МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
БІЛОЦЕРКІВСЬКИЙ НАЦІОНАЛЬНИЙ АГРАРНИЙ УНІВЕРСИТЕТ

Соціально-гуманітарний факультет
Кафедра іноземних мов

МЕТОДИЧНІ РЕКОМЕНДАЦІЇ ДЛЯ ВИКОНАННЯ САМОСТІЙНОЇ РОБОТИ ІЗ НАВЧАЛЬНОЇ ДИСЦИПЛІНИ «ФАХОВА ІНОЗЕМНА МОВА»

РІВЕНЬ ВИЩОЇ ОСВІТИ	Другий (магістерський)
ГАЛУЗЬ ЗНАНЬ	10 «Природничі науки»
СПЕЦІАЛЬНІСТЬ	101 «Екологія»
Освітня програма	«Екологія»
Тип дисципліни	Обов’язковий компонент ОК 9

Біла Церква – 2024

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Затверджено науково-методичною комісією
Білоцерківського НАУ
(Протокол № 8 від 28.05.2024 р.)

Методичні рекомендації для виконання самостійної роботи із навчальної дисципліни «Фахова іноземна мова» для здобувачів другого (магістерського) рівня вищої освіти спеціальності 101 «Екологія», ОП «Екологія» / В.А. Зелінська. О.П. Цвид-Гром. Біла Церква: БНАУ, 2024. 47 с.

Рецензент:
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Методичні рекомендації рекомендовано для здобувачів вищої освіти другого (магістерського) рівня вищої освіти, галузі знань 10 – Природничі науки, спеціальності – 10 Екологія для виконання самостійної роботи із дисципліни «Фахова іноземна мова». Методичні рекомендації містять вступну частину, завдання для самостійної та індивідуальної роботи, зокрема – тексти фахового спрямування для читання та перекладу і завдання до них, тестові завдання до тем.

ЗМІСТ

ВСТУП

Нові стандарти та стратегії, запроваджені Україною протягом останніх років, визначають вивчення іноземної (англійської) мови у ЗВО як обов'язкового освітнього компонента у процесі підготовки майбутніх фахівців. Відповідно до Наказу Міністерства освіти та науки України № 898 від 25 липня 2023 року, затверджені Методичні рекомендації щодо забезпечення якісного вивчення, викладання та використання англійської мови у закладах вищої освіти України. Згідно з рекомендаціями, вивчення, викладання та використання англійської мови у закладах вищої освіти України здійснюється відповідно до «Концептуальних засад державної політики щодо розвитку англійської мови у сфері вищої освіти».

За рекомендаціями Комітету Ради Європи з питань освіти[1], випускники закладів вищої освіти повинні оволодіти навиками чіткого формулювання висловлювань з дотриманням загальних стилістичних, академічних, професійних норм іноземною мовою на рівні B2+.

Відповідно до Стандарту вищої освіти України другого (магістерського) рівня, галузі знань 10 – Природничі науки, спеціальності – 101 Екологія вивчення дисципліни **«Фахова іноземна мова»** передбачає формування у здобувачів загальної компетентності: **ЗК 05** Здатність спілкуватися іноземною мовою. У результаті вивчення дисципліни здобувачі мають досягти наступних програмних результатів: **ПРН07**. Уміти спілкуватися іноземною мовою в науковій, виробничій та соціально-суспільній сферах діяльності. **ПРН14**. Застосовувати нові підходи для вироблення стратегії прийняття рішень у складних непередбачуваних умовах.

Навчання фахової англійської мови студентів спеціальності «Екологія» розглядається як органічна частина формування елементів системи безперервної освіти, якій притаманні цілісність, автономність та специфіка. Дисципліна «Фахова іноземна мова» допомагає сформувати майбутнім фахівцям природничого профілю отримати потрібні навики для розширення міжнародних зв'язків, спрямована на формування практичного володіння англійською мовою як вторинним засобом письмового та усного спілкування у професійній сфері.

Мета навчання дисципліни «Фахова іноземна мова» зосереджена на досягненні здобувачами вищої освіти достатнього рівня мовних компетенцій: комунікативно-пізнавальних, мовленнєвих та письмових навичок мовлення, а також навичок перекладу загально-природничих текстів, їх реферування та анотування.

Завдання вивчення дисципліни – сформувати практичні навички розмовного та письмового мовлення, читання, перекладу та реферування текстів за фахом. Після завершення вивчення дисципліни, здобувачі повинні вміти: робити письмовий переклад статей, доповідей, повідомлень; перекладати англомовні професійні тексти на державну мову; розуміти та аналізувати автентичну, науково-публіцистичну літературу; володіти правильним монологічним та діалогічним

[1] [1]Common European Framework of Reference for Languages: Learning, Teaching, Assessment. – Cambridge Univ. Press, 2001. – p.24

мовленням; знаходити нову текстову, графічну, аудіо та відеоінформацію, що міститься в англомовних галузевих матеріалах; готувати публічні виступи з фахових питань, застосовуючи англомовні засоби вербальної комунікації

Методичні рекомендації з дисципліни «Фахова іноземна мова» містять різноманітні типи і види вправ, що сприяють досягненню програмних результатів навчання та ефективному засвоєнню знань під час аудиторної та самостійної роботи. Автори пропонують сучасні фахові тексти практичного характеру англійською мовою для читання та перекладу; тестові завдання до тем та модульні контрольні роботи.

ОЧІКУВАНІ КОМПЕТЕНТНОСТІ ВІДПОВІДНО ДО СТАНДАРТУ ВО

№ ЗК за СВО	Класифікація компетентностей за НРК	Знання	Уміння	Комунікація	Автономність та відповідальність
Загальні компетентності					
ЗК 05	Здатність спілкувати ся іноземною мовою.	- практичний курс граматики; - професійну термінологію	читати, перекладати та аналізувати автентичну літературу, науково-публіцистичну літературу за фахом; робити письмовий переклад статей, доповідей, повідомлень, перекладати, аналізувати, синтезувати; - володіти правильним монологічним та діалогічним мовленням, перекладати англомовні професійні тексти на державну мову, користуючись двомовними термінологічними словниками, електронними словниками;	– готовність до комунікації у письмовій та усній формах англійською мовою з метою вирішення завдань у майбутній професійній діяльності; – здатність комунікувати з колегами щодо наукових досягнень, як на загальному рівні, так і на фаховому рівні; обговорювати наукові теми, використовуючи фахову термінологію	– здатність виконувати самостійні завдання відповідно до розробленої програми; – здатність нести особисту відповідальність за результати власної професійної діяльності; – здатність адаптуватись до нових ситуацій та приймати відповідні рішення.

			- готувати публічні виступи з галузевих питань, застосовуючи англомовні засоби вербальної комунікації		

ОЧІКУВАНІ РЕЗУЛЬТАТИ НАВЧАННЯ

Програмний результат навчання за відповідно до освітньо-професійної програми «Екологія»	Результати навчання з дисципліни
ПРН07. Уміти спілкуватися іноземною мовою в науковій, виробничій та соціально-суспільній сферах діяльності. **ПРН14.** Застосовувати нові підходи для вироблення стратегії прийняття рішень у складних непередбачуваних умовах.	– читати, перекладати та аналізувати автентичну літературу, науково-публіцистичну літературу за фахом; – робити письмовий переклад наукових фахових статей, доповідей, повідомлень; – володіти правильним монологічним та діалогічним мовленням, перекладати англомовні професійні тексти на державну мову, використовуючи двомовні термінологічні словники, електронні словник; – готувати публічні виступи з галузевих питань, застосовуючи англомовні засоби вербальної комунікації

САМОСТІЙНА РОБОТА

Назва теми самостійної роботи	К-сть годин
Змістовий модуль 1. Ecology. Its History and Development	
1. Ecology: introduction into science	10
2. Scales of ecology: organisms	15
3. Population Ecology	15
Усього за модуль	40
Змістовий модуль 2. Ecosystem	
2. Community Ecology	15
3. Ecosystems and biosphere	10
4. The evolution of life in the context of ecology	15

Усього за модуль	40
Змістовий модуль 3. Pollution of Environment	
1. Kinds of pollution. Air pollution	15
2. Water pollution	15
3. Land pollution	10
Усього за модуль	40
Усього	**120**

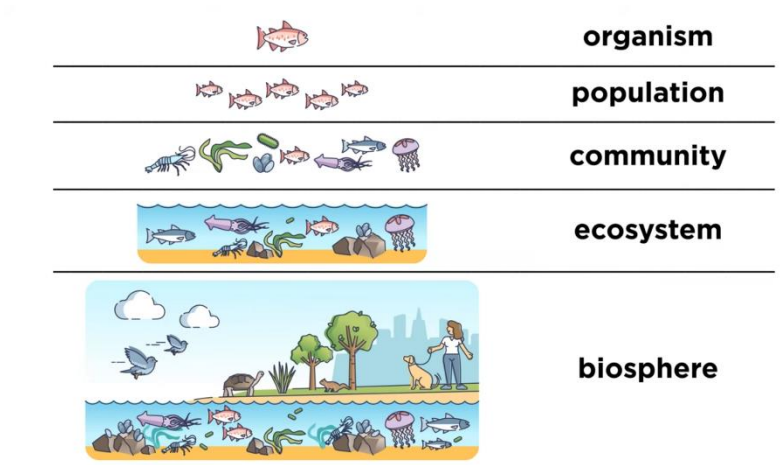
Оберіть питання на Ваш розсуд і підготуйте наукове повідомлення або презентацію для виступу перед групою з опрацьованим додатковим матеріалом.

Назва теми наукового повідомлення чи презентації	1-5 балів за участь в одному проєкті
1. Ecology at the level of organisms 2. Population Ecology 3. Community Ecology 4. Scales of ecology: ecosystems and biosphere 5. Oceans in Danger 6. Socially optimal level of pollution 7. Natural Resource Depletion 8. The evolution of life in the context of ecology 9. Climate change. 10. Loss of biodiversity. 11. Air pollution. 12. Ocean health. 13. Water pollution. 14. Overpopulation. 15. Energy use. 16. Weather events. 17. Ecology movements 18. Conservation Biology 19. Environmental Justice 20. Water conservation 21. Species extinction	

Module 1
Task 1
Read the text and translate it into Ukrainian
Ecology: introduction into science

What if we wish to consider all of these things at once? Then we would be studying ecology. Ecology is a science that describes how the organisms that populate this planet interact with each other and their physical environments. These environments vary depending on where we are, from the oceans to the forests, and from the deserts to the mountains. The scientists who study these relationships between organisms and their environments are called ecologists, and ecology itself is considered a branch of biology.

This field is incredibly broad in scale, as ecologists can choose to study the individual organism itself, populations or communities of organisms, large ecosystems, or even the entire biosphere as a whole, which is a word that refers to the regions of the planet occupied by living organisms. They can specialize even further, focusing on genetics, plant and animal physiology, biodiversity, or conservation.



As we are beginning to understand, the earth can be broken down into distinct spheres, such as the atmosphere, lithosphere, cryosphere, and biosphere. We define the atmosphere as an envelope of gases surrounding the planet, making it habitable for life. The lithosphere is the rigid outer part of the earth consisting of the crust and upper mantle. Over geologic time scales, the lithosphere determines how much land is available for living organisms to inhabit, and where that land is located geographically.

The cryosphere is the part of earth's surface characterized by frozen water. Its expanse changes over time, and this is an important factor in maintaining a habitable climate. And then the biosphere we described a moment ago. These spheres are dynamic, and can influence one another, so the better we understand interactions within individual spheres, the more equipped we are to understand how they all work together as an entire system.

But let's zoom back in for a moment. Within any given physical environment, ecologists seek to study both the types of organisms present and their abundance. By monitoring these factors over time, ecologists can track the general trends and well-being of the ecosystem. For example, as climate changes, the numbers and types of organisms may change too, in order to adapt to changing conditions.

This might result in a positive or negative change depending on the species, and as a whole the ecosystem could be accordingly fortified or placed in jeopardy. The more we know and understand about interactions between organisms and their environments, the

better we will be able to address any consequences that arise. Ecology does not encompass only the outdoors, as many might assume.

What about mold in your kitchen or shower? Or if you're an athlete, the dreaded athlete's foot fungus that you can pick up in a locker room. These are also examples of ecology in action. Factors that can affect the distribution of organisms can be biotic or abiotic in nature. Biotic refers to the living factors, which can include animals, plants, bacteria, and fungi, like the athlete's foot fungus.

The fungus is living, but how did it grow in the first place? Water. The availability of water is abiotic, or a non-living factor. These are physical or chemical in nature, and they also impact an ecosystem. A few other examples include air, soil, and sunlight. Earlier we mentioned the range and scale of phenomena that ecologists can study.

Later we will examine this more thoroughly, but let's briefly summarize the tiers now so that you know what to expect moving forward. Think of an individual tree. Let's say a pine tree. For those ecologists who are detail-oriented and like studying the small scale, they might be more inclined to study ecology at the organism level.

They're interested in details like how this pine tree adapts, and how natural selection played a role in the evolution of beneficial features for survival. Organism ecologists study not only the physiological traits of an organism, or those traits that relate to normal functions of living organisms and their parts, but can also focus on organism behaviors.

Next on our scale is populations, or groups of organisms of the same species that live in the same area at the same time. So all of the pine trees living in a specific area make up a population. Population ecologists are interested not only in the size of the population, or the number of pine trees, but also the densities and structures of these populations, and how they change with time.

How many trees are adults, how many are juveniles or seedlings. Next comes communities. What do we mean by this term in the ecological sense? A biological community is defined as all the populations of different species that live in a given area. So now we're looking beyond the pine trees. What other tree species are there? And what other organisms call this area home? Which other plants? Which animals? Which bacteria? Community ecologists are interested in studying the interactions between populations of species, and then how those interactions shape the entire community. Let's zoom out again. What about an ecosystem? Looking at the bigger picture, this encompasses all of the organisms in an area, or the community, as well as all of the abiotic factors that influence it. Ecologists that study this scale are interested in understanding the flow of energy in the system and the recycling of nutrients that sustains it. Looking beyond the trees and the critters that call the trees home, we're focused on the entire forest ecosystem here, and the influence of abiotic factors like the soil, sunlight, and moisture. Finally, zooming out one last time, we get to the biosphere. The biosphere is earth, but viewed as an ecological system. Scientists studying this scale are interested in global perspectives, global patterns in climate and species distribution, how ecosystems interact, and how climate change is having a real and measurable impact on the biosphere. In going over this scale, we've introduced the majority of the phenomena we will be examining in this series. Given that we will be focusing on ecology, there will be many instances in

which we will be taking certain prerequisite knowledge for granted. If you are looking for more information on individual organisms, my playlists on botany, mycology, zoology, and microbiology will be of great help. Additionally, certain aspects of basic biology and geology will be assumed, but if all of that information is squared away, this series will add considerable depth and scope to your understanding of life on this planet and how it interacts with its surroundings, which is rich with complexities far beyond imagination.

Post Reading

I Answer the following questions

1. What is ecology and what does it study?
2. What are the different environments mentioned in the text where organisms interact with each other?
3. Who are the scientists that study the relationships between organisms and their environments called?
4. How can ecologists specialize further within the field of ecology?
5. What are the distinct spheres of the earth mentioned in the text, and how do they influence each other?
6. What factors can affect the distribution of organisms in a physical environment, and give examples of each?
7. What are the different scales or tiers at which ecologists can study ecosystems, and what aspects do they focus on at each level?

II. Read the statements and say if they are True or False. Correct the false statements according to the text

1. Ecology is the study of how organisms interact with each other and their environments.
2. Ecologists study relationships between organisms and their environments, but ecology is not considered a branch of biology.
3. The lithosphere is the outer part of the earth made up of the crust and upper mantle.
4. The cryosphere is the part of earth's surface characterized by liquid water.
5. The biosphere is the earth seen as an ecological system.
6. Factors that affect the distribution of organisms are only abiotic in nature.
7. Community ecologists study how interactions between species populations shape the community.

III. Check yourself, choose the correct answer:

1. What do scientists call the study of how living things interact with their environment?

A. Biology
B. Geography
C. Ecology
D. Zoology

2. Which sphere of the Earth includes the part with frozen water?

A. Atmosphere
B. Lithosphere
C. Biosphere
D. Cryosphere

3. What do ecologists call a group of the same type of living things that live in the same area?

A. Community
B. Population
C. Organism
D. Ecosystem

4. Which of these is an example of a non-living factor that affects living things?

A. Animals
B. Plants
C. Sunlight
D. Bacteria

5. Which level of ecology focuses on how different species interact with each other?

A. Organism
B. Population
C. Community
D. Ecosystem

IV. Match the part of the sentences.

1. A biological community is defined as	**a**. the better we will be able to address any consequences that arise.
2. This field is incredibly broad in scale, as ecologists can choose to	**b**. consisting of the crust and upper mantle.
3. The scientists who study these relationships between organisms and their environments	**c.** describes how the organisms that populate this planet interact with each other and their physical environments.
4. The lithosphere is the rigid outer part of the earth	**d**. all the populations of different species that live in a given area.
5. By monitoring these factors over time,	**e**. ecologists can track the general trends and well-being of the ecosystem.
6. Next on our scale is populations, or groups of organisms of the same species	**f.** the planet, making it habitable for life.
7. Ecology is a science that	**g**. study the individual organism itself, populations or communities of organisms, large ecosystems, or even the entire biosphere as a whole, which is a word that refers to the regions of the planet occupied by living organisms.
8. Factors that can affect the distribution of organisms can be	**h**. characterized by frozen water.
9. The more we know and understand about interactions between organisms and their environments,	**i.** biotic or abiotic in nature.
10. As we are beginning to understand, the earth can be broken down into distinct spheres,	

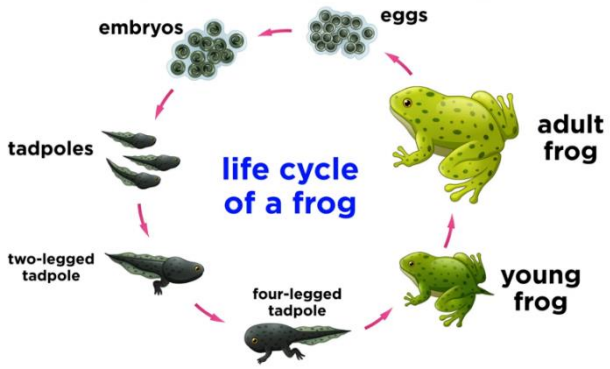
11. The cryosphere is the part of earth's surface **12.** We define the atmosphere as an envelope of gases surrounding	**j**. that live in the same area at the same time. **k**. such as the atmosphere, lithosphere, cryosphere, and biosphere. **l**. are called ecologists, and ecology itself is considered a branch of biology.

Task 2

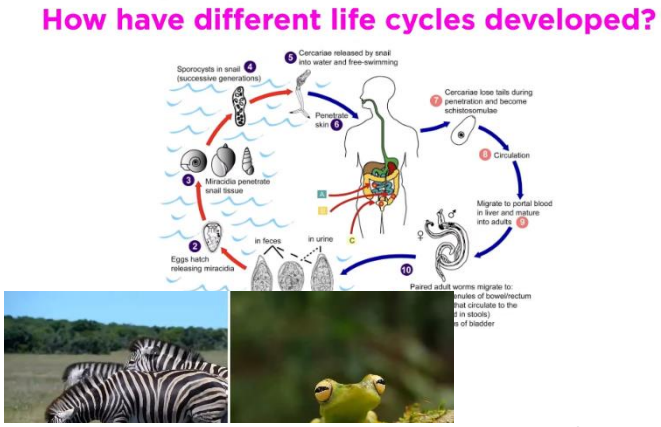
I. Read the text and translate it into Ukrainian

Scales of ecology: organisms

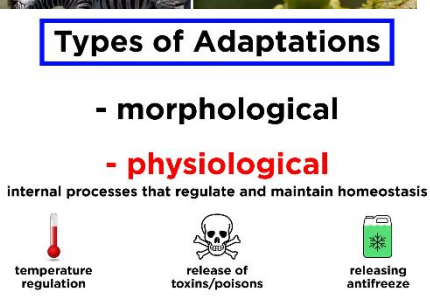
In the introduction to this series, we looked at all the tiers of complexity that an ecologist may study, starting with an individual organism and zooming out to consider the entire biosphere. Let's now take a closer look at all of these tiers one at a time so that we can get a better understanding of what ecologists study starting at the most fundamental level, an organism. What can an ecologist study when it comes to a single organism?



First, they can study an organism's life history, or cycle. This pertains to how the organism grows, develops with time, reproduces, and ultimately survives. Life histories vary tremendously from one species to the next. For example, some organisms die immediately after reproducing, such as salmon, many insects, and all grain crops, while others live on to reproduce repeatedly, like most plants and vertebrates. Why is there so much variation? Researchers who study ecology at the organism level ask this question and many others, like how have different life cycles developed?



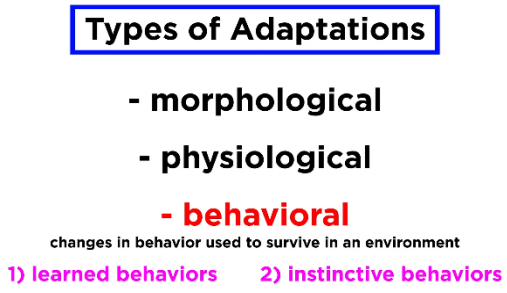
How do they serve the organism? They also attempt to understand adaptations they observe in an organism. These are beneficial features or behaviors arising by natural selection which allow organisms to thrive in specific habitats.



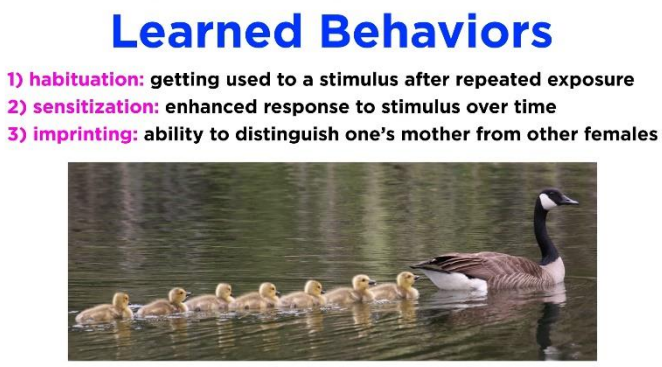
They range from varying body coverings, like fur, feathers, and scales, to patterns of color and camouflage, to defenses, like a skunk's spray and a snake's venom, and finally to body parts, like beaks, claws, and antlers. Adaptations can take multiple forms, including alterations to an organism's morphology, which refers to a structural change which gives an organism a greater chance of survival in its particular

habitat. A great example is the fennec fox, which lives in the desert. It has large ears. You might think it's so the fox can hear better, but it's actually to allow heat to radiate away from the body, helping to cool the fox down in the intensely hot environment. Adaptations can be physiological in nature as well. These are internal processes that regulate and maintain homeostasis, so that an organism is able to survive in the environment in which it exists.

Examples of this include temperature regulation, release of toxins or poisons for protection, and even releasing natural antifreeze in the form of proteins to avoid freezing in cold environments. When it comes to humans, we can find some familiar examples. Calluses on our hands can be considered physiological adaptations to repeated contact or pressure, as can tanning or darkening of the skin after repeated exposure to the sun.



There are also behavioral adaptations, which are changes in behavior that certain organisms or species use to survive in their environment. There are two types, learned behaviors and instinctive behaviors. Learned behaviors include habituation, or getting used to a particular stimulus after being exposed to it multiple times, and sensitization, or responding to certain stimuli in an enhanced or more reactive manner. Think about becoming allergic to something, like a certain type of food or pollen. Your body, by becoming more sensitive, protects you from exposing yourself to these irritants in the future by producing a noticeable and worsening response.



Then there's imprinting, an adaptive function that allows a young animal to distinguish its own mother from other females of the same or different species, and to remain near her for safety and protection. Learned behaviors can also come about from play and observation.

Crows, for example, are notorious for their knack for observation-based learned behaviors, including solving puzzles and using tools. Instinctive behaviors are those behaviors that animals are born knowing how to do. Changes usually come about over many generations until they finally become a part of instinctive behavior. Some examples include the migration of birds like geese during the cold seasons of the year to areas further south in search of food, the hibernation of some mammals during the winter like bears, courtship or mating patterns, and foraging behaviors, which include knowing ways of finding food depending on the habitat or environment.

Post Reading

II Answer the following questions

1. What does an ecologist study when it comes to a single organism?
2. How do life histories vary among different species?

3. What are adaptations in organisms and why are they important for survival?

4. Give examples of morphological adaptations in organisms.

5. Explain the physiological adaptations that help organisms survive in their environment.

6. What are behavioral adaptations, and what are the two types mentioned in the text?

7. Provide examples of instinctive behaviors in animals as discussed in the text.

III. Read the information and choose if it is True, False, or NOT Given. Correct the false statements according to the text

1. The author discusses the various tiers of complexity that ecologists study.
2. Life histories differ greatly between different species.
3. Researchers at the organism level do not question how different life cycles have developed.
4. Adaptations only involve changes in an organism's behaviour.
5. The fennec fox, a desert-dwelling animal, has large ears.
6. The author discusses the physiological nature of adaptations.
7. Learned behaviours do not involve habituation.
8. Instinctive behaviours are learned over time.

IV. Check yourself, choose the correct answer:

1. What is the main focus of an ecologist studying a single organism?
A. The organism's physical adaptations
B. The organism's life history and development
C. The organism's behavioural adaptations
D. The organism's physiological processes
2. How do fennec foxes adapt to the desert environment?
A. They have large ears to hear better
B. They have thick fur to protect against the heat
C. They have long legs to run faster
D. They have large ears to help regulate their body temperature
3. What is the purpose of imprinting in young animals?
A. To learn how to solve problems
B. To distinguish their mother from other females
C. To develop courtship and mating behaviours
D. To acquire foraging techniques
4. Which of the following is an example of a learned behaviour?
A. Hibernation in bears
B. Migration of geese to warmer climates
C. Habituation to a particular stimulus
D. Instinctive defensive behaviours
5. What is the difference between physiological and behavioural adaptations?
A. Physiological adaptations are internal, while behavioural are external

B. Physiological adaptations are always beneficial, while behavioural can be harmful

C. Physiological adaptations are innate, while behavioural are learned

D. Physiological adaptations regulate homeostasis, while behavioural help in survival

6. What is the significance of variations in life histories among different species?

A. It shows how organisms have adapted to different environments

B. It demonstrates the complexity of ecological systems

C. It reflects the diversity of reproductive strategies

D. It highlights the evolutionary processes that shape species

7. What is the role of observation-based learning in the development of behaviours?

A. It allows animals to acquire new skills and problem-solving techniques

B. It is responsible for the development of all learned behaviours

C. It is only found in highly intelligent animals like crows

D. It is a more advanced form of learning compared to instinctive behaviours

V. Match the part of the sentences.

1. Changes usually come about over many generations 2. Examples of this include temperature regulation, release of toxins or poisons for protection, 3. Then there's imprinting, an adaptive function that allows a young animal to distinguish its 4. Adaptations can take multiple forms, 5. These are internal processes that regulate and maintain homeostasis,	a. until they finally become a part of instinctive behavior. b. so that an organism is able to survive in the environment in which it exists. c. and even releasing natural antifreeze in the form of proteins to avoid freezing in cold environments. d. including alterations to an organism's morphology, which refers to a structural change which gives an organism a greater chance of survival in its particular habitat. e. own mother from other females of the same or different species, and to remain near her for safety and protection.

Module test 1

1. What is Ecology?

A) The study of chemicals

B) The study of relationships between organisms and their environment

C) The study of rocks

2. What is an ecologist?

A) A farmer

B) A person who studies ecology

C) A doctor

3. What is an organism?

A) A living thing

B) A non-living thing

C) A type of food

4. What is a population?

A) A group of individuals of the same species in a given area

B) A group of different species

C) A group of rocks

5. What is a community?

A) A group of people living in the same area

B) A group of interacting populations in a particular area

C) A group of buildings

6.What is an ecosystem?

A) A place where computers are stored

B) A biological community of interacting organisms and their physical environment

C) A type of vehicle

7. What is the biosphere?

A) The atmosphere surrounding the Earth

B) The zone of life on Earth

C) The study of illnesses

8. What is a life cycle?

A) The cycle of seasons in a year

B) The series of changes in the life of an organism

C) The cycle of transportation

9. What are types of adaptations?

A) Patterns of behavior

B) Characteristics that help an organism survive in its environment

C) Types of food

10. What is habituation?

A) A type of mating ritual

B) The decrease in response to a repetitive stimulus

C) A type of competition

11. What is imprinting?

A) A type of adaptation

B) The tendency to follow the first moving object seen after birth

C) A type of habitat

12. What is a habitat?

A) A specific environment where an organism lives

B) A place for human dwelling

C) A type of food source

13. What is an environment?

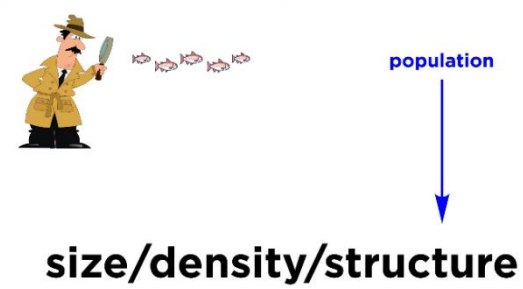
A) The temperature of a place

B) The surroundings or conditions in which a person, animal, or plant lives
C) A type of species

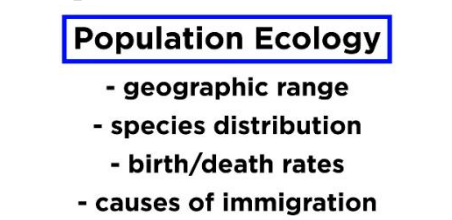
14. What is instinctive behavior?
A) Behavior that is learned through experience
B) Behavior that is inherited rather than learned
C) Behavior that is copied from others

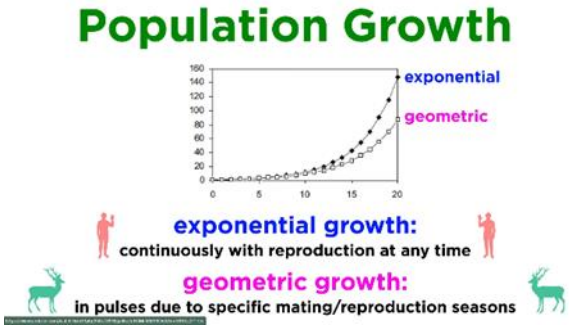
15. Which of the following is an example of instinctive behavior?
A) Building a nest
B) Learning a new language
C) Riding a bicycle

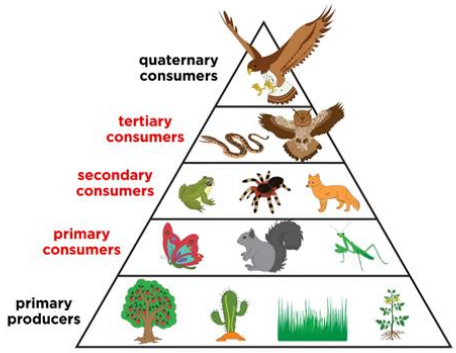
Module 2
Task 3
I.Read the text and translate it into Ukrainian
Population Ecology



Moving on from organisms, population ecologists are scientists who study the size, or total number of individuals, as well as density and structure of populations, and how they change over time. Of interest are a population's geographic range, which has limits that a species can tolerate, like fluctuations in temperature or moisture. The study of population ecology also includes understanding, explaining, and predicting species distributions. Why do species inhabit particular areas, and how are they prevented from establishing beyond their range limits? Such range questions have become popular in the last decade or so in response to concerns about climate change. Additionally, what are the birth and death rates of a particular species? What urges populations to immigrate or explore new areas beyond their previous range? What causes them to emigrate when they leave familiar territory altogether? What are the long-term probabilities of species persisting and surviving in certain habitats? What factors play a role in deciding this? Now let's discuss population growth. Populations can grow in two different modes, at geometric rates or at exponential rates. While exploring these, keep in mind that we will be assuming the presence of unlimited resources which urge population growth. Exponential growth happens continuously, with reproduction happening at any time, like in human populations. Geometric populations grow through pulsed reproduction instead. An example of this is deer, which have a constrained mating and reproduction season, keeping them from constantly reproducing.







When exponential growth occurs, it is in favorable environments and at low population densities. Because of this, exponential growth may apply to populations establishing new environments, during transient favorable conditions, and by populations with low initial population density. Of course, neither geometric nor exponential growth can continue indefinitely. In nature, population growth must eventually slow, and population size eventually ceases to increase. As resources are depleted, the population growth rate slows and eventually stops. This is known as logistic growth. The population size at which growth stops is generally called the carrying capacity, which is the number of individuals of a particular population that the environment can carry or support. Carrying capacity is characterized by equal birth and death rates, creating a population growth of zero. In some populations, organisms in lower trophic levels, meaning the positions that organisms occupy in a food web, are controlled by organisms at the top. This is known as top-down control. For example, carnivores at the top keep the herbivore population in check. If herbivores weren't controlled, all the plants would be eaten, leading to a potential collapse of the entire ecosystem. In bottom-up control, it's the producers at the lower trophic levels who drive the changes instead. If plant populations change, then the population of all species will be impacted.

Post Reading

I Answer the following questions

1. What aspects of populations do population ecologists study?
2. Why have questions about species range become popular in the last decade?
3. How do birth and death rates influence population dynamics?
4. What factors can cause populations to immigrate or emigrate?
5. What are the differences between geometric and exponential population growth?
6. What is logistic growth, and how does it relate to carrying capacity?
7. How do top-down and bottom-up controls impact population dynamics?

II Match the words to their Ukrainian equvivalents

1. temperature	a. харчовий ланцюг
2. population size	b. структура популяцій
3. moisture	c. види
4. structure of populations	d. види, які витримують
5. environment	e. вологість
6. species	f. конкретні області
7. particular areas	g. середовище
8. food web	h. температура
9. species inhabit	i. розмір популяції
10. species persisting	j. види, які заселяють

III. Read the information and choose if it is True, False, or NOT Given. Correct the false statements according to the text

1. Population ecologists are primarily focused on studying individual organisms.
2. A population's geographic range has no impact on the species living there.
3. Population ecology involves predicting where species will be found.
4. In the future, all species will inhabit every area on Earth.
5. Range questions have always been popular, not just in the last decade.
6. Population ecologists also study the birth and death rates of species.
7. Populations never explore new areas beyond their previous range.
8. Species have no chance of surviving in certain habitats.
9. Populations can grow in geometric or exponential modes.
10. Population growth in nature never slows down.

IV. Role-play the dialogue. Translate the underlined word-combinations into Ukrainian:

Ethan: So, what does your sister do again?

Mark: She's a population ecologist.

Ethan: Population eco-what?

Mark: Ecology. The study of how organisms interact with their environment and each other.

Ethan: Oh! Sounds complicated. What exactly is she studying now?

Mark: Right now, she's focusing on population structure and *species distributions*. She wants to understand why certain species live in specific areas and how they are prevented from spreading beyond those limits. Especially with all the changes happening due to climate change.

Ethan: That's really interesting. Does she look at birth and death rates too?

Mark: Yes, that's part of it as well. She's trying to predict the long-term survival of different populations in different habitats. And right now she's looking into population growth. Did you know there are two types - geometric and exponential?

Ethan: No way. Please explain.

Mark: Well, think of humans as an example of exponential growth. We reproduce anytime we want. But then there's geometric growth which happens in pulses, like deer who have specific mating seasons.

Ethan: Hmm, I see. But this can't go on forever, right?

Mark: Exactly. There's also logistic growth where population size eventually reaches a limit or carrying capacity determined by the environment and resources available.

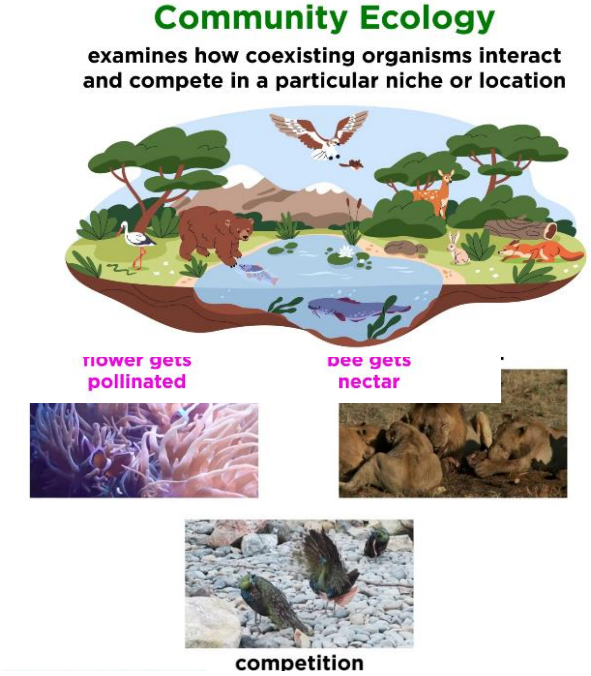
Ethan: Wow, ecology is more complex than I thought. It seems like everything is connected in a food web.

Mark: Exactly. And sometimes populations can be controlled either from the top-down, meaning predators controlling prey populations, or bottom-up, where changes in plant populations cause ripple effects throughout the ecosystem.

Ethan: Ah, makes sense. Good thing we're just doing simple multiplication problems in math class today. This stuff is mind boggling.

V. Discuss the following questions in your group:

1. How do scientists study the structure of populations in ecology?
2. Why is it important to understand why species inhabit particular areas?
3. What factors influence the population size of a species in its environment?
4. How does temperature and moisture affect the distribution of species?
5. Why is it crucial for species to persist in certain habitats?
6. In what ways can the food web impact the survival of different species?
7. How do environmental conditions influence the birth and death rates of species?
8. What role does the geographic range play in determining where species can live?
9. Why is it significant to study how populations grow over time?
10. How do fluctuations in temperature and moisture affect the ability of species to establish beyond their range limits?

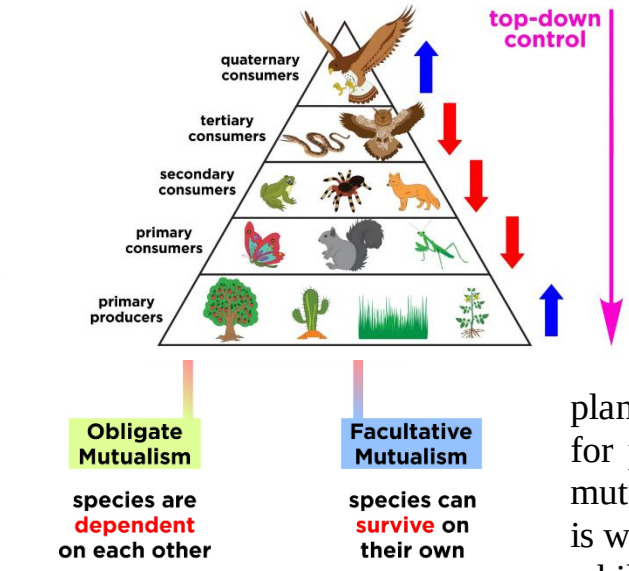


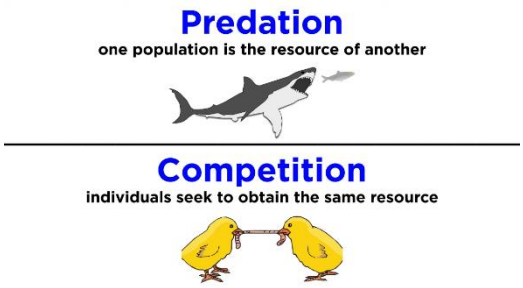
Task 4 Read the text and translate it into Ukrainian

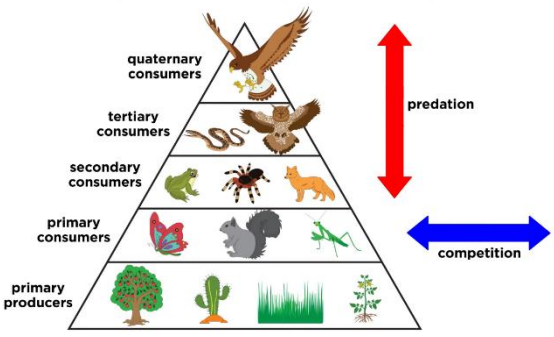
Community Ecology

We just examined the two lowest tiers on the scale of ecology, organisms, and populations. When populations of different species can be found in the same location, this constitutes a community. So how do ecologists study communities? Community ecologists focus on interactions between populations of different species, and how these interactions shape the communities where they live. This includes not just the study of the interactions of species, such as mutualism, predation, and competition, but also the dynamics and structure of the community. How is it organized? How does it function? In a nutshell, community ecology examines how coexisting organisms interact and compete in a particular niche or geographical location, such as woodland, prairie, or lake. Let's start by defining the different kinds of interactions between populations of species. Mutualism is a symbiotic relationship that is beneficial to both organisms involved. This occurs when two organisms of different species work together, and each reaps benefits that increase survivability. The oxpecker, a kind of bird, and the zebra are one such example. The bird gets food in the form of ticks and other parasites on the zebra's skin, while the zebra gets a kind of pest control. Going a little deeper, mutualism can take two forms. When the species are entirely dependent on each other, this is called obligate mutualism. An easy way to remember this is that both organisms are obligated or forced to rely on one another. An example of this is mycorrhizal fungi with hyphae that exchange crucial nutrients with plant roots. In other

situations where the species can survive on their own, like the bird-zebra relationship we mentioned, this is called facultative mutualism. Another example of obligate mutualism is the yucca plant and the moth. The flower of the yucca plant in the habitat of the arid climate of the southwestern United States relies on the moth for the pollination process. In turn, the moth benefits by laying its own eggs on the flower and feeding the larvae with the seeds. Honeybees and plants are another example of facultative mutualism, given that honeybees visit many different plant species for nectar, and the plants receive a number of different insect visitors for pollination. Now let's look at the opposite of mutualism, predation and competition. The former is when one population is the resource of the other, while the latter is when individuals seek to obtain the same environmental resource. Think of competition as occurring horizontally on the same resource level, while predation takes place vertically between different resource levels. These are still ecological relationships, but they're not symbiotic ones. The best known examples of predation include carnivorous interactions in which one animal consumes another, like when wolves hunt moose or owls hunt mice. If there's an increase in predation in a community or any other source of mortality, this will generally reduce the absolute change in density of consumers, simply because the direct impact of predators is to reduce the numbers of their prey. While the term reducing seems negative, predators are often a positive influence on communities and can increase diversity. They do this by hunting dominant species, which reduces the pressure on or overconsumption of foundation species, those species that have a strong role in structuring a community by providing habitat structure and food. Some examples of foundation species are corals, kelp beds, seagrass meadows, or hardwood trees. Predation can have a positive effect when the predators feed more on the dominant competitors that would otherwise use up all of the community's resources, which organisms are competing for. Animals fight over territory, food, water, and shelter. Plants compete for light exposure, pollinators, and soil nutrients. Microbes compete for nutrients and chemical substrates. Competition is important in an ecosystem, as the best competitors are the ones who survive and pass along their genes. Their offspring have an increased chance of survival because







their parents outcompeted other species and passed down the genetic tools that helped them succeed. What can affect population size? It comes down to the availability of food, which can act as a bottom-up control. In years when preferred food is abundant, populations are able to grow. As predator populations increase in response to the growth of consumer populations,they put greater strain on the prey populations and act as a top-down control, pushing the prey towards a state of decline to keep the community in balance. While the presence of a predator can decrease the growth rate of the population, that doesn't affect the overall carrying capacity, which is reliant on the availability of resources. Predators are effective agents of natural selection because they posses key traits that allow them to capture and consume their prey. They adopt different strategies to hunt which can drive prey evolution, to increase they likelihood of survival.

Post Reading

I Answer the following questions

1. What is a community in ecology?
2. How do community ecologists study communities?
3. What are some examples of mutualism in nature?
4. Explain the difference between obligate mutualism and facultative mutualism.
5. Give examples of predation in ecological relationships.
6. How can predators have a positive effect on communities?
7. Why is competition important in an ecosystem?

II Read the statements. Say, are they True / False? If the statement false, correct it.

1. Different species in the same area form a community.
2. Mutualism is a harmful relationship to both organisms involved.
3. The oxpecker and the zebra do not have a mutualistic relationship.
4. The bird benefits by eating ticks and other parasites from the zebra's skin.
5. The yucca plant does not rely on the moth for pollination.
6. Animals compete for territory, food, water, and shelter.
7. Competition has no impact on the survival of species in an ecosystem.

III. Check yourself, choose the correct answer

1. Which of these is NOT a type of ecological interaction?

A. Mutualism
B. Predation
C. Competition
D. Symbiosis

2. What do ecologists study when they look at communities?

A. How different species interact with each other
B. The number of organisms in a population
C. The physical environment of a habitat
D. The life cycle of a single species

3. Which of these is an example of obligate mutualism?
A. Oxpecker birds and zebras
B. Honeybees and flowers
C. Mycorrhizal fungi and plant roots
D. None of the above

4. How do predators affect the diversity of a community?
A. They reduce the numbers of their prey
B. They increase the numbers of their prey
C. They have no effect on the community
D. They hunt the dominant species, which helps other species thrive

5. What is the main factor that can affect the size of a population?
A. The number of predators
B. The availability of food
C. The level of competition
D. All of the above

IV Translate into Ukrainian and make up sentences with given collocations.

1. in the same location
2. between populations of different species
3. study of species interactions
4. community ecology examines interactions
5. in a geographical location
6. obligate mutualism
7. facultative mutualism
8. to take place
9. consumer density
10. dominant competitors
11. the availability of food
12. predator populations
13. population rate

V Discuss these questions with a partner or in a group of three.

1. How important is the study of species interactions in community ecology?
2. Can you explain the concept of obligate mutualism and facultative mutualism?
3. What factors influence consumer density within a community?
4. Why is it crucial to examine interactions between populations of different species in the same location?
5. How do dominant competitors impact the availability of food for other species?
6. In what ways do predator populations affect population rates within a community?
7. Where do these interactions typically take place in a geographical location?

8. What role does the availability of food play in shaping the dynamics of an ecological community?

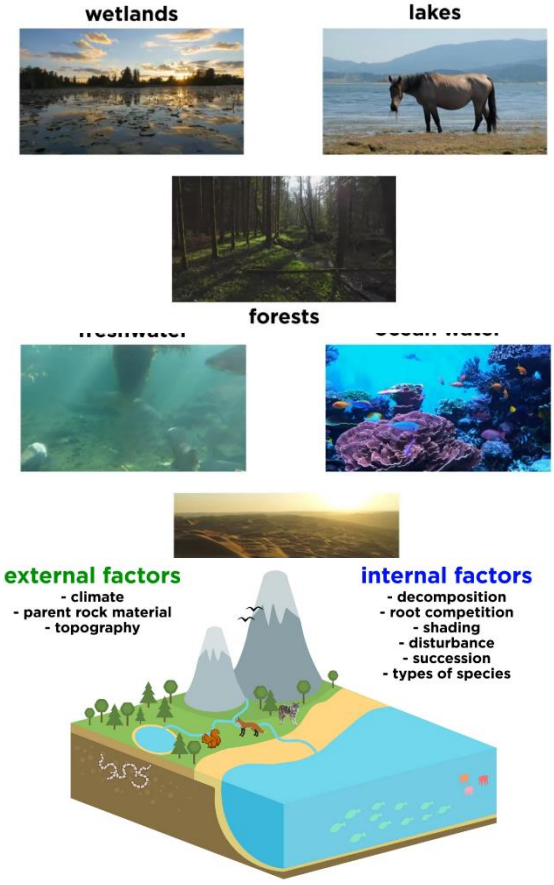
9. Can you provide examples of how predator populations can influence the overall ecosystem?

10. How do changes in consumer density impact the balance of an ecological community?

Task 4

Read the text an translate it into Ukrainian

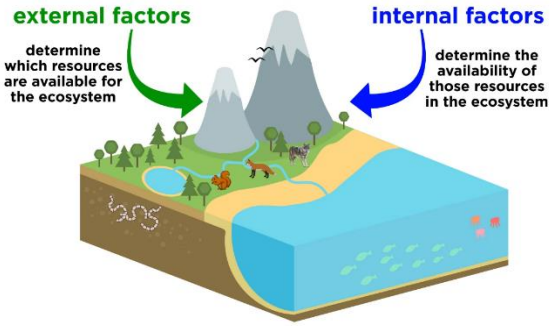
Ecosystems and biosphere



An ecosystem consists of all the organisms in an area, meaning the entire community, as well as the abiotic factors that influence the community, so we are looking past organisms here, towards the physical phenomena that have an impact on them. Ecosystem ecologists often focus on the flow of energy and recycling of nutrients. Think of an ecosystem as a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life. The three broad categories of ecosystems based on their general environment include freshwater, ocean water, and terrestrial ecosystems. Within these broad categories are individual ecosystem types based on the organisms present and the type of environmental habitat, such as wetlands, lakes, and forests. With regards to the flow of energy, the biotic and abiotic components of an ecosystem are linked together. Energy enters the system through photosynthesis and is incorporated into plant tissue. By feeding on plants and on one another, animals play an important role in the movement of matter and energy through the system. They also influence the quantity of plant and microbial life. When decomposers break down dead organic matter, they release carbon back to the atmosphere and facilitate nutrient cycling by converting nutrients stored in dead biomass back into a form that can be readily used by plants and microbes. Energy and nutrients can also be released from an ecosystem in the form of disturbances, such as wildfires, or transferred to other ecosystems, like from a forest to a stream to a lake, through the process of erosion, which is the physical and chemical breakdown of materials in the environment. Thus, ecosystems are controlled by both external and internal factors. External factors such as climate, the parent rock material that forms the soil, and topography are what control the

overall structure of an ecosystem, but are not themselves influenced by the ecosystem. Internal factors are controlled, for example, by decomposition, root competition, shading, disturbance, succession, and the types of species present. While the kinds of resources made available to the ecosystem are generally controlled by external processes, the availability of these resources within the ecosystem is controlled by internal factors. Therefore, internal factors not only control ecosystem processes, but are also influenced by them. Ecosystems are dynamic entities, and they are subject to periodic disturbances. More than likely, they are always in the process of recovering from some past disturbance. The tendency of an ecosystem to remain close to its ideal or equilibrium state despite these disturbances is termed its resistance. Scientists can study ecosystems through a variety of approaches, including but not limited to, theoretical studies, monitoring specific ecosystems over long periods of time, direct experimentation, and comparing or contrasting ecosystems to figure out how they work. The largest ecosystem of all is our planet that is known as an ecosphere or biosphere. The biosphere is the region extending a few thousand feet above and below the Earth's surface in which life exists. The biosphere did not always exist. The evolution is likely to have been very slow. The modern biosphere seems to have had its beginning two or three billion years ago. And with ecosystems better understood, we can begin to approach the biosphere as a whole. Ecologists tend to work together to inform our collective knowledge about the biosphere.

Post Reading



I Answer the following questions

1. What does an ecosystem consist of?
2. How do ecosystem ecologists typically focus their studies?
3. What are the three broad categories of ecosystems based on their general environment?
4. How are biotic and abiotic components linked together in an ecosystem?
5. What role do animals play in the movement of matter and energy through an ecosystem?
6. How do decomposers contribute to nutrient cycling in an ecosystem?
7. What factors control the overall structure of an ecosystem?

II Read the statements. Say, are they True / False? If the statement false, correct it.

1. Ecosystem ecologists concentrate on energy flow and nutrient recycling.
2. An ecosystem is a small area where only plants exist.
3. Ecosystems are broadly categorized into freshwater, ocean water, and terrestrial ecosystems.

4. Energy enters the system through respiration and is incorporated into plant tissue.

5. Decomposers release carbon to the atmosphere and help in nutrient cycling.

6. Energy and nutrients cannot be released from an ecosystem through disturbances.

7. The biosphere was not always present.

IV. Role-play the dialogue. Translate the underlined word-combinations into Ukrainian

Mark: Wow, did you read that article on ecosystems?

Emily: Yes, it's fascinating how everything in an ecosystem is interconnected.

Mark: I know, like the flow of energy and recycling of nutrients. It's all so complex.

Emily: And don't forget about the abiotic components - the non-living things that also impact an ecosystem.

Mark: Right, like climate and topography. They control the overall structure but aren't influenced by the ecosystem itself.

Emily: Yes, and internal factors such as decomposition, competition, and disturbance also play a role in shaping ecosystems.

Mark: It's incredible how they can resist changes and maintain their equilibrium despite disturbances.

Emily: Definitely. And we're only just starting to understand the biosphere as a whole. The largest ecosystem of all!

Mark: True, but with more research and collaboration, we can continue to learn more about our planet and its ecosystems.

V. Read the dialogues, underline essential vocabulary

A) -The ecosystem is so fragile. We need to be careful not to damage it.

-Yes, I agree. It's important to understand the recycling of nutrients within it.

B) -The abiotic components play a crucial role in the ecosystem.

-Definitely. They provide the necessary resources for all living organisms.

C) - External and internal factors can greatly affect the balance of the ecosystem.

- Absolutely. We need to consider all factors when studying and protecting it.

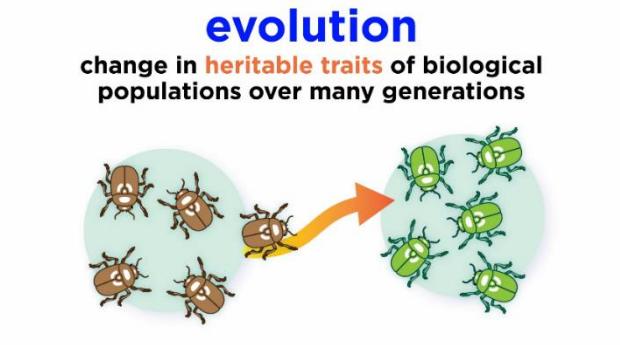
D) -The Earth's surface is constantly changing due to natural processes.

That's true. It's important to study and understand these changes for the sake of the biosphere.

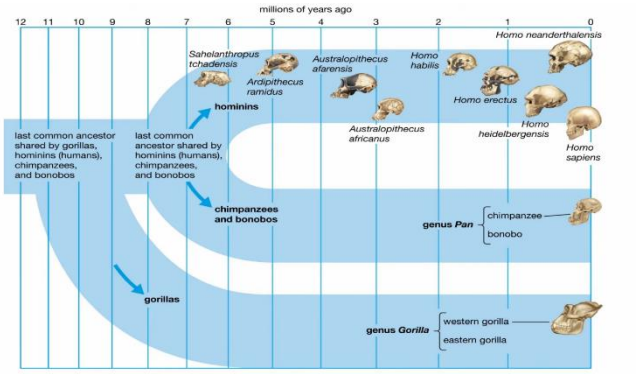
Task 4

I. Read the text an translate it into Ukrainian

The evolution of life in the context of ecology



The origin of life implies the simplest, most ancient organism arising from nonliving matter, and then subsequently evolving very gradually over millions of years into more complex organisms. These then formed populations, communities, ecosystems, and then eventually the entire biosphere, thus the ecology connection. So just what is evolution in this ecological context? We can think of evolution as the change in heritable traits, those traits that are transmissible from parent to offspring of biological populations over many generations. The process of evolution gives rise to diversity at every level of biological organization. While studies in evolution consider the processes by which modern organisms have developed from ancestral ones, the field of ecology explores the interactive web of organisms and the environment. Organisms evolve because they are in ecological relationships with other organisms of their environment, and because the environment itself influences their evolution via natural selection. So even though we may think of evolution as all the changes that took place over millions of years, the truth is that evolution is at work all the time. Sometimes the changes are small and appear insignificant at first glance, but they all play a part in natural selection and the survival of the species. Speaking of natural selection, this is one of the many mechanisms of evolution. In most cases, it doesn't lead to the development of a new species, it simply allows a species to better adapt to its environment by changing the genetic makeup from one generation to the next. The organisms better adapted to their environment tend to survive and produce more offspring, and this plays a role in the evolution of beneficial features. If a species lacks a certain trait that will allow it to survive, the species either dies out or eventually develops the missing trait. A modern example of this is insects and our use of pesticides. The more a pesticide is used, the greater the chance that the insects targeted will develop immunity to the chemical. Resistance can happen as quickly as a single generation. Since many insects reproduce quickly, several generations can be born within weeks and months, and by the time a few generations have passed, all insects are likely to be resistant to the pesticide. Here's another strange example, there are bacteria out there called pseudomonas that have evolved the ability to eat nylon. When placed in an environment where only nylon was available as food, the bacteria evolved until it was able to eat it. This demonstrates that even the most basic of life forms can adapt to the food an environment provides. Another mechanism of evolution is mutation, or a change in the DNA sequence of an organism. This can result due to errors in DNA replication during cell division, exposure to mutagens, or high energy radiation. Mutations generally fall into two types, point



mutations, which change as a single nucleotide, and chromosomal, or mutations that change chromosome structure. Mutations can have a range of effects as well.

Often they can be harmful, others have little or no detrimental effect, and sometimes, although very rarely, the change in DNA sequence may even turn out to be beneficial to an organism. More significant changes to organisms require events like gene duplication, or even chromosome duplication, followed by subsequent diversion from the original copy through mutation, thus producing brand new proteins. This can also be achieved through de novo genes, where a promoter migrates to a previously non-protein coding section, thereby generating an entirely new gene. If these genes are involved with embryonic development, we can see totally new body plans rapidly emerge. But this is more complex evolutionary biology that is outside of the scope of this series. Now we arrive at mechanisms pertaining less to biochemistry and more to ecology. The first is gene flow, also called gene migration. This is any movement of individuals and the genetic material they carry, from one population to another, changing the composition of the gene pool of the receiving population. Migrants can change the distribution of genetic diversity by modifying allele frequencies, or the proportion of the members carrying a particular variant of a gene. This leads us to another mechanism of evolution, genetic drift, which can lead to large changes in populations over a short period of time, though it is a random process, not caused by environmental factors. In this case, allele frequencies of a population change over generations due to chance, also called sampling error. Essentially, an allele randomly starts to become more or less common in a population.

When people who have the gene causing a specific genetic trait, like freckles, reproduce with people who do not have the gene, the gene either can become more popular such that nearly everyone gets freckles, or totally disappear from the population such that no one has freckles. While drift occurs in all populations, its effects are strongest in the smallest populations. In natural populations, all these mechanisms of evolution do not act in isolation, but rather in tandem at all times. Finally, let's examine adaptations. In biology and ecology, adaptation refers to adjusting behavior, physiology, or structure to become more suited for an environment. We covered these specifics in an earlier tutorial, but it's important to bring them up again, as understanding adaptations helps us understand how some organisms can live in specific habitats. Mimicry, for example, is not just humans imitating someone else in order to entertain. In biology, the close external resemblance of an animal, plant, or part of one to another, as well as producing the same undesirable smells, sounds, or behaviors as other creatures, can save the life of the imitator.

We can see insects that strongly resemble sticks, and other such organisms which clearly benefit from this ability. Toxin production is another adaptation critical to some plants, and these compounds act as a natural defense mechanism against predators like insects or bacteria, as well as parasites and viruses. These can be naturally occurring phytochemicals or metabolites formed by plants themselves to protect against various threats. Amongst vertebrates, another adaptation is echolocation, or a system of orientation involving the use of echoes or sounds produced by animals for gathering information about its environment. This is performed in order to find roosts or homes, food or both, irrespective of light conditions.

Post Reading

II Answer the following questions

1. What is the relationship between evolution and ecology?
2. How does natural selection play a role in the evolution of species?
3. Can you provide an example of how insects can develop resistance to pesticides through natural selection?
4. What are mutations, and how do they contribute to evolution?
5. Explain the concept of gene flow and its impact on genetic diversity.
6. How does genetic drift differ from natural selection in terms of driving evolutionary changes?
7. Why are adaptations important for organisms in their respective environments?

III Read the statements. Say, are they True / False? If the statement false, correct it.

1. The origin of life involves the gradual evolution of simple organisms from nonliving matter over millions of years.
2. Evolution leads to uniformity at every level of biological organization.
3. Organisms evolve due to their ecological relationships and the influence of the environment through natural selection.
4. All changes in organisms are significant and immediately noticeable.
5. Resistance takes multiple generations to develop.
6. Mutations can be classified into point mutations, which alter a single nucleotide, and chromosomal mutations, which affect chromosome structure.
7. In natural populations, each mechanism of evolution acts independently.

IV. Check yourself, choose the correct answer

1. What term is used to describe the change in heritable traits that is transmissible from parent to offspring over many generations?

A. Adaptation
B. Mutation
C. Evolution
D. Natural selection

2. Which of the following mechanisms of evolution does not involve changes to the genetic makeup of a population?

A. Gene flow
B. Genetic drift
C. Mutation
D. Mimicry

3. What is the term used to describe the close external resemblance of one organism to another, which can provide a survival advantage?

A. Toxin production
B. Mimicry
C. Gene duplication

D. Nylon consumption

4. How do pesticides typically affect the evolution of insects over time?

A. Pesticides cause insects to develop new traits that are beneficial.

B. Pesticides eradicate all insects, preventing further evolution.

C. Pesticides drive the selection of insects resistant to the chemicals.

D. Pesticides have no effect on the evolution of insects.

5. What is the primary driver behind the evolution of organisms adapting to new environments?

A. Mutation

B. Gene flow

C. Natural selection

D. Genetic drift

6. Which of the following is an example of a mechanism of evolution that can lead to the development of new genes and proteins?

A. Point mutations

B. Chromosomal mutations

C. Gene duplication

D. Nylon consumption

7. How do bacteria demonstrate the ability of even basic life forms to adapt to new environments?

A. By developing immunity to pesticides

B. By evolving the ability to consume nylon

C. By undergoing gene flow between populations

D. By displaying mimicry to avoid predators

V. Discuss the following questions with a group. Do a survey and present your results to the class.

1. How do you think ancient organisms have influenced the evolution of more complex life forms over millions of years?

2. Can you explain the concept of natural selection and its role in shaping the genetic makeup of different species?

3. What are some examples of mimicry in nature, and how does this adaptation benefit certain organisms?

4. How do mutations play a role in the evolutionary process, and what effects can they have on an organism's DNA sequence?

5. In what ways does genetic drift contribute to changes in populations over time, and why is it more pronounced in smaller populations?

6. Why is adaptation important for organisms to survive and thrive in their specific environments?

7. How has the web of organisms within ecosystems influenced the diversity of life on Earth through evolution?

8. Can you discuss the significance of toxin production as an adaptation for plants in defending against predators and parasites?

9. What connections can be made between the idea of subsequently evolving organisms and the overall process of evolution in biological populations?

10. How does the interplay between various mechanisms of evolution, such as gene flow and genetic drift, shape the genetic diversity of different populations?

Module test 2

1. What is defined as a group of organisms of the same species living in the same area?

A) Population

B) Species distribution

C) Population growth

2. Which term refers to the way in which a particular species is spread out over an area?

A) Mutualism

B) Species distribution

C) Predation

3. The term that describes the change in population size over time is known as:

A) Mutualism

B) Population growth

C) Competition

4.Which growth pattern occurs when a population increases by a fixed percentage each year?

A) Exponential growth

B) Logistic growth

C) Geometric growth

5. When a population grows by a constant amount over a constant time interval, it is known as:

A) Geometric growth

B) Logistic growth

C) Exponential growth

6. Which term describes a growth pattern that starts slowly, then accelerates and finally levels off?

A) Logistic growth

B) Exponential growth

C) Predation

7. Community ecology is the study of:

A) Individual species

B) Populations of different species living in the same area

C) Population growth of a single species

8. Mutualism is a relationship between two species in which:

A) Both species benefit

B) One species benefits while the other is harmed

C) Both species are harmed

9. Predation is a relationship between two species in which:

A) Both species benefit
B) One species benefits by eating the other
C) Species avoid each other
10. Competition occurs when:
A) Two species cooperate for resources
B) Two species have a neutral interaction
C) Two species compete for limited resources
11. What term best describes a situation where one organism kills and eats another organism?
A) Mutualism
B) Predation
C) Competition
12. Which of the following is an example of interspecific competition?
A) Two lions in the same pride
B) Two different species of birds fighting over nesting sites
C) Ants working together to find food
13. Logistic growth occurs when:
A) A population grows exponentially without limit
B) Population growth is initially slow, then accelerates, and finally levels off
C) Population growth is constant over time
14. Geometric growth differs from exponential growth in that geometric growth:
A) Is limited by carrying capacity
B) Grows by a fixed percentage over a constant time interval
C) Follows a J-shaped curve
15. In a mutualistic relationship between a bee and a flower, what is the benefit for the bee?
A) Pollen for nutrition
B) Nectar for food
C) Protection from predators

Module 3
Task 1
I. Read the text and translate it into Ukrainian

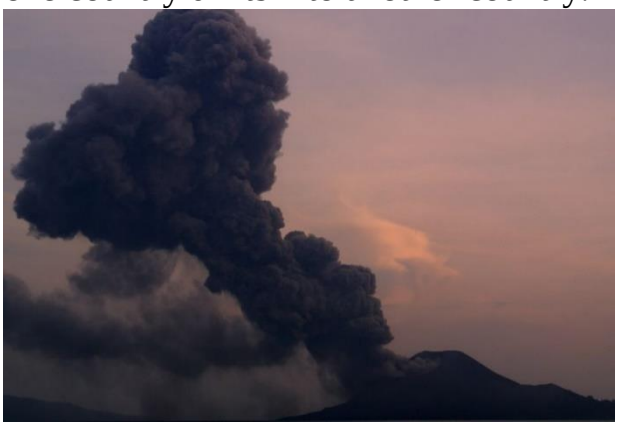
Kinds of pollution. Air pollution

Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land. Many things that are useful to people produce pollution. Cars spew pollutants from their exhaust

pipes. Burning coal to create electricity pollutes the air. Industries and homes generate garbage and sewage that can pollute the land and water. Pesticides—chemical poisons used to kill weeds and insects—seep into waterways and harm wildlife.

Pollution is a global problem. Although urban areas are usually more polluted than the countryside, pollution can spread to remote places where no people live. For example, pesticides and other chemicals have been found in the Antarctic ice sheet. In the middle of the northern Pacific Ocean, a huge collection of microscopic plastic particles forms what is known as the Great Pacific Garbage Patch.

Air and water currents carry pollution. Ocean currents and migrating fish carry marine pollutants far and wide. Winds can pick up radioactive material accidentally released from a nuclear reactor and scatter it around the world. Smoke from a factory in one country drifts into another country.



The three major types of pollution are <u>air pollution, water pollution, and land pollution.</u>

Air Pollution. Sometimes, air pollution is visible. A person can see dark smoke pour from the exhaust pipes of large trucks or factories, for example. More often, however, air pollution is invisible. Polluted air can be dangerous, even if the pollutants are invisible. It can make people's eyes burn and make them have difficulty breathing. It can also increase the risk of lung cancer. Natural disasters can also cause air pollution to increase quickly. When volcanoes erupt, they eject volcanic ash and gases into the atmosphere. Volcanic ash can discolor the sky for months. After the eruption of the Indonesian volcano of Krakatoa in 1883, ash darkened the sky around the world. The dimmer sky caused fewer crops to be harvested as far away as Europe and North America. For years, meteorologists tracked what was known as the "equatorial smoke stream." In fact, this smoke stream was a jet stream, a wind high in Earth's atmosphere that Krakatoa's air pollution made visible.

Most air pollution is not natural, however. It comes from burning fossil fuels—coal, oil, and natural gas. When gasoline is burned to power cars and trucks, it produces carbon monoxide, a colorless, odorless gas. The gas is harmful in high concentrations, or amounts. City traffic produces highly concentrated carbon monoxide. Cars and factories produce other common pollutants, including nitrogen oxide, sulfur dioxide, and hydrocarbons. These chemicals react with sunlight to produce smog, a thick fog or haze of air pollution. The smog is so thick in Linfen, China, that people can seldom see the sun. Smog can be brown or grayish blue, depending on which pollutants are in it. Smog makes breathing difficult, especially for children and older adults. Some cities that suffer from extreme smog issue air pollution warnings. The government of Hong Kong, for example, will warn people not to go outside or engage in strenuous physical activity (such as running or swimming) when smog is very thick. When air pollutants such as nitrogen oxide and sulfur dioxide mix with moisture, they change into acids. They then fall back

to earth as acid rain. Wind often carries acid rain far from the pollution source. Pollutants produced by factories and power plants in Spain can fall as acid rain in Norway.

Acid rain can kill all the trees in a forest. It can also devastate lakes, streams, and other waterways. When lakes become acidic, fish can't survive. In Sweden, acid rain created thousands of "dead lakes," where fish no longer live.

Greenhouse gases are another source of air pollution. Greenhouse gases such as carbon dioxide and methane occur naturally in the atmosphere. In fact, they are necessary for life on Earth. They absorb sunlight reflected from Earth, preventing it from escaping into space. By trapping heat in the atmosphere, they keep Earth warm enough for people to live. This is called the greenhouse effect.

But human activities such as burning fossil fuels and destroying forests have increased the amount of greenhouse gases in the atmosphere. This has increased the greenhouse effect, and average temperatures across the globe are rising. The decade that began in the year 2000 was the warmest on record. This increase in worldwide average temperatures, caused in part by human activity, is called global warming. Global warming is causing ice sheets and glaciers to melt. The melting ice is causing sea levels to rise at a rate of two millimeters (0.09 inches) per year. The rising seas will eventually flood low-lying coastal regions. Entire nations, such as the islands of Maldives, are threatened by this climate change. Global warming also contributes to the phenomenon of ocean acidification. Ocean acidification is the process of ocean waters absorbing more carbon dioxide from the atmosphere. Fewer organisms can survive in warmer, less salty waters. The ocean food web is threatened as plants and animals such as coral fail to adapt to more acidic oceans. The change in average temperatures is already shrinking some habitats, the regions where plants and animals naturally live. Polar bears hunt seals from sea ice in the Arctic. The melting ice is forcing polar bears to travel farther to find food, and their numbers are shrinking. People and governments can respond quickly and effectively to reduce air pollution. Chemicals called chlorofluorocarbons (CFCs) are a dangerous form of air pollution that governments worked to reduce in the 1980s and 1990s. CFCs are found in gases that cool refrigerators, in foam products, and in aerosol cans.

II. Answer the following questions

1. What are the main types of pollution?
2. What are pollutants and how are they classified?
3. How does human activity contribute to pollution in the environment?
4. What are some examples of natural pollutants mentioned in the text?
5. How can air pollution impact human health, according to the text?
6. What causes acid rain and what are its effects on the environment?
7. How do greenhouse gases contribute to global warming?
8. What measures have governments taken to reduce specific forms of air pollution?

III. Read the statements. Say, are they True / False? If the statement false, correct it.

1. All pollutants are man-made.

2. Pollutants have a negative impact on the environment.
3. Pollution is only a local issue.
4. Pollution can be transported by air and water currents.
5. The main forms of pollution include air, water, and land pollution.
6. Air pollution is always visible.
7. Greenhouse gases contribute to air pollution.

IV. Check yourself, choose the correct answer

1. According to the passage, what is the primary human-made source of air pollution?
A. Burning of fossil fuels
B. Volcanic eruptions
C. Pesticide runoff
D. Factory emissions
2. Which of the following pollutants is not mentioned in the passage as contributing to smog formation?
A. Nitrogen oxide
B. Sulfur dioxide
C. Hydrocarbons
D. Ozone
3. What was the impact of the 1883 eruption of the Indonesian volcano Krakatoa on the environment?
A. It caused ash to darken the sky around the world for months.
B. It increased the risk of lung cancer for people living nearby.
C. It led to the discovery of the "equatorial smoke stream."
D. It reduced crop yields in Europe and North America.
4. Which of the following is a consequence of acid rain according to the passage?
A. It can kill fish in lakes and streams.
B. It can increase the greenhouse effect.
C. It can make breathing difficult for people.
D. It can release harmful chemicals into the soil.
5. What is one of the effects of global warming mentioned in the passage?
A. It is causing ice sheets and glaciers to melt.
B. It is increasing the frequency of natural disasters.
C. It is reducing the acidity of the world's oceans.
D. It is causing a decline in the population of polar bears.
6. What action did governments take in the 1980s and 1990s to address a specific form of air pollution?
A. Banning the use of chlorofluorocarbons (CFCs)
B. Implementing air pollution warning systems
C. Increasing regulations on factory emissions
D. Promoting the use of renewable energy sources
7. Which of the following is identified in the passage as a natural source of air pollution?

A. Burning of fossil fuels
B. Volcanic eruptions
C. Factory emissions
D. Pesticide runoff

V. Discuss the following questions with a group. Do a survey and present your results to the class.

1. How does pollution impact the environment and living organisms?
2. What are some common sources of air pollution in urban areas?
3. Can you describe any visible signs of air pollution that you have observed?
4. How do natural disasters contribute to an increase in air pollution levels?
5. What are the effects of acid rain on forests, lakes, and aquatic life?
6. In what ways can greenhouse gases lead to global warming and climate change?
7. Have you experienced any health issues related to poor air quality or pollution?
8. How can individuals and governments work together to reduce air pollution?
9. What measures can be taken to prevent pollutants from harming the atmosphere and ecosystems?
10. Do you think it's important for society to raise awareness about different types of pollution, including air pollution?

Task 2

I. Read the text an translate it into Ukrainian

Water Pollution

Some polluted water looks muddy, smells bad, and has garbage floating in it. Some polluted water looks clean, but is filled with harmful chemicals you can't see or smell.

Polluted water is unsafe for drinking and swimming. Some people who drink polluted water are exposed to hazardous chemicals that may make them sick years later. Others consume bacteria and other tiny aquatic organisms that cause disease. Sometimes, polluted water harms people indirectly. They get sick because the fish that live in polluted water are unsafe to eat. They have too many pollutants in their flesh.

There are some natural sources of water pollution. Oil and natural gas, for example, can leak into oceans and lakes from natural underground sources. These sites are called petroleum seeps.

Human activity also contributes to water pollution. Chemicals and oils from factories are sometimes dumped or seep into waterways. These chemicals are called runoff. Chemicals in runoff can create a toxic environment for aquatic life. Runoff can also help create a fertile environment for cyanobacteria, also called blue-green algae. Cyanobacteria reproduce rapidly, creating a harmful algal bloom (HAB). Harmful algal blooms prevent organisms such as plants and fish from living in the ocean. They are

associated with “dead zones” in the world’s lakes and rivers, places where little life exists below surface water.

Mining and drilling can also contribute to water pollution. Acid mine drainage (AMD) is a major contributor to pollution of rivers and streams near coal mines. Acid helps miners remove coal from the surrounding rocks. The acid is washed into streams and rivers, where it reacts with rocks and sand. It releases chemical sulfur from the rocks and sand, creating a river rich in sulfuric acid. Sulfuric acid is toxic to plants, fish, and other aquatic organisms. Sulfuric acid is also toxic to people, making rivers polluted by AMD dangerous sources of water for drinking and hygiene.

Oil spills are another source of water pollution. In April 2010, the Deepwater Horizon oil rig exploded in the Gulf of Mexico, causing oil to gush from the ocean floor. In the following months, hundreds of millions of gallons of oil spewed into the gulf waters. The spill produced large plumes of oil under the sea and an oil slick on the surface as large as 24,000 square kilometers (9,100 square miles).

Buried chemical waste can also pollute water supplies. For many years, people disposed of chemical wastes carelessly, not realizing its dangers. If not disposed of properly, radioactive waste from nuclear power plants can escape into the environment. Radioactive waste can harm living things and pollute the water.

Sewage that has not been properly treated is a common source of water pollution. Many cities around the world have poor sewage systems and sewage treatment plants. Delhi, the capital of India, is home to more than 21 million people. More than half the sewage and other waste produced in the city are dumped into the Yamuna River.

A major source of water pollution is fertilizer used in agriculture. Fertilizer is material added to soil to make plants grow larger and faster. Fertilizers usually contain large amounts of the elements nitrogen and phosphorus, which help plants grow. Rainwater washes fertilizer into streams and lakes. There, the nitrogen and phosphorus cause cyanobacteria to form harmful algal blooms. Rain washes other pollutants into streams and lakes. It picks up animal waste from cattle ranches. Cars drip oil onto the street, and rain carries it into storm drains, which lead to waterways such as rivers and seas. Rain sometimes washes chemical pesticides off of plants and into streams. Pesticides can also seep into groundwater, the water beneath the surface of the Earth.

Heat can pollute water. Power plants, for example, produce a huge amount of heat. Power plants are often located on rivers so they can use the water as a coolant. Cool water circulates through the plant, absorbing heat. The heated water is then returned to the river. Aquatic creatures are sensitive to changes in temperature. Some fish, for example, can only live in cold water. Warmer river temperatures prevent fish eggs from hatching. Warmer river water also contributes to harmful algal blooms.

Another type of water pollution is simple garbage. The Citarum River in Indonesia, for example, has so much garbage floating in it that you cannot see the water. Floating trash makes the river difficult to fish in. Aquatic animals such as fish and turtles mistake trash, such as plastic bags, for food. Plastic bags and twine can kill many ocean creatures.

Chemical pollutants in trash can also pollute the water, making it toxic for fish and people who use the river as a source of drinking water. The fish that are caught in a polluted river often have high levels of chemical toxins in their flesh. People absorb these toxins as they eat the fish.

Garbage also fouls the ocean. Many plastic bottles and other pieces of trash are thrown overboard from boats. The wind blows trash out to sea. Ocean currents carry plastics and other floating trash to certain places on the globe, where it cannot escape. The largest of these areas, called the Great Pacific Garbage Patch, is in a remote part of the Pacific Ocean. According to some estimates, this garbage patch is the size of Texas. The trash is a threat to fish and seabirds, which mistake the plastic for food. Many of the plastics are covered with chemical pollutants.

II. Answer the following questions

1. What are some visible signs of polluted water?
2. How can consuming polluted water make people sick indirectly?
3. What natural sources contribute to water pollution?
4. How does human activity, specifically runoff, impact aquatic life in waterways?
5. What is acid mine drainage (AMD) and how does it contribute to water pollution?
6. Describe the environmental impact of oil spills on water bodies.
7. How does fertilizer used in agriculture contribute to water pollution?

III. Read the statements. Say, are they True / False? If the statement false, correct it.

1. All polluted water looks clean and smells good.
2. It is unsafe to drink or swim in polluted water.
3. Only natural sources contribute to water pollution.
4. Mining and drilling activities can also cause water pollution.
5. Oil spills are a different cause of water pollution.
6. Buried chemical waste does not pollute water supplies.
7. Improperly treated sewage is a frequent cause of water pollution.

IV. Read and discuss the dialogue. What is the topic of the dialogue? What are the people's thoughts?

Sophie: Did you hear about the water pollution in our area?

Liam: Yeah, it's really bad. The oil and natural gas companies are causing a lot of damage with their drilling.

Sophie: That's not good at all. It's affecting the water we drink and use for everyday activities.

Liam: And it's not just them. Human activity is also contributing to the problem. We need to be more conscious of how our actions affect the environment.

Sophie: Absolutely. Like dumping sewage and garbage into rivers and oceans - that's just unacceptable.

Liam: I heard that there are even buried chemicals leaking into the groundwater. How scary is that?

Sophie: It's terrifying. But we can't just sit back and do nothing. We need to take action and raise awareness about water pollution.

Liam: You're right. Maybe we could organize a beach clean-up or start a campaign against single-use plastics. Small steps can make a big difference.

Sophie: Definitely. Let's get started on making changes in our community before it's too late.

V. Discuss the following questions with a group. Do a survey and present your results to the class.

1. How concerned are you about the issue of water pollution in our environment?
2. Have you ever witnessed the effects of sewage contamination in a river or ocean?
3. What steps do you think can be taken to reduce the amount of garbage polluting our waters?
4. In what ways can individual actions contribute to the prevention of water pollution from wastes?
5. Do you believe that industries should be held accountable for their role in causing water pollution?
6. How important is it to raise awareness about the impact of water pollution on marine life?
7. Have you noticed any improvements in efforts to combat water pollution in recent years?
8. What measures can communities take to ensure that rivers and oceans remain free from harmful pollutants?
9. How does water pollution affect ecosystems within rivers and oceans?
10. Do you think stricter regulations are needed to address the issue of water pollution effectively?

Task 3

I. Read the text and translate it into Ukrainian

Land Pollution

Many of the same pollutants that foul the water also harm the land. Mining sometimes leaves the soil contaminated with dangerous chemicals.

Pesticides and fertilizers from agricultural fields are blown by the wind. They can harm plants, animals, and sometimes people. Some fruits and vegetables absorb the pesticides that help them grow. When people consume the fruits and vegetables, the pesticides enter their bodies. Some pesticides can cause cancer and other diseases.

Trash is another form of land pollution. Around the world, paper, cans, glass jars, plastic products, and junked cars and appliances mar the landscape. Litter makes it difficult for plants and other producers in the food web to create nutrients. Animals can die if they mistakenly eat plastic. Garbage often contains dangerous pollutants such as oils, chemicals, and ink. These pollutants can leech into the soil and harm plants, animals, and people. Inefficient garbage collection systems contribute to land pollution. Often, the

garbage is picked up and brought to a dump, or landfill. Garbage is buried in landfills. Sometimes, communities produce so much garbage that their landfills are filling up. They are running out of places to dump their trash.

A massive landfill near Quezon City, Philippines, was the site of a land pollution tragedy in 2000. Hundreds of people lived on the slopes of the Quezon City landfill. These people made their living from recycling and selling items found in the landfill. However, the landfill was not secure. Heavy rains caused a trash landslide, killing 218 people. Sometimes, landfills are not completely sealed off from the land around them. Pollutants from the landfill leak into the earth in which they are buried. Plants that grow in the earth may be contaminated, and the herbivores that eat the plants also become contaminated. So do the predators that consume the herbivores. This process, where a chemical builds up in each level of the food web, is called bioaccumulation.

Pollutants leaked from landfills also leak into local groundwater supplies. There, the aquatic food web (from microscopic algae to fish to predators such as sharks or eagles) can suffer from bioaccumulation of toxic chemicals. Some communities do not have adequate garbage collection systems, and trash lines the side of roads. In other places, garbage washes up on beaches. Kamilo Beach, in the U.S. state of Hawai'i, is littered with plastic bags and bottles carried in by the tide. The trash is dangerous to ocean life and reduces economic activity in the area. Tourism is Hawai'i's largest industry. Polluted beaches discourage tourists from investing in the area's hotels, restaurants, and recreational activities.

Some cities incinerate, or burn, their garbage. Incinerating trash gets rid of it, but it can release dangerous heavy metals and chemicals into the air. So while trash incinerators can help with the problem of land pollution, they sometimes add to the problem of air pollution.

II. Answer the following questions

1. How does mining contribute to land pollution?
2. What are the potential health risks associated with consuming fruits and vegetables that have absorbed pesticides?
3. How does trash impact the ability of plants and producers in the food web to create nutrients?
4. Describe the tragedy that occurred at the Quezon City landfill in 2000.
5. What is bioaccumulation, and how does it occur in the context of land pollution?
6. How can pollutants leaked from landfills affect local groundwater supplies?
7. What are the potential consequences of garbage washing up on beaches for areas reliant on tourism?

III. Read the statements. Say, are they True/False? If the statement false, correct it.

1. Pollutants that harm the water do not affect the land.
2. Soil contamination can occur due to mining activities.
3. Pesticides and fertilizers do not spread through the wind.
4. Trash does not contribute to land pollution.

5. Garbage frequently includes harmful substances like oils and chemicals.
6. The landfill tragedy in Quezon City was not significant.
7. Certain cities burn their waste as a disposal method.

IV. There are four opinions of different people, discuss them. Say if you agree or disagree with the opinions.

Alex: "I really hate how people just litter everywhere without thinking about the consequences. It's disgusting. I remember walking through the park with my niece and she almost stepped on broken glass that someone had left behind. It's not fair to future generations to leave our mess for them to clean up."

Emma: "I understand that sometimes accidents happen and littering can be unintentional, but we need to take responsibility for our actions. We only have one planet and we need to take care of it. I always make sure to properly dispose of my rubbish and even participate in local clean-up events. For example, last month, I organized a beach clean-up with my friends and it was so rewarding to see the difference we made."

Josh: "I can see both sides of the argument. On one hand, I believe in protecting the environment, but on the other hand, there are times when I forget to recycle or properly dispose of my waste. It's a tough balance to strike. Just last week, I was rushing to catch the bus and I threw my empty coffee cup on the ground without even thinking. I felt guilty afterwards, but in the moment, I was too focused on getting to work on time."

Sophie: "It breaks my heart to see the land being destroyed by pollution. Nature is so beautiful and we should be doing everything we can to preserve it. I remember visiting a national park as a child and being in awe of the untouched wilderness. Seeing litter scattered everywhere now makes me feel angry and sad at the same time. We need to do better for the sake of our planet."

V. Discuss the following questions with a group. Do a survey and present your results to the class.

1. How concerned are you about the issue of land pollution in our environment?
2. Have you noticed any signs of soil contamination in your local area?
3. What do you think is the main source of pesticides in our surroundings?
4. Do you believe that the use of fertilizers has a significant impact on land pollution?
5. How can we reduce the amount of trash and garbage that contributes to land pollution?
6. In what ways can individuals help prevent further damage from land pollution?
7. Have you ever participated in a community clean-up to tackle issues related to land pollution?
8. What measures do you think should be taken to address the problem of soil contamination?
9. How do you feel about the current level of awareness regarding land pollution in society?
10. What role do you think government policies play in combating land pollution?

Module test 3

1. What is air pollution?
a) Pollution caused by contamination of rivers and lakes
b) Pollution caused by contamination of the air with harmful substances
c) Pollution caused by excessive use of fertilizers
2. What is water pollution?
a) Pollution caused by contamination of the air with harmful substances
b) Pollution caused by contamination of the water with harmful substances
c) Pollution caused by excessive use of pesticides
3. What is land pollution?
a) Pollution caused by contamination of the land with harmful substances
b) Pollution caused by contamination of the water with harmful substances
c) Pollution caused by excessive use of fertilizers
4. What is a natural disaster?
a) A sudden event caused by human activities
b) A sudden event caused by environmental factors
c) A gradual change in climate patterns
5. What are fossil fuels?
a) Fuels derived from living organisms
b) Fuels derived from decayed organic matter over millions of years
c) Fuels derived from nuclear reactions
6. What is acid rain?
a) Rainwater that is slightly acidic
b) Rainwater that is highly acidic due to pollution
c) Rainwater that is alkaline
7. What is the greenhouse effect?
a) The trapping of heat in the Earth's atmosphere
b) The cooling of the Earth's atmosphere
c) The depletion of the ozone layer
8. What is global warming?
a) A decrease in the average temperature of the Earth's atmosphere
b) An increase in the average temperature of the Earth's atmosphere
c) A decrease in the Earth's population
9. What is an oil spill?
a) The intentional release of oil into the ocean
b) The accidental release of oil into the ocean
c) The extraction of oil from underground reserves
10. What is garbage?
a) Biodegradable waste
b) Non-biodegradable waste
c) Organic waste
11. What is trash?
a) Biodegradable waste
b) Non-biodegradable waste

c) Organic waste
12. What is sewage?
a) Liquid waste from households and industries
b) Solid waste from households and industries
c) Hazardous waste from households and industries
13. 1What are human activities?
a) Activities carried out by animals
b) Activities carried out by plants
c) Activities carried out by humans that impact the environment
14. Which of the following are kinds of pollution?
a) Air, water, and land
b) Plants, animals, and humans
c) Rocks, soil, and water
15. What are fertilizers?
a) Substances used to improve soil fertility
b) Substances used to kill pests
c) Substances used to clean water pollution
16. Which of the following is NOT a type of pollution?
a) Air pollution
b) Noise pollution
c) Renewable energy
17. What is the main cause of the greenhouse effect?
a) Deforestation
b) Burning fossil fuels
c) Recycling
18. How does global warming affect the environment?
a) By causing sea levels to rise
b) By decreasing air pollution
c) By increasing biodiversity
19. What is the primary source of oil spills in oceans?
a) Natural disasters
b) Human activities such as oil drilling and transportation
c) Marine animals
20. Which of the following is an example of non-biodegradable waste?
a) Food scraps
b) Plastic bottles
c) Leaves and grass clippings

ECOLOGY VOCABULARY

Ecology - Study of interactions of living organisms with one another and with their physical environment.

Habitat - place where a particular population of a species lives

Community - the many different species that live together in a habitat

Ecosystem - a community and all of the physical aspects of its habitat (soil, air, water, weather).

Abiotic - the physical, or non-living aspects of a habitat.

Biotic - the living organisms of a habitat.

Biodiversity - number of species living within an ecosystem

Pioneer Species - the first organisms to live in a new habitat; usually small, fast growing plants

Succession - regular progression of species replacement.

Primary Succession - succession that occurs where plants have not grown before (ex: volcanoes, receding glaciers).

Secondary Succession - succession that occurs in areas where there has been previous growth (ex: forest fires, forest clearings)

Primary Productivity - the rate at which organic material is produced by photosynthetic organisms in an ecosystem

Autotroph - Organisms that make their own food, producers

Heterotroph - Organisms that consume producers for food, consumers

Producer - organisms that first capture energy and that make their own food (plants).

Consumer - organisms that consume producers for food (animals).

Trophic Level - a specific level in an ecosystem based on the organism's source of energy

Food Chain - the path of energy through the trophic levels of an ecosystem

Herbivores - second trophic level, animals that eat plants or other primary producer

Carnivores - third trophic level, animals that eat herbivores

Omnivores - both herbivores and carnivores

Detritivores - obtain energy from organic waste and dead bodies, release nutrients back into environment (decomposers: worms, bacteria, fungi)

Food Web - a complicated, interconnected group of food chains

Biomass - the dry weight of tissue and other organic matter found in a specific ecosystem

Predation - the act of one organism feeding on another

Symbiosis - two or more species live together in a close, long-term association

Parasitism - one organism feeds on and usually lives on or in another, does not usually kill the host (ticks)

Mutualism - a symbiotic relationship in which both species benefit (ants and aphids)

Commensalism - one species benefits and the other is neither harmed nor helped

Fundamental Niche - the entire range of conditions an organism is potentially able to occupy

Realized Niche - the part of its fundamental niche that a species occupies

Biome - major biological community that occurs over a large area of land

РЕКОМЕНДОВАНА ЛІТЕРАТУРА

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для здобувачів другого (магістерського) рівня вищої освіти спеціальності 101 «Екологія», ОП «Екологія»

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