Although reductions in pollution were achieved, in particular with regard to sulphur dioxide, forest ecosystems continue to be strongly affected. On an average 11% of all tree species showed visible damage due to insects and fungus. After reaching a peak level in 1993 the percentage of damaged trees dropped by 5% in 1994 and 1995. There are different reasons for this decline and it can be attributed only in part to the reduction in air pollution levels.

Forest damage as a result of fire and storm. Forest fires are not a significant factor in Germany. Wind and snow, on the other hand, are recurrent causes of considerable damage to forests. The storm disaster of 1990 was a once in a century event affecting 1.5% of the overall forest area (3% of the total timber stock). In accordance with the provisions of the Forest Damage Compensation Act the felling of timber was curtailed as much as market conditions demanded.

Forests and hoofed game. Under the Federal Hunting Law the hunting of hoofed game has to be carried out in such a way that the justified rights of the farming, forestry and fisheries sectors to protection against damage from wild animals are fully respected while taking into account nature and landscape conservation interests. The hunting authorities monitor compliance with hunting regulations which take into account the interests of the forestry sector as well as the interest in preserving the animal populations.

Damage to forests as a result of non-forestry use. Non-forestry uses (e.g. use of forests as pastureland and forest-field cultivation) that could have a negative impact on the forest ecosystem are largely things of the past.

3. Maintenance and encouragement of production functions of forests (wood and non-wood).

Increment exceeds felling, growing stock is increasing. More than 90% of forestry income derives from the sale of wood. Other forest uses (e.g. Christmas tree farming, production of decorative and wreath making materials, hunting, fishing) are carried out with a view to nature conservation and in the context of sustainable forest

management. The average growing timber stock in German forests is continuing to grow and at a current level of 270 cubic metres per hectare would rank very high in a European comparison.

Legal framework. The provisions of the Federal Forest Act and the various forestry acts of the Lands guarantee orderly and sustainable forest management. The Federal Forest Act is primarily a framework law, laying out fundamental rules that are then implemented in detail in the legislation of the Lands. Compliance with forestry regulations is ensured by a country wide network of forest authorities. The availability of training and advice as well as other services to forest owners is required by law. Certain areas are regulated by specific laws such as the Forest Seed and Planting Stock Act, the Forest Damage Compensation Act, and the Forest Sales Fund Act.

Federal and the nature conservation laws of the Lands provide for special protection of rare species and habitats. Numerous laws in other areas also relate to forests, e.g. regional planning, water management, plant protection, land conveyance, and land consolidation laws, as well as laws regulating relations between neighbours.

Forest management follows detailed plans. Forest operations of 30 hectares or more are managed in accordance with the provisions of forest laws, forestry relevant tax laws and on the basis of medium and long term nature plans (e.g. forestry operations centres, forestry operations reports). Regional planning and nature conservation principles are taken into account in these plans.

4. Maintenance, conservation and appropriate enhancement of biodiversity in forest ecosystems.

The principles of sustainable forest management laid down in the forestry laws include, in addition to sustained wood production, safeguarding the viability of forest ecosystems as well as maintenance of biodiversity. Threats to forest ecosystems and their biodiversity emanate from the wide ranging impacts of air pollution.

Forestry adapted to local conditions. In Germany forestry has adapted to the often different conditions given in different locations. Forest management practices vary in accordance with these local conditions. Mixed stands with different age and tree species as a result of differing climatic, soil and light conditions create an interrelated network of different habitats. Widely differing ownership and forest use structures promote the diversity of forests as well as the continuing development of forest management practices.

About 90 tree and shrub species are native to Germany. Originally beeches and oaks were the most prominent species of trees in German forests. The percentage of spruce and pine has increased, among other things as a result of the afforestation of previously cleared or devastated areas. Other tree species are found for the most part in specific locations or in mixture with the indicated main species of trees.

The spectrum of native species has been complemented by species such as Douglas fir, or northern red oak. Some of these species were native to Central Europe prior to the Ice Age. For some years now natural regeneration and planting of deciduous trees have been emphasized so that today mixed stands account for 60% of forest areas. The percentage of naturally regenerated stands in the overall total of

regenerated areas currently accounts for 40% and is still rising. About 2% of overall forest areas are recognized seed stock (under the Forest Seed and Planting Stock Act).

Pesticides and fertilizers. The use of pesticides and fertilizers in forest management is infinitesimal. Pesticides are used only when biological methods are no longer effective to prevent or curb the massive multiplication of pests that pose a threat to a forest area. The spreading of lime is a means of counteracting progressive acidification of forest soils and not a method of fertilization with a view to increasing forest growth.

Forest management promotes biodiversity. Commercially used forest lands are at the same time habitats for native animal and plant species. The percentage of forest based species of flora and fauna is very high. The numbers of animal species and their population densities are higher in forests than in any other type of land habitat.

Large forest areas protected by law. Large percentages of forests are under the protection of conservation laws. Federal and Lands conservation laws contain special provisions on the protection of rare species and habitats.

5. Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water).

In addition to their functions with regard to climate protection, protection against the impact of air and noise pollution, as well as landscape protection, forests also have the function of protecting soil quality and the quality of water in catchment areas. To safeguard this function the forestry sector assumes considerable burdens in the form of additional expenditure and foregone income, amounting to more than DM 60 per hectare and year.

6. Maintenance of other socio-economic functions and conditions.

Forests as a source of employment and income. Traditionally, and as a result of widely varying ownership and forest use structures, people living in rural areas are closely and diversely associated with forestry and forest management. For many farmers, forestry work is an important source of supplementary income. Numerous owners of farms with mixed agricultural and silvicultural resources are dependent on forest related income to keep them economically viable.

The German forestry sector provides full-time jobs for more than 100,000 persons. It also provides several hundred thousand people with part-time employment, an important structural factor in rural regions. The wood processing and paper industries provide around 500,000 jobs.

2. Знайдіть інформацію про збалансоване управління лісами в Україні. Визначте подібності та розбіжності у підходах.

Forest Management Methods

1. Прочитайте текст і дайте відповіді на питання:

1. What does the concept of "forest management" suggest?
2. What forest management methods are used in Finland?

The concept of forest management has recently taken on a wider meaning. Today, it refers increasingly to management of the entire forest environment. The methods used in wood production take environmental factors into account at all stages of the wood growing process. Decisions taken at the forest regeneration stage have the most far reaching effects in terms of wood production and environmental management.

Forest regeneration. Forest regeneration is part of the sustainable use of forest resources. It is recommended that conifer stands be regenerated at the age of 60-120 years, depending on growth site, in southern Finland and at the age of 80-160 years in northern Finland. For birch, the recommended age is 60-80 years. Stands can be regenerated earlier if the trees are sufficiently mature.

In most cases, the purpose of regeneration is to produce mixed forest in which the dominant species is either pine or spruce together with some birch. Extremely barren forest soils, on which broadleaved trees do not grow well, are an exception, and such areas are therefore exclusively coniferous forest. Aspen, willow, and other deciduous trees, old conifers and decaying trees are left standing on areas marked for regeneration to provide habitats for threatened species and to enhance the landscape. Marshy areas, the banks of streams, rocky outcrops and other special features are left completely alone.

The choice of dominant tree species and regeneration method depends mainly on the type of soil and how fertile the area is. On barren growth sites, first consideration is given to natural regeneration, because this is the easiest and cheapest method – when it succeeds. If seedlings fail to spring up, restocking will be needed, including grass control and cleaning, operations that are both laborious and expensive.

In southern Finland, roughly 60 per cent of areas regenerated are dominated by pine, the remainder by spruce or birch. The proportion of spruce and birch has grown recently at the expense of pine, and this trend is continuing. About a third of the area regenerated with pine is naturally regenerated. Spruce forest, on the other hand, is regenerated largely by planting, as natural regeneration has produced poor results. In northern Finland, conditions are harsher than in the south, with the result that pine is more common in the north.

Planting density has been reduced in recent years, the idea being to cut regeneration costs by making more use of naturally regenerated and broadleaf and conifer seedlings. The recommended densities are 2,000 seedlings per hectare for pine, 1,400-1,800 for spruce and 1,200-1,600 for birch. Most of these are still planted manually.

Site preparation is vital for successful regeneration. On mineral soils, scraping away patches of surface vegetation improves seedling survival and promotes the growth of natural seedlings, particularly birch in mixed forest. Soil preparation methods have been made less aggressive to the terrain in recent years. Forest ploughing, for example, is being phased out. Today, some two-thirds of forest land is prepared by scarifying or scalping and the rest mounded by tractor digger or

excavator. Interest in controlled burning is reawakening, but this method is little practised at present.

In Finland, the areas regenerated are small: the average size is under two hectares and areas over 10 hectares are rare. Regeneration in small units is appropriate as modern timber harvesting and regeneration methods do not require large operating areas.

Management of young stands. Cleaning and thinning are used to adjust tree species ratios while stands are still young. Bushes, undergrowth and unwanted trees are cleared to allow the dominant species to grow properly.

The guidelines for tending young stands have been revised in recent years, particularly with a view to achieving mixed stands containing broadleaved trees and to delaying the final treatment of the young stand. The presence of broadleaved trees in a mixed young stand improves soil characteristics, reduces damage and increases the biodiversity of the stand. Broadleaved trees also help to improve the quality of conifers, notably pine, by suppressing the growth of branches. Young stands usually need tending once or twice during the 15 or so years of the juvenile stage. When tended for the final time, some trees are removed to give a density of 1,600-2,000 trees per hectare (depending on the species) in preparation for the first thinning cutting.

Young stands are cleared with a clearing saw, as herbicides are little used in forests today. Recovery of wood for fuel during the final tending of a young stand has started to arouse interest; this would also improve opportunities for mechanizing the process of managing stands.

Thinning. Thinning removes diseased and poor quality trees, thus providing more space for the best trees to grow. Depending on the site conditions and tree species, thinning is carried out 1-3 times during a rotation. Thinning is now performed less frequently than before in order to make the operation more economic and to reduce damage to standing trees.

The first thinning is carried out 30-35 years after regeneration, when the trees are 12-14 metres high. The stand density is reduced to around 1,000 stems per hectare. Considerably more first thinnings need to be carried out in Finland than at present. Neglecting to carry out first thinning significantly erodes the profitability of wood production. In later thinnings, the number of stems is reduced to 450-550.

Drainage and fertilization. The large scale drainage of peat land forests has now virtually stopped. However, the drains must be kept open to ensure that forests continue to grow on this peat land. Drain cleaning is needed every 20 years or so, and most of the areas drained are now in need of attention. Information obtained from drainage has led to a revision of forest drainage practice, and as a result some of the peat lands drained in the most barren areas are now being allowed to return to their natural state. The new guidelines for water pollution control drawn up by the environmental authorities, the forest industry and forestry organizations are being used in work to restore drains.

The amounts of fertilizer spread on forest land have fallen sharply in the last 10 years. Rather than being employed to increase wood yields, fertilizer is now being

used increasingly to maintain a nutrient balance and to maintain the health of the forest.

2. Виберіть з тексту ключові слова та перекажіть текст. Визначте основні методи управління лісами в Фінляндії.

3. Напишіть анотацію до тексту.

UPM-Kymmene Corporation (Finland)

1. Прочитайте текст і дайте відповіді на запитання:

1. What products does UPM-Kymmene Corporation manufacture?

2. What principle is its operation based on?

The UPM-Kymmene Group is one of the biggest forest industry undertakings in the world and employs a staff of 34,000. It has production plants in 17 countries. The Group's business is organized in seven divisions: magazine papers, newsprint, fine papers, packaging materials, sawn goods, plywood and speciality converting. The last of these divisions covers self-adhesive label stock, label and other special papers, dry papers and stationery products. The Group's resource production consists of pulp making, timber and energy supply. Papers are produced from a varied raw material base, and a high proportion of production is based on recycled fiber.

UPM-Kymmene's operations are mainly based on the natural resource wood, be it fresh wood fiber or recycled fiber. The company's position as one of the world's leading paper manufacturers demands responsibility and an in depth understanding of sustainable use of this natural resource. The creation of a looped production cycle is a prerequisite for doing business in an ecologically responsible way. The fiber cycle is sustainable only if all parts of the product chain are environmentally compatible and fit together well. Important aspects range from responsible forestry to the use of recyclable printing inks and other materials at the printers', all the way to efficient used paper collection programmes. The recovery of production residues in all parts of the product chain is also important.

The first step in a sustainable fiber cycle is the use of wood from forests which are managed sustainably. UPM-Kymmene complies with the principles of sustainable forestry in each country where it operates. The company works according to international agreements such as those made at Rio in 1992, and Helsinki in 1993.

In 2002, UPM-Kymmene consumed about 26 million cubic metres of wood at its mills in different countries in order to produce pulp, paper, sawn goods and plywood. The largest diameter and best quality parts of the trees are used for making sawn goods and plywood. Paper is made from small diameter wood produced in thinnings and final felling, as well as other wood which is not the right quality for sawn goods and plywood. Chips and other by-products of the saw mills and plywood mills are also used for paper production.

In each country, UPM-Kymmene's local forest departments take care of wood procurement for the mills. They are also responsible for forest management in company owned forests and forests leased by the company. UPM-Kymmene owns

forests in Canada, Finland, the UK, and the USA. In Canada, the company has leased forests from the province of New Brunswick. Altogether, UPM-Kymmene annually obtains about 10% of the wood it consumes from own and leased forests.

The majority of the wood UPM-Kymmene uses, comes from forests owned by private individuals and families. In Finland, the UK and the USA, the local forest departments have also agreed with a number of private forests owners that the company will take care of forest management on their behalf. In all, UPM-Kymmene manages more than two million hectares of forests.

Through forest certification, UPM-Kymmene verifies that the wood used for its products comes from sustainably managed forests. UPM-Kymmene promotes forest certification and supports efforts for the creation of a worldwide umbrella organization which mutually recognizes credible forest certification schemes like PEFC (Programme for the Endorsement of Forest Certification Schemes), FSC (Forest Stewardship Council), SFI (Sustainable Forest Initiative) or CSA (Canadian Standard Association). A chain of custody follows the changes in custodianship of forest products during the transportation, processing and distribution chain from the forest to the end user.

UPM-Kymmene does not fell or accept wood which originates from protected forests, forest areas included in nature conservation programmes, or sites which have been notified by the authorities to be excluded from felling.

2. Знайдіть у тексті твердження, які доводять, що компанія UPM-Куммене займається екологічно безпечним бізнесом.

3. Розкажіть про UPM-Kymmene Group, одну з найбільших лісопереробних компаній в світі.

The Forest's economic and ecological Values can be combined

1. Прочитайте текст і доберіть твердження, яке найкраще передає його зміст:

1. In this text the ways of environmental training for the UPM-Kymmene personnel are considered.

2. In this text means of forest harvesting and protecting the most valuable biotopes are specified.

3. In this text different forestry operations as both economically and ecologically essential measures are regarded.

4. In this text the environmental management of forests which may also be economically profitable is described.

Today's forest experts see more than just timber in forests. Environmental management is part of everyday life in commercial forests and involves preservation of the biodiversity of the forest environment as well as water and landscape protection. Preservation of threatened species is promoted by protecting their habitats and the structural characteristics of the forests.

If the decision to regenerate a forest is based on the age and the dimension of the tree stand, the decision to carry out a thinning depends on many factors: yield and condition of the stand, sustainable felling volume and harvesting costs. During forest fellings, a certain number of habitats have to be preserved under the Finnish Forest Act and Nature Conservation Act. These sites are identified during field visits, as not all of them have been inventoried beforehand. In forestry operations it is important to know the characteristics of the site and the growth rhythm of the forest in order to perform the work exactly as required by the conditions prevailing at that particular site, using appropriate methods and species and intervening at the right time.

When regenerating a forest, the first decision to make is to define the regeneration area according to the natural contours of the terrain. The sites to be conserved as well as any buffer zones required for preserving the waters of the area are marked out of bounds. Especially in residential areas and along the sides of the main gateways, the impact of the felling operations on the landscape is considered so as to achieve a natural result. The choice of the regeneration method is another important issue, as it has an influence on the choice of species for the new stand to be established, on the site preparation method and on the felling method. The aim is always to obtain as fast as possible a good full-density species mix that is adapted to the site. Natural saplings are preserved if they occur in convenient groups.

The felling operations may be scheduled for the summer months or, if possible with regard to the load-bearing capacity of the soil, carried out even during the frost heave season. The forest payments timetable and the actual way in which the forest regeneration measures are carried out are agreed upon with the forest owner. Before taking any measures, a site plan with relevant instructions is established for the forest worker or the forest machine entrepreneur. Seamless cooperation is required at all stages, from planning to implementation. The implementation of the harvesting operations is monitored by the Forest Division internally and by a third party.

Beyond the environmental management of commercial forests, the most valuable biotopes also have to be protected. One good example of taking into account ecological values is the Repovesi area located in northern Valkeala and where UPM-Kymmene owns a lot of forests in which it has practised forestry while safeguarding the unique characteristics of the area. During the past ten years, for example, no logging has been carried out in the company forests in the Repovesi area. A proposal has been made to establish a national park in this wilderness area of high rocks, forests and lakes. In 2001, the UPM-Kymmene Board of Directors proposed a donation of 560 hectares of land for the establishment of the national park and decided to protect another 1,400 hectares of forests surrounding the area without the benefit of compensation. The Annual General Meeting ratified the proposal in 2002. The donation and the decision to protect the surrounding areas have been welcomed by the environmental authorities and the measures have been awarded distinctions by ecological associations.

2. Висловіть свою згоду чи незгоду з точкою зору автора тексту. Поясніть власну точку зору.

3. Дайте стислий переказ тексту про UPM-Kymmene Corporation.

European Forest Institute

1. Прочитайте текст та доберіть зі списку відповідний заголовок для кожної частини тексту:

1. EFI member organizations and research programmes
2. Search for EFI international status
3. EFI's ongoing projects
4. Ratification of EFI Convention
5. EFI's objectives and activities

The first stage of seeking international status for the European Forest Institute (EFI) has successfully been concluded. Thirteen European countries have signed the Convention on EFI since 28 August 2003. The new international status of EFI, endorsed by the European governments, will start a new era in pan-European research cooperation by bringing international forest research closer to the national agendas.

The countries which have signed the Convention up to now are: Austria, Bulgaria, Denmark, Finland, France, Italy, the Netherlands, Norway, Germany, Spain, Sweden, Turkey, and the United Kingdom. The Convention will be open for further signatures at the Ministry for Foreign Affairs, Finland, until 28 November 2003. At this stage, a ratification process follows in each signatory country. Two months after eight countries have ratified the Convention, the Convention enters into force. The basis of the Convention is to maintain the old organizational structure of EFI. In this way European research organizations and other similar bodies can have EFI membership and thus have an impact on its activities.

In ten years EFI has grown into the leading forest research network in Europe. It was established by 12 European organizations in 1993 while now the Institute has over 140 member organizations from 38 countries. The members of EFI are universities, research institutes, industry and non-governmental organizations. EFI conducts research in four Research Programmes: Forest Management and Ecology, Forest Products Markets and Socio Economics, Policy Analysis and Forest Resources and Information. Its annual budget is 3 million euro and its international staff represented 15 nationalities last year.

In order to promote the conservation and sustainable management of forests in Europe EFI's mission is to:

- promote, conduct and cooperate in research of forests, forestry and forest products at the pan European level;
- make the results of the research known to all interested parties, notably in the areas of policy formulation and implementation,

In order to achieve its objectives, the Institute:

- provides relevant information for policy making and decision making in European countries relating to the forest and forest industry sector,
- conducts research in the above mentioned fields,
- develops research methods,
- compiles and maintains data concerning European forests,

- organizes and participates in scientific meetings,
- organizes and participates in forest research training,
- publishes and disseminates knowledge of its work and results.

EFI's research projects fall within its R&D (Research and Development) areas. EFI has currently over 30 ongoing projects, which include:

- Forestry data bank. A continuously updated database on European forest resources and other forest related data,
- Forest scenario modeling,
- Analysis of policy networks regarding timber certification,
- Relationships between recent changes of growth and nutrition of Norway spruce, Scots pine and European beech forests in Europe,
- Scenario analyses of the impacts of major international changes on the European forest cluster,
- Comparison of public participation approaches to mountain eco-system management in Alpine countries.

EFI's Research and Development Priorities

1. Прочитайте текст та визначте пріоритетні напрямки діяльності Європейського Інституту лісу:

1. Forest Ecology and Management
2. Forest Products, Markets and Socio-Economics
3. Policy Analysis
4. Forest Resources and Information

The main topics under the area of **Forest Ecology and Management** include:

- Carbon sequestration in forestry
- Effect of environmental changes on forestry
- Management of forests under various pressures
- Forests as a renewable source for energy and other goods and services
- Biodiversity

Recent changes in forest growth and soil chemical properties reported for many European forest ecosystems emphasize the need for detailed investigation into the interrelationships between forest growth, forest nutrition and site conditions in order to assess the sustainability of the productivity of forest ecosystems. Also the health condition of forest ecosystems, including both biotic and abiotic impacts, requires continuous research and follow-up.

Forests in Europe are mostly managed, however, the management objectives and intensity vary. There is a continuously increasing trend towards managing forests as ecosystems taking into account both economic benefits and environmental values. In sustainable forest management various pressures and demands, both environmental and societal, need to be considered, e.g. climate change, air impurities, land use

changes, protection, biodiversity, certification, timber production and water resources. Mitigation of climate change and carbon balance as well as the impact of climate change on European forests will remain a key issue in research. The Ministerial Conferences in Strasbourg, Helsinki and Lisbon, as well as the Kyoto meeting clearly state the demand for reliable information on these topics.

EFI contributes to the above mentioned research needs by research co-operation with its members and other collaborators. Models operating at different levels (from stand level to regional and country level) are operational tools to analyze the sensitivity of ecosystems to various changes. These models can produce information for scenario analyses also in other research areas.

The main topics under the area of **Forest Products, Markets and Socio-Economics** include:

- Rural development and socio-economics of forest uses
- Economics of multifunctional uses of forests and forest externalities
- Analysis and modelling of the supply and demand for timber and forest products
- Forest products trade analysis
- Competitiveness of forest sector enterprises

Across Europe, the rural areas are characterized by high unemployment figures, a narrow occupational base and poor job creation. Yet there is often a large and underutilized forest resource, and the role of forest sector in addressing those problems is seen as promising. However, the issues trigger the need for more comprehensive information on the prevailing socio-economic situation and on the crucial factors behind the success of the forest sector in finding solutions to those problems. Also, the profitability of forest management practices from the viewpoint of a forest owner as well as that of society needs detailed analysis.

The supply of and demand for timber and other forest products and services is closely linked to the socio-economic sustainability of the forest sector and the economics of forest management practices. One important issue is to provide consistent analyses of the structure of forest industries, demand and supply of round wood and forest industry products, and to analyze the interactions between demand and supply of wood and other non-wood products and services. As a tool for such analysis, a forest sector model will be constructed, with emphasis on Europe, but including major global regional demand and supply aspects. Such a model will be useful in analyzing the impacts on the European wood chain by changes in factors such as environmental and trade regulations, policy options on multiple use forestry, transport costs, foreign exchange rates, and energy prices.

The main topics under the area of **Policy Analysis** include:

- Efficiency and effectiveness of public policies in support of sustainable development and SFM (Sustainable Forest Management)
- Interface between forest science and policy making
- Forest policy development processes (national forest programmes)
- Behaviour, goals and values of stakeholders in forestry
- Cross-sectoral policy impacts on forest and environment

Hence, the strategy is outlined on overall policy analysis and evaluation, comparative policy research, behavioural studies of the target groups, stakeholders and institutions as well as contributions to policy development on regional basis. Dissemination of the results of policy research results in effective ways is one area of research and development activities of Programme Area 3. All of these areas are active in 2001 in terms of completing the ongoing projects or starting and planning of new projects within the theoretical frame of the strategic plan.

The main topics under the area of **Forest Resources and Information** include:

- Information on the options of the future development of European forest resources

- Value added information services for policy and decision making in forestry and related disciplines

One of the main tasks of EFI's information services is construction of databases on forestry information in Europe. In the long run, the programme will also increasingly invest in the publication of research results through the Internet in a user-friendly form. Currently, the programme is implementing two large umbrella projects:

1. Forest information services, with the overall goal to develop into a first stop shop information source of European forests and forest products by incorporating EFI's research activities.

2. Scenario modelling projects, with the overall goal to project options for the future of Europe's forests under various forest management policies.

In addition, a number of other individual projects related to the programme are carried out. The principal idea of including such projects is to supplement the existing information sources and to analyze the data by combining information from different sources.

By means of a well-structured and highly informative EFI web site and a user friendly forestry and forest products data bank, the Forest Resources and Information programme has operational tools to disseminate information on the forests of Europe, at the same time focusing attention to other existing high-quality sources of information on forests.

The long-term goal of the Forest Resources and Information programme is to establish a forestry information network for Europe to increase the exchange of information and strengthen the cooperation between forestry institutions and individuals. This effort, in cooperation with other EFI re-search programmes, will contribute to a more transparent view of forestry related matters in European countries.

A future vision is to present an information source on European forests, the forest environment and forest products and trade at EFI, which can be part of a global forest information services.

2. Прочитайте текст та доберіть ключові слова. Розкажіть про внесок Європейського Інституту лісу в розвиток та дослідження потреб Європейського лісівництва.

3. Зробіть резюме тексту.

Food and Agriculture Organization Assessing and Monitoring of Forest Resources

1. Прочитайте та знайдіть у тексті інформацію про:

1. FAO's partner organizations in global forest resources assessments
2. Information and data that the global assessments report on
3. The main objectives of global forest resources assessments
4. Means of obtaining the primary data for forest assessments
5. Problems of forest resources assessments in developing countries
6. The main objectives of the Forest Resources Assessment Programme
7. The support that FAO offers the governments in implementing national forest assessments

Global forest resources assessments. At the request of its member countries, FAO has been carrying out global forest resources assessments since 1947, in collaboration with countries and other partners, notably the United Nations Environment Programme (UNEP) and the United Nations Economic Commission for Europe (UNECE). The global assessments report on the worldwide status and trends of forest resources, their management and uses. They are based on nationally validated data from national forest inventories and assessments. The reports also include analytical assessments (trends and valuations) of goods, services and stock of forests.

The latest assessment, the Global Forest Resources Assessment 2000 (FRA 2000), constitutes the most comprehensive global reporting on forest resources to date. The picture shows the distribution of the world's forests by major ecological zone in the beginning of the 3rd millennium. The main report of FRA 2000 concluded that there are still major gaps in information on forests and forestry and that basic parameters such as forest area trends and forest biomass cannot be accurately and reliably estimated for most countries, despite the considerable attention that forestry has received internationally over the past decade.

Indeed, demand for forest information has never been greater or more complex than now, with international for a requesting countries to report regularly on multiple functions of forests across social, economic and ecological dimensions, and civil society becoming increasingly concerned about the state and trends in forest stocks, goods and services.

The next global assessment is planned for 2005, with a focus on the review of the sustainability of national forest resources. A more comprehensive global assessment report will be published around 2010.

Objectives. The main objectives of the global forest resources assessment are:

- to provide consistent, precise, accurate and high-quality information on the status and trends of forest resources worldwide, to facilitate improved policies related to forests and forest management;

- to help countries view their forest sector within regional and global environmental and socio-economic contexts;

- to provide some of the validated and harmonized data required for monitoring and assessment by international processes;
- to provide data that can be used in technical studies and in support of investment decisions and private sector development;
- to present relevant information on forests to wider communities, including other sectors, non-governmental organizations (NGOs) and the general public.

FAO's global assessment also contributes to the improvement of concepts, definitions and methods related to forest resources assessments. Efforts are made to harmonize and streamline reporting with other international forest related processes within the framework of the Collaborative Partnership on Forests, as well as with the process to harmonize forest related definitions. The assessment is thus expected to help reduce the reporting burden on countries by providing information required by regional and international processes and agreements.

Implementation. The global forest resources assessment receives its mandate from the FAO Committee on Forestry (COFO) and the FAO Council, technical guidance from expert consultations and detailed specifications and advice from its advisory group. In line with recommendations from these entities, the next global assessment will be a broad and holistic assessment of forest resources (stocks, functions and benefits). Its overall conceptual framework will be defined by the criteria identified in the ongoing international processes on criteria and indicators for sustainable forest management.

Future global forest resources assessments are expected to maintain and publish validated and harmonized national, regional and global data for key parameters (a core set of global variables) as well as for complementary variables required to explain country-specific conditions. Most of the primary data will be provided by member countries through an established network of officially nominated national correspondents. Some of the data sets may originate from complementary sources, such as remote-sensing surveys. The incorporation of national information into the global database will be undertaken collaboratively between countries and FAO, and will be transparent and well documented to ensure credibility and consistency.

Support to national forest assessments. Information provided by countries constituted the core data for FRA 2000. The assessment revealed that many countries, and especially developing countries, lacked basic data and the capacity to implement national inventories and assessments. Gaps in the data refer not only to forest resources and products, but also to the environmental services and benefits provided by forests and trees in support of local food security and poverty alleviation, and to the interaction among human settlements, agricultural lands and forests. This lack of information hampers the development of effective national policies as well as the ability of countries to respond to requirements for forest-related international reporting. Therefore, as part of the Forest Resources Assessment Programme, an approach has been developed to support national forest assessments and build national capacities.

The thrust of this support is to supplement national assessment efforts with forest inventories based on systematic sampling and to establish forest information services to facilitate analysis of the contribution of the forest sector to overall national development.

Objectives. The programme to support national forest assessments has the following three main objectives:

- to strengthen the ability of countries to expand and manage the forestry information base for the benefit of national and international information users;

- to increase awareness of and knowledge about the multiple functions of forests and trees and their contribution to national economies, including in particular poverty alleviation in rural areas, and paying due regard to gender aspects and food security;

- to advance action aimed at the sustainable management of forests by increased use of forestry knowledge in national forest policy development and implementation.

Implementation. National governments are responsible for implementing national forest assessments, for which they may seek external donor assistance. FAO, on request, offers support in technology transfer, methodology development and capacity building. In some cases, where funding is available, FAO implements pilot studies.

New systematic knowledge is created through one to one-and-a-half-year participatory projects implemented by national institutions. Projects include a strong component of capacity building to enable countries to continue national forest assessments after the projects are closed. With a moderate investment, a number of pilot projects facilitated by FAO have provided valuable results in a relatively short period. In 2002, pilot inventories were in progress in Guatemala, the Philippines and Cameroon, and some 20 other countries had made preliminarily requests for assistance.

2. Прочитайте текст і розкажіть про роль Продовольчої та Сільськогосподарської Організації в оцінці та моніторингу лісових ресурсів.

Рекомендована література

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