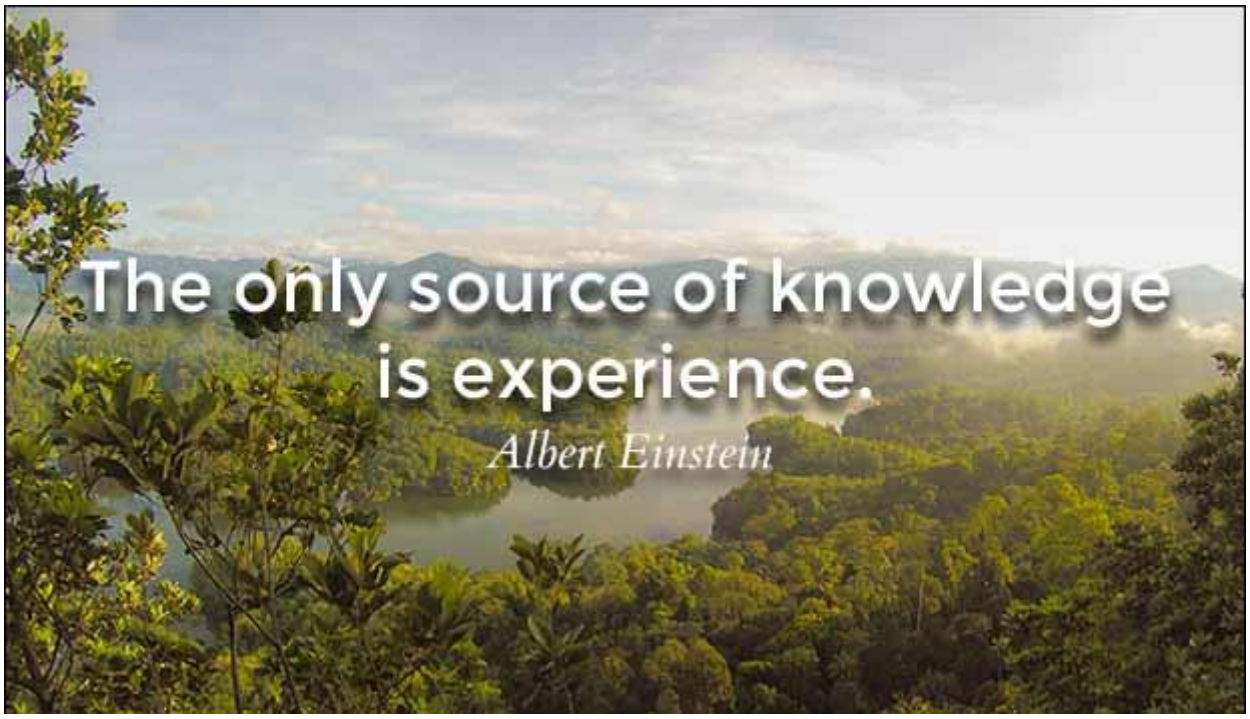
ЧЕРКАСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ІМЕНІ БОГДАНА ХМЕЛЬНИЦЬКОГО
МІНІСТЕРСТВА ОСВІТИ І НАУКИ УКРАЇНИ

Кафедра іноземних мов

Методичні рекомендації

до самостійного вивчення іноземної мови магістрантами природничих спеціальностей



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Методичні рекомендації до самостійного вивчення іноземної мови магістрантами природничих спеціальностей

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«Методичні рекомендації» призначаються для самостійного вивчення дисципліни «Основи наукової комунікації іноземною мовою» магістрантами природничих спеціальностей. «Методичні рекомендації» включають зміст курсу, теми самостійної роботи, рекомендації щодо виконання певних завдань, семестрові завдання, граматичний довідник.

Тематика самостійної роботи відповідає програмі з іноземної мови для магістрантів природничих спеціальностей

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ЗМІСТ

І. Вступ.

Проблема підготовки фахівців, які б володіли іноземною мовою професійно, є однією з важливіших завдань професійної педагогіки вищої школи. Професійна самореалізація та відповідне життя індивіду здебільш залежить від його професійної компетенції, вміння адаптуватися, реалізовувати свої професійні здібності, нахили, інтереси, бути мобільним в професійному самовизначенні та кар'єрі. Іноземна мова наближує ситуацію навчального процесу до реальних умов, що породжує потребу в знаннях, їх практичному застосуванні й забезпечує персональну зацікавленість студентів, перехід від пізнавальної мотивації до професійної.

Навчальна дисципліна „Основи наукової комунікації іноземною мовою" є необхідною складовою частиною підготовки магістрантів природничих спеціальностей. Дисципліна розрахована на магістрантів першого року навчання. Основна мета курсу – сформувати комунікативну спроможність в сфері професійного та наукового спілкування в усній і письмовій формах, вдосконалювати вміння користуватися широким тематичним словником засвоєної функціональної лексики за фахом, розширювати та збагачувати його. Активне використання навичок двостороннього перекладу, вміння використовувати різноманітні засоби читання для подальшої роботи з інформацією, навички аудіювання, реферування і анотування тексту, оволодіння новітньою фаховою інформацією через іноземні джерела також вдосконалюються у рамках курсу іноземної мови за професійним та науковим спрямуванням.

Основні завдання курсу:

1. Розвиток монологічного мовлення з використанням функціональної лексики професійного та наукового спілкування.
2. Розвиток непідготовленого діалогічного мовлення з використанням функціональної лексики та засвоєних граматичних конструкцій.
3. Вдосконалення навичок двостороннього усного перекладу в процесі ділових контактів та ділових зустрічей.
4. Вдосконалення навичок письмового перекладу та закріплення навичок аналізу граматичних і лексичних трансформацій при перекладі текстів за фахом.
5. Вдосконалення навичок ознайомчого та пошукового читання для подальшого використання отриманої інформації.
6. Вдосконалення навичок вивчаючого читання із використанням словника для подальшого розширення лексичного запасу за фахом.
7. Формування та розвиток вмінь реферування, анотування, складання резюме та аналізу текстів за фахом..
8. Розвиток навичок аудіювання англомовного тексту.
9. Закріплення навичок ділового листування.

За підсумками вивчення курсу магістрант повинен знати функціональну лексику іноземної мови професійної та наукової тематики, що вивчається протягом року; граматичний матеріал в обсязі, передбаченому програмою курсу; основні принципи, методи та лінгвістичні особливості анотування та реферування текстів; принципи та план аналізу граматичних та лексичних трансформацій при перекладі текстів за фахом.

Студент повинен вміти аналізувати робочі ситуації та обмінюватися досвідом з основних аспектів спеціальності іноземною мовою, проводити обговорення проблем загальнонаукового та професійно-орієнтованого характеру, що має на меті досягнення порозуміння; перекладати з іноземної та на іноземну мову інформацію з використанням функціональної лексики за фахом; перекладати тексти у письмовій формі, використовуючи термінологічні двомовні словники, електронні словники; аналізувати граматичні та лексичні трансформації, що виникають при перекладі з іноземної мови та на іноземну мову, в залежності від цього правильно вибирати перекладацьку стратегію; робити аналітичне опрацювання іншомовних джерел з метою отримання інформації, що необхідна для вирішення певних завдань професійно-виробничої діяльності, реферувати та анотувати англомовні джерела за фахом, працювати з інформацією та обробляти інформацію; здійснювати ефективне слухання повідомлень на іноземній мові.

ІІ. Самостійне вивчення дисципліни

Самостійна робота студентів є формою організації навчання, яка зв’язує усі блоки навчання та одночасно існує параллельно кожному з них. Самостійна робота – це процес відображення та перевтілення в свідомості студентів явищ об’єктивної дійсності. В цьому процесі самостійна робота студентів виступає як об’єкт діяльності (тобто навчальні завдання, які він мусить виконати) і як форма прояву певних дій в навчанні по виконанню цих завдань. Виходячи з цього, ми дотримуємося такого визначення самостійної роботи студентів – це запланована пізнавальна діяльність виконання творчих навчальних завдань різних видів, яка виконується самостійно з метою надбання знань, накопичення вмінь та навичок, досвіду творчої викладацької діяльності й вироблення професійно важливих якостей. Реалізація такої мети на практиці сприяє розв’язанню завдань інтеграції – повному злиттю навчання і виховання, здійсненню принципу розвиваючого навчання, формуванню особистості майбутнього фахівця.

Самостійна робота з іноземної мови вирішує такі завдання:

- удосконалення знань, навичок і вмінь набутих на практичних заняттях;
- розширення світогляду студентів;
- розвиток творчих здібностей, самостійності, естетичних смаків.

Ефективність навчальної діяльності залежить від готовності студента до самонавчання та його індивідуальних якостей. Здатність до самонавчання

є однією з найважливіших передумов не тільки успішного оволодіння іноземною мовою, але й формування навичок самостійної діяльності взагалі. Лише готуючи здатну до самонавчання особистість можна реалізувати модель фахівця нового типу, орієнтованого до умов інформаційного суспільства та широких міжнародних контактів.

У процесі організації самостійної роботи з іноземної мови необхідно враховувати як психологічні особливості особистості, так і психологічні особливості колективу: рівень його розвитку, ступень організації, психологічної, інтелектуальної та емоційної єдності. Знання психологічних особливостей студентів – необхідна передумова успішного виконання вибору відповідних форм самостійної роботи, визначення змісту цих форм організації самостійної роботи. Результативність самостійної роботи з іноземної мови передбачає врахування таких аспектів в його організації, які забезпечують взаємодію взаємозумовлених факторів впливу на особистісний розвиток фахівця та формування його комунікативної компетенції, а саме: мотиваційного, ситуативного, комунікативного, особистого і діяльнісного.

Необхідною умовою організації самостійної роботи є формування особистісної значущості навчання, яка виникає у студента внаслідок його інтересу не тільки до змісту навчального матеріалу, а й самого процесу набуття знань. Для розвитку продуктивної самостійної роботи доцільно використовувати таку її організацію, яка поступово орієнтує студентів на підвищення автономії їхнього навчання.

Основними організаційними принципами самостійної роботи з іноземної мови є принципи урахування і розвитку індивідуальних особливостей та інтересів студентів, принципи комплексності, захопленості та розвитку ініціативи і самодіяльності.

Вимоги щодо організації самостійної роботи:

- інформативність і змістовність, які сприяють реалізації практичних та загальноосвітніх цілей;
- комунікативна спрямованість: усі види самостійної роботи повинні забезпечувати користування іноземною мовою як засобом одержання і передачі інформації в типових природних ситуаціях спілкування;
- ситуативність;
- орієнтація завдань на підвищення мовленнєвої активності студентів;
- емоційність форм і способів реалізації, що сприяє підвищенню інтересу студентів до іншомовної діяльності.

Центральною проблемою щодо організації самостійної роботи є проблема забезпечення високої внутрішньої мотивації до самостійного її опанування. Продуктивність самостійної роботи з іноземної мови залежить від психолого-педагогічних умов його організації: як мотивується навчально-пізнавальна діяльність студентів; як реалізується професіонально-комунікативна компетенція студента; як здійснюється контроль його навчальних досягнень.

Самостійна робота – це самостійна навчально-пізнавальна діяльність проблемного, творчого та практичного характеру. Самостійна робота

базується на володінні студентами навичками та вміннями, набутими на практичних заняттях з іноземної мови, тому важливим є те, щоб студенти якнайповніше використовували ці навички та вміння під час самостійної роботи. Самостійна робота має позитивно впливати на навчальну діяльність студентів з іноземної мови.

Мета навчання іноземної мови за професійним спрямуванням полягає в формуванні необхідної комунікативної спроможності в своїй галузі. Студентам пропонуються різноманітні продуктивні вправи:

1) підбір та накопичення мовних засобів для вираження певних комунікативних намірів;
2) тлумачення мовних засобів;
3) складання глосаріїв;
4) творчі завдання, які пов’язані з текстом,
5) коментування подій та фактів;
6) формування ідей, які виражено у тексті неясно;
7) висловлювання свого ставлення до фактів і подій;
8) аргументація свого погляду щодо наведених у тексті тверджень;
9) обґрунтування висновків;
10) використання фактів з тексту для описуваного повідомлення.

III. Зміст курсу та теми до самостійної роботи

Згідно з робочою програмою з дисципліни на самостійну роботу студентів виносяться усні та письмові завдання для закріплення тем, опрацьованих на практичних заняттях.

Форми контролю:

1) усна (читання та переклад текстів, анотації, завдання з діалогічного та монологічного мовлення);
2) письмова (лексичні та граматичні вправи, складання термінологічних словників).

IV. Як самостійно працювати над темою

Якщо вам необхідно самостійно опрацювати тему, ми рекомендуємо вам працювати за такою схемою:

- Прочитайте и перекладіть основний текст теми.
- Випишіть незнайомі слова та словосполучення (попрацюйте зі словником).
- Виконайте лексичні вправи на ознайомлення та закріплення з новими термінами та термінологічними словосполученнями.
- Дайте відповіді на запитання до тексту.
- Прочитайте граматичний матеріал до теми заняття.
- Виконайте граматичні вправи на автоматизацію дій з новими

граматичними структурами.

- Запишіть свої запитання до викладача, якщо щось залишилося для вас нез'ясованим.

V. Як підготуватися до анотації статті

Якщо ви отримали завдання підготувати анотацію статті, ми рекомендуємо вам працювати за такою схемою:

1. Перегляньте англомовну газету в паперовому або електронному варіанті.
2. Виберіть статтю, заголовок якої здається вам цікавим.
3. Прочитайте статтю, користуючись словником та виписуючи невідомі слова та словосполучення.
4. Повторіть зразок для анотації статті.
5. Виберіть цитати з основною інформацією статті.
6. Проанотуйте статтю за зразком, використовуючи вибрані цитати в письмовій формі.
7. На подальших етапах, після ряду письмових анотацій, ви зможете анотувати статті і в усній формі.

VI. Як підготуватися до обгрунтування наукового дослідження

Якщо ви отримали завдання підготувати обгрунтування наукового дослідження, ми рекомендуємо вам працювати за такою схемою:

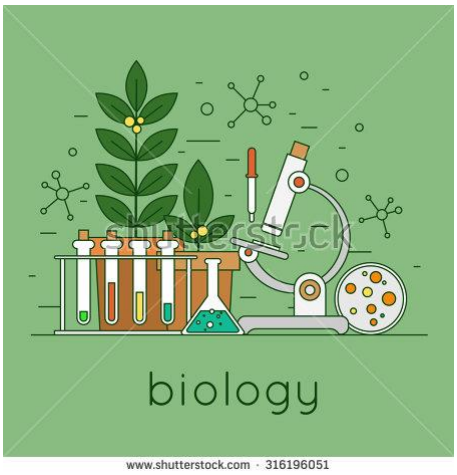
1. Прочитайте та перекладіть зразок для обгрунтування наукового дослідження.
2. Перегляньте вступ до магістерського дослідження.
3. Використовуючи речення-кліше зразку, перекладіть основну інформацію вступу до магістерської роботи.
4. Підготуйте обгрунтування наукового дослідження в друкованому варіанті .
5. Підготуйтеся до усної презентації обгрунтування.

VII. Семестрові завдання

Unit I

BIOLOGY AS A SCIENCE

Text 1



Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy.

Modern biology is a vast and eclectic field, composed of many branches and subdisciplines. However, despite the broad scope of biology, there are certain general and unifying concepts within it that govern all study and research, consolidating it into single, coherent fields.

In general, biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the synthesis and creation of new species. It is also understood today that all organisms survive by consuming and transforming energy and by regulating their internal environment to maintain a stable and vital condition.

1. Find the English equivalents in the text:

Стосуватися вивчення, складатися з галузей, керувати дослідженням, пов'язані галузі, визнавати основною одиницею, споживання та перетворення енергії, підтримувати стабільні життєві умови.

2. Translate the following terms and terminological expressions:

Living organism, growth, distribution, taxonomy, subdiscipline, cell, gene, heredity, species, internal environment.

3. Find the definitions:

Cell	a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.
Gene	a unit of heredity that is transferred from a parent to offspring and is held to determine some characteristic of the offspring
Species	the smallest structural and functional unit of an organism, typically microscopic and consisting of cytoplasm and a nucleus enclosed in a membrane

4. Answer the following questions:

1. What does biology concern with?
2. What does biology recognize as the basic unit of life?

3. By what way do all organisms survive?

5. Give a summary of the text.

6. Read and translate the model to the annotation of the article:

ANNOTATION

1. I was supposed to annotate the following article.
2. It was published in the British journal (magazine, newspaper) …
3. The title (headline) of the article is …
4. The author of the article is …
   (The article was written by a special correspondent of the journal).

5. The article represents a definite interest from the point of view …
6. It gives facts (tables, diagrams, figures, schemes).
7. The article considers the problem of …
8. It describes (discusses) …
9. The article draws the reader's attention to …
10. The author points out that …
11. He stresses that …
12. The writer analyses the achievements of …
13. He approves …
14. The key problem of the article is …
15. To my mind (in my opinion) …
16. The article is worth reading because the problem is of great interest (of good use, actual, informative).

Text 2

Subdisciplines of biology are defined by the scale at which organisms are studied, the kinds of organisms studied, and the methods used to study them:

Biochemistry examines the rudimentary chemistry of life.

Molecular biology studies the complex interactions among biological molecules.

Botany studies the biology of plants.

Cellular biology examines the basic building-block of all life, the cell.

Physiology examines the physical and chemical functions of tissues, organs, and organ systems of an organism.

Evolutionary biology examines the processes that produced the diversity of life. Ecology examines how organisms interact in their environment.

1. Find the English equivalents in the text:

Визначатися, вивчати організми, складні взаємодії, фізичні функції, тканина, різноманіття життя, взаємодіяти, навколишнє середовище.

2. Translate the following terms and terminological expressions:

Biological molecule, plant, chemical functions, tissue, organ system, diversity of life, environment.

3. Find the definitions:

Tissue	an individual animal, plant, or single-celled life form
Organ	a part of an organism that is typically self-contained and has a specific vital function
Organism	any of the distinct types of material of which animals or plants are made, consisting of specialized cells and their products

4. Answer the following questions:

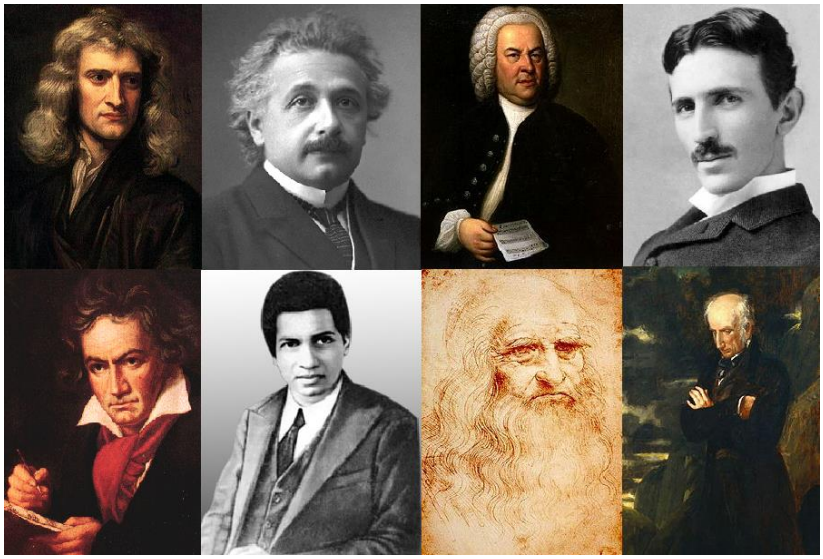
1. What are the main subdisciplines of biology?
2. What does molecular biology study?
3. What does physiology examine?
4. What does ecology examine?

5. Give a summary of the text.

6. Make an annotation of the article:

Do Great Minds Think Alike?

(From Wavelength Intermediate. By Kathy Burke and Ben Wordon)



What makes a person so brilliant that they change the course of history? Is there a recipe for genius – a list of ingredients that all geniuses share? Perhaps not, but geniuses really seem to have quite a lot in common.

For example, geniuses often come from an unhappy background and many are orphans. One study of important creators found that twenty per cent of them lost one or both parents in childhood. Tolstoy, Michelangelo, Bach, Raphael, Wagner and Charlie Chaplin all lost parents before they were ten years old. Seventy-five per cent of the geniuses in another study came from families affected by poverty, divorce, abuse, alcoholism and mental illness.

What is the connection? Perhaps stress made the children escape into there own private worlds – they felt different from other children and so decided to become even more different. Or were they working hard to please parents who were not there?

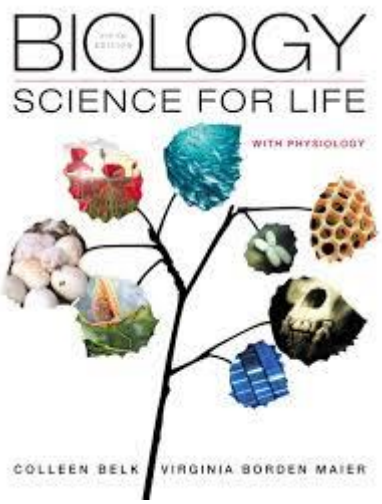
Geniuses are also incredibly productive. Picasso is responsible for 20,000 works. Thomas Edison, inventor of the light bulb, patented 1093 inventions. Freud produced 330 publications. Of course, high productivity will include failures, but what makes geniuses different is that they do not give up when they fail – they build on failure to create their biggest successes. Freud had his breakthrough about the importance of dreams after spending years on another project, which finally came to nothing. He was already over forty – but according to one study, most great works are done between the ages of thirty-five and forty-five. Whenever their great creations come, however, one thing seems to connect all geniuses (even young ones like Mozart) – a "ten-year rule". Geniuses have always worked hard in their chosen areas for at least a decade before they create their first masterpieces.

Finally, could genius also be a question of simple childlike curiosity? Einstein often said that his greatest discoveries came from simply asking the same kinds of questions children ask – but unlike most adults, he never stopped asking them.

(*adapted from The Sunday Times by The Moscow News)*

Text 3

History



Although modern biology is a relatively recent development, sciences related to and included within it have been studied since ancient times. Natural philosophy was studied as early as the ancient civilizations of Mesopotamia, Egypt, the Indian subcontinent, and China. However, the origins of modern biology and its approach to the study of nature are most often traced back to ancient Greece.

While the formal study of medicine dates back to Hippocrates (460 BC – 370 BC), it was Aristotle (384 BC – 322 BC) who contributed most extensively to the development of biology. Especially important

are his History of Animals and other works where he showed naturalist leanings, and later more empirical works that focused on biological causation and the diversity of life.

Aristotle's successor at the Lyceum,Theophrastus, wrote a series of books on botany that survived as the most important contribution of antiquity to the plant sciences, even into the Middle Ages.

1. Find the English equivalents in the text:

Бути пов'язаним з, з давніх часів, джерела (витоки), підхід до вивчення, прослідковуватися, зробити внесок, зосереджуватися на, причинно-настідковий зв'язок, різноманітність життя, спадкоємець.

2. Translate the following terms and terminological expressions:

Modern biology, natural philosophy, study of medicine, naturalist leanings, empirical work, biological causation, the diversity of life, plant science.

3. Find the definitions:

Biology	the science or practice of the diagnosis, treatment, and prevention of disease
Botany	the scientific study of plants, including their physiology, structure, genetics, ecology, distribution, classification, and economic importance.
Medicine	the study of living organisms, divided into many specialized fields that cover their morphology, physiology, anatomy, behavior, origin, and distribution

4. Answer the following questions:

1. Is biology a modern science?
2. When are the origins of modern biology traced back to?
3. Who contributed most extensively to the development of biology?
4. What was the most important contribution of antiquity to the plant sciences?

5. Give a summary of the text.

6. Make an annotation of the article:

A history of biology in biography

Charles Darwin

EDITED BY EUGENE M. MCCARTHY, PHD

The first and, in some ways, the best Charles Darwin biography was written by Darwin himself. Here, to fill out the story, Darwin's original text is offered with added illustrations, links, and explanatory notes. The notes are either inserted at the bottom of each page or, more often, into the text itself.

First published in *The Life and Letters of Charles Darwin* (Francis Darwin, ed., 1887. London: John Murray), the autobiography was written in 1876, except for the addendum, written in 1881. The first page of the original is dated May 31st, 1876, and bears the title *Recollections of the Development of my Mind and Character*. This short biography of Charles Darwin — a summary of his life expressed in his own words.

Charles Darwin's father, Dr. Robert Waring Darwin (1766–1848), was a wealthy physician.[2]His own father, Erasmus, had been the friend of Charles' other grandfather, Josiah Wedgwood. This connection led to the marriage of Charles' parents. As Desmond and Moore (1991, p. 11) comment, "Marriage for the Darwins, like everything else, was managed by old Erasmus…they wed in April, 1796, a year after Josiah's death." With her, Susannah brought a £25,000 inheritance. At the time, a British laborer made about 10 shillings a week. Today, a laborer in the U.S. makes around $400 in the same period of time, so Susannah Darwin's inheritance was the equivalent of about $20,000,000 today.

Text 4

Scholars of the medieval Islamic world who wrote on biology included al-Jahiz (781–869), Al-Dinawari (828–896), who wrote on botany, and Rhazes (865–925) who wrote on anatomy and physiology.

Medicine was especially well studied by Islamic scholars working in Greek philosopher traditions, while natural history drew heavily on Aristotelian thought, especially in upholding a fixed hierarchy of life.

Biology began to quickly develop and grow with

Anton van Leeuwenhoek's dramatic improvement of the microscope. It was then that scholars discovered spermatozoa, bacteria,infusoria and the diversity of microscopic life.

Investigations by Jan Swammerdam led to new interest in entomology and helped to develop the basic techniques of microscopic dissection.

1. Find the English equivalents in the text:

Науковці середньовічного світу, фіксована ієрархія життя, різке покращення, дослідження, озвивати основні прийоми, препарування.

2. Translate the following terms and terminological expressions:

Anatomy, physiology, natural history, hierarchy of life, microscope, spermatozoa, bacteria,infusoria, microscopic life, entomology, microscopic dissection.

3. Find the definitions:

Anatomy	the branch of zoology concerned with the study of insects
Physiology	the branch of biology that deals with the normal functions of living organisms and their parts
Entomology	the branch of science concerned with the bodily structure of humans, animals, and other living organisms

4. Answer the following questions:

1. What scholars of the medieval world wrote on biology?
2. When did biology begin to quickly develop?
3. What helped to develop the basic techniques of microscopic dissection?

5. Give a summary of the text.

6. Make an annotation to the article:

A history of biology in biography

Mary Anning

BY EUGENE M. MCCARTHY, PHD

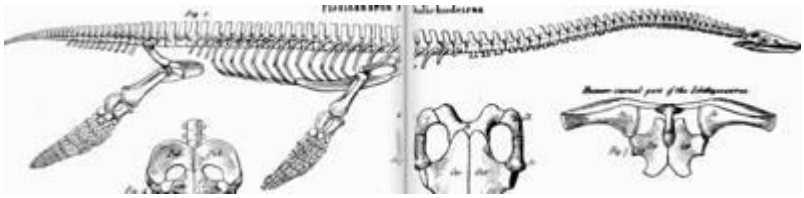
Throughout her life, Mary Anning (1799-1847), the great fossil hunter, lived in the little seaside town of Lyme Regis on the south coast of England. The simple serendipity of this place of birth, together with the gift of a penetrating eye, would bring her lasting fame.

Mary began her career early. When she only ten, her father, Richard Anning, died of the combined effects of tuberculosis and a serious fall. He had been a cabinetmaker and carpenter, who supplemented his income by collecting fossils — then known as "curiosities" — down on the beach and selling them to tourists. It was he who taught Mary how to find and clean fossils.

Her regular method of searching was to comb the beaches near Lyme for anyfossiliferous rocks that might have fallen from the cliffs along the shore. This was the famous Blue Lias formation, an abundant source of Jurassic ammonites andbelemnites, and of the occasional fossil vertebrate as well.

Mary Anning went on to make many other important discoveries, including several additional well-preserved ichthyosaur skeletons. From a scientific standpoint, however, perhaps her most important find was a largely intact plesiosaur (*Plesiosaurus dolichodeirus*), which she located in 1824. This "grand fossil skeleton of Lyme-Regis," with its incredible snakelike neck, was an immediate international sensation. Its illustration from the original description (Conybeare 1824) appears below.

Indeed, she made so many discoveries that her finds inspired what was apparently the earliest attempt to reconstruct the appearance of the Mesozoic world. *Duria Antiquior* (*Ancient Dorset*), a painting based on Mary Anning's discoveries by Henry De la Beche, was the first pictorial representation of a scene from deep time.



Text 5

Advances in microscopy also had a profound impact on biological thinking. In the early 19th century, a number of biologists pointed to the central importance of the cell.

Then, in 1838, Schleiden and Schwann began promoting the now universal ideas that:

(1) the basic unit of organisms is the cell

2) individual cells have all the characteristics of life, although they opposed the idea that

(3) all cells come from the division of other cells.

Thanks to the work of Robert Remak and Rudolf Virchow, however, by the 1860s most biologists accepted all three tenets of what came to be known as cell theory.

Meanwhile, taxonomy and classification became the focus of natural historians. Carl Linnaeus published a basic taxonomy for the natural world in 1735 (variations of which have been in use ever since), and in the 1750s introduced scientific names for all his species.

Georges-Louis Leclerc, Comte de Buffon, treated species as artificial categories and living forms as malleable—even suggesting the possibility of common descent. Though he was opposed to evolution, Buffon is a key figure in the history of evolutionary thought; his work influenced the evolutionary theories of both Lamarck and Darwin.

1. Complete the sentences:

1. The development of … had a great influence on biological thinking.
2. .The basic unit of organisms is …
3. … introduced scientific names for all his species.
4. Buffon's work influenced the evolutionary theories of…

2. Agree or disagree with the statements:

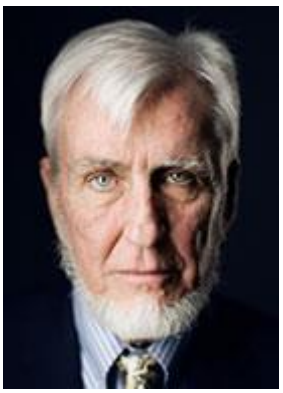
1. The biologists of the 19th century consider the cell to be the basic unit.
2. The cell theory was developed due to the works of Schleiden and Schwann.
3. Carl Linnaeus published a basic taxonomy.
4. … is a key figure in the history of evolutionary thought.

3. Put 4 questions on the text and ask your partner to answer them.

4. Make an annotation of the article:

The Nobel Prize in Physiology or Medicine 2014

John O'Keefe, May-Britt Moser, Edvard I. Moser



The 2014 Nobel Prize in Physiology or Medicine is awarded to Dr. John M. O'Keefe, Dr. May-Britt Moser and Dr. Edvard I. Moser for their discoveries of nerve cells in the brain that enable a sense of place and navigation. These discoveries are ground breaking and provide insights into how mental functions are represented in the brain and how the brain can compute complex cognitive functions and behaviour.

An eternal map of the environment and a sense of place are needed for recognizing and remembering our environment and for navigation. This navigational ability, which requires integration of multi-modal sensor information, movement execution and memory capacities, is one of the most complex of brain functions.

The work of the 2014 Laureates has radically altered our understanding of these functions. John O'Keefe discovered place cells in the hippocampus that signal position and provide the brain with spatial memory capacity. May-Britt Moser and Edvard I. Moser discovered in the medial entorhinal cortex, a region of the brain next to hippocampus, grid cells that provide the brain with an internal coordinate system essential for navigation.

Together, the hippocampal place cells and the entorhinal grid cells form interconnected nerve cell networks that are critical for the computation of spatial maps and navigational tasks. The work by John O'Keefe, May-Britt Moser and Edvard Moser has dramatically changed our understanding of how fundamental cognitive functions are performed by neural circuits in the brain and shed new light onto how spatial memory might be created.

Text 6

Serious evolutionary thinking originated with the works of Jean-Baptiste Lamarck, who was the first to present a coherent theory of evolution. He posited that evolution was the result of environmental stress on properties of animals, meaning that the more frequently and rigorously an organ was used, the more complex and efficient it would become, thus adapting the animal to its environment. Lamarck believed that these acquired traits could then be passed on to the animal's offspring, who would further develop and perfect them.

However, it was the British naturalist Charles Darwin, combining the biogeographical approach of Humboldt, the uniformitarian geology of Lyell, Malthus's writings on population growth, and his own morphological expertise and extensive natural observations, who forged a more successful evolutionary theory based on natural selection; similar reasoning and evidence led Alfred Russel

Wallace to independently reach the same conclusions. Although it was the subject of controversy (which continues to this day), Darwin's theory quickly spread through the scientific community and soon became a central axiom of the rapidly developing science of biology.

1. **Complete the sentences:**

1. … presented a coherent theory of evolution.
2. Lamark considered the evolution to be the result of …
3. … developed a more successful evolutionary theory.
4. …became a central axiom of the development of biology science.

2. **Agree or disagree with the statements:**

1. The use and development of an organ adapt the animal to its environment.'
2. These acquired traits could not be passed on to the animal's offspring.
3. Darwin's theory was based on natural selection.
4. Darwin's theory did not spread through the scientific community.

3. **Put 4 questions on the text and ask your partner to answer them.**

4. **Make an annotation of the article:**

Immunity researchers awarded Nobel Prize in medicine

Topic: Nobel Prize 2011

Immunity researchers awarded Nobel Prize in medicine

© AFP/ Jonathan Nackstrand

15:51 03/10/2011

STOCKHOLM, October 3 (RIA Novosti)

The Nobel Prize in physiology or medicine was awarded on Monday to three scientists for their discoveries about the immune system that could contribute to the treatment and prevention of viral diseases and cancer, the Nobel committee at Stockholm Karolinska institute said.

"Their work has opened up new avenues for the development of prevention and therapy against infections, cancer and inflammatory disease," the institute said in a statement.

French scientist Jules Hoffmann, the U.S. Bruce Beutler and Canadian-born Ralph Steinman will share the $1.5 million award.

The prize, established by Swedish industrialist Alfred Nobel in his will in 1895, also covers chemistry, medicine, literature, peace and economics.

Text 7

The discovery of the physical representation of heredity came along with evolutionary principles and population genetics. In the 1940s and early 1950s, experiments pointed to DNA as the component of chromosomes that held the trait-carrying units that had become known as genes.

A focus on new kinds of model organisms such as viruses and bacteria, along with the discovery of the double helical structure of DNA in 1953, marked the transition to the era of molecular genetics.

From the 1950s to present times, biology has been vastly extended in the molecular domain. The genetic code was cracked by Har Gobind Khorana, Robert W. Holley and Marshall Warren Nirenberg after DNA was understood to contain codons. Finally, the Human Genome Project was launched in 1990 with the goal of mapping the general human genome. This project was essentially completed in 2003, with further analysis still being published. The Human Genome Project was the first step in a globalized effort to incorporate accumulated knowledge of biology into a functional, molecular definition of the human body and the bodies of other organisms.

1. Find the English equivalents in the text:

Відкриття, спадковість, генетика популяції, носій характерних рис (особливостей), подвійна спіральна структура, ознаменувати перехід, значно розширитися, молекулярна галузь (сфера), зламати генетичний код, містити кодони, подальший аналіз.

2. Translate the following terms and terminological expressions:

Evolutionary principles, the component of chromosomes, gene, viruses and bacteria, the double helical structure of DNA, genetic code, to contain codons, human genome, molecular definition of the human body.

3. Find the definitions:

Gene	single celled microbes
Virus	the molecular unit of heredity of a living organism

Bacteria	a small infectious agent that replicates only inside the living cells of other organisms.

4. Answer the following questions:

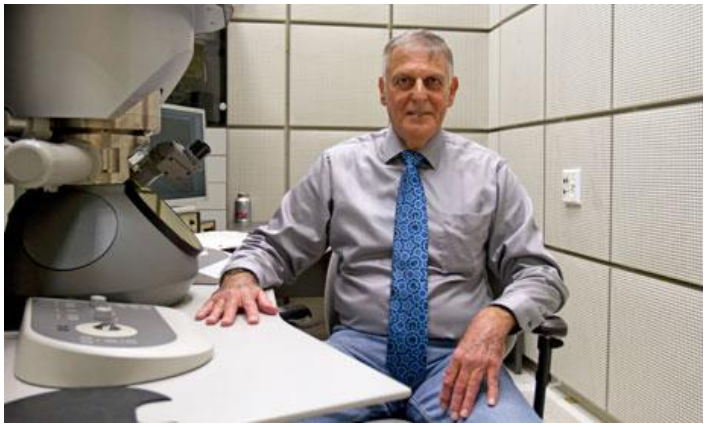
1. What did experiments point to DNA in the 1940s and early 1950s?
2. What marked the transition to the era of molecular genetics?
3. Whom was the genetic code cracked by?
4. What was the goal of the Human Genome Project?

5. Make an annotation of the article:

Nobel Prize in Chemistry for dogged work on 'impossible' quasicrystals

Daniel Shechtman, who has won the chemistry Nobel for discovering quasicrystals, was initially lambasted for 'bringing disgrace' on his research group

Ian Sample, science correspondent
guardian.co.uk, Wednesday 5 October 2011 17.47 BST



Daniel Shechtman, 70, a researcher at Technion-Israel Institute of Technology in Haifa, received the award for discovering seemingly impossible crystal structures in frozen gobbets of metal that resembled the beautiful patterns seen in Islamic mosaics.

Images of the metals showed their atoms were arranged in a way that broke well-establised rules of how crystals formed, a finding that fundamentally altered how chemists view solid matter.

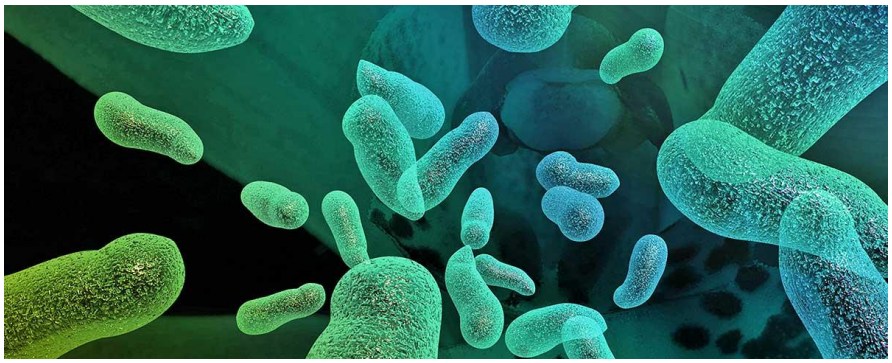
In addition to the kudos of the award, Shechtman receives 10 million Swedish kronor (£934,000).

Crystallised materials are normally made up of "unit cells" of atoms that repeat over and over to make a single, uniform structure. This kind of crystal structure makes graphite a good lubricant, for example, because it can cleave easily across certain planes of weakness.

"His discovery was extremely controversial. In the course of defending his findings, he was asked to leave his research group," the Nobel committee at the Royal Swedish Academy of Sciences said in a statement. "However, his battle eventually forced scientists to reconsider their conception of the very nature of matter … Scientists are currently experimenting with using quasicrystals in different products such as frying pans and diesel engines."

Text 8

Cell theory



Cell theory states that the cell is the fundamental unit of life, and that all living things are composed of one or more cells or the secreted products of those cells (e.g. shells).

All cells arise from other cells through cell division. In multicellular organisms, every cell in the organism's body derives ultimately from a single cell in a fertilized egg.

The cell is also considered to be the basic unit in many pathological processes. In addition, the phenomenon of energy flow occurs in cells in processes that are part of the function known as metabolism.

Finally, cells contain hereditary information (DNA), which is passed from cell to cell during cell division.

1. Find the English equivalents in the text:

Констатувати (заявляти), складатися з, продукт секреції, оболонка, походити з, в кінцевому рахунку, запліднена яйцеклітина, вважатися, на додаток, явище, потік енергії, містити спадкову інформацію.

2. Translate the following terms and terminological expressions:

Cell theory, fundamental unit of life, cell division, multicellular organisms, fertilized egg, pathological processes, metabolism, hereditary information, DNA.

3. Find the definitions of the notions:

Shell	the set of life-sustaining chemical transformations within the cells of living organisms.
Metabolism	a hard outside covering
DNA	a molecule that encodes the genetic instructions used in the development and functioning of all known living organisms and many viruses

4. Answer the following questions:

1. What is the fundamental unit of life?
2. What do all cells arise from?

3. What does every cell in the multicellular organism derive from?
4. What information do cells contain?

5. Give a summary of the text.

6. Make an annotation of the article:

The Nobel Prize in Chemistry 2014
Eric Betzig, Stefan W. Hell, William E. Moerner



The Nobel Prize in Chemistry 2014 was awarded jointly to Eric Betzig, Stefan W. Hell and William E. Moerner ***"for the development of super-resolved fluorescence microscopy"***

Surpassing the limitations of the light microscope

For a long time optical microscopy was held back by a presumed limitation: that it would never obtain a better resolution than half the wavelength of light. Helped by fluorescent molecules the Nobel Laureates in Chemistry 2014 ingeniously circumvented this limitation. Their ground-breaking work has brought optical microscopy into the nanodimension.

In what has become known as nanoscopy, scientists visualize the pathways of individual molecules inside living cells. They can see how molecules create synapses between nerve cells in the brain; they can track proteins involved in Parkinson's, Alzheimer's and Huntington's diseases as they aggregate; they follow individual proteins in fertilized eggs as these divide into embryos.

It was all but obvious that scientists should ever be able to study living cells in the tiniest molecular detail. In 1873, the microscopist Ernst Abbe stipulated a physical limit for the maximum resolution of traditional optical microscopy: it could never become better than 0.2 micrometres. **Eric Betzig**, **Stefan W. Hell**and **William E. Moerner** are awarded the Nobel Prize in Chemistry 2014 for having bypassed this limit. Due to their achievements the optical microscope can now peer into the nanoworld.

Two separate principles are rewarded. One enables the method *stimulated emission depletion (STED) microscopy*, developed by Stefan Hell in 2000. Two laser beams are utilized; one stimulates fluorescent molecules to glow, another cancels out all fluorescence except for that in a nanometre-sized volume. Scanning

over the sample, nanometre for nanometre, yields an image with a resolution better than Abbe's stipulated limit.

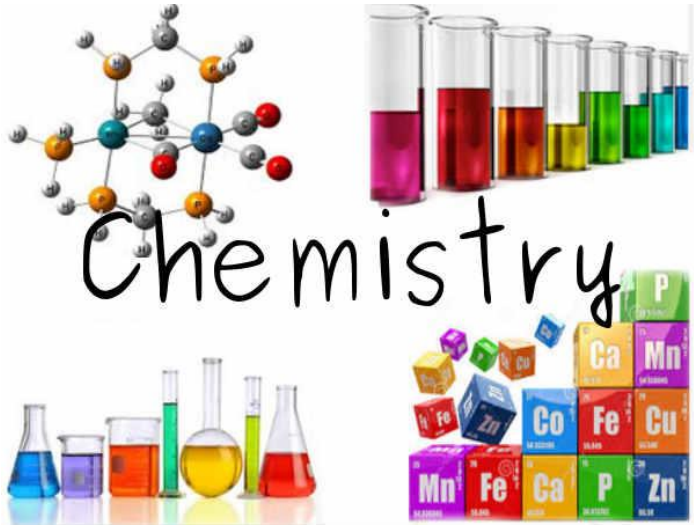
Eric Betzig and William Moerner, working separately, laid the foundation for the second method, *single-molecule microscopy*. The method relies upon the possibility to turn the fluorescence of individual molecules on and off. Scientists image the same area multiple times, letting just a few interspersed molecules glow each time. Superimposing these images yields a dense super-image resolved at the nanolevel. In 2006 Eric Betzig utilized this method for the first time.

Today, nanoscopy is used world-wide and new knowledge of greatest benefit to mankind is produced on a daily basis.

Unit II
CHEMISTRY AS A SCIENCE

Text 1

Chemistry



Chemistry is a branch of physical science that studies the composition, structure, properties and change of matter. Chemistry is chiefly concerned with atoms and molecules and their interactions and transformations, for example, the properties of the chemical bonds formed between atoms to create chemical compounds.

As such, chemistry studies the involvement of electrons and various forms of energy in photochemical reactions, oxidation-reduction reactions, changes in phases of matter, and separation of mixtures. Preparation and properties of complex substances, such as alloys, polymers, biological molecules, and pharmaceutical agents are considered in specialized fields of chemistry.

Chemistry is sometimes called *the central science* because it bridges other natural sciences like physics, geology and biology. Chemistry is a branch of physical science but distinct from physics.

1. Find the English equivalents in the text:

Вивчати властивості, мати справу з атомами, властивості хімічних зв’язків, хімічні сполуки, розглядатися, сплав, поєднувати природничі науки, відмінний.

2. Translate the following terms and terminological expressions:

Change of matter, interaction, chemical bond, chemical compound, photochemical reaction, oxidation-reduction reactions, separation of mixtures, complex substances, alloys, polymers, biological molecules, pharmaceutical agents.

3. Find the definitions:

Biology	the science that deals with the earth's physical structure and substance, its history, and the processes that act on it.
Physics	the branch of science concerned with the nature and properties of matter and energy
Geology	the study of living organisms, divided into many specialized fields

4. Answer the following questions:

1. What does chemistry study?
2. What does chemistry concern with?
3. What is considered in specialized fields of chemistry?
4. Why is chemistry called the central science?

5. Give a summary of the text.

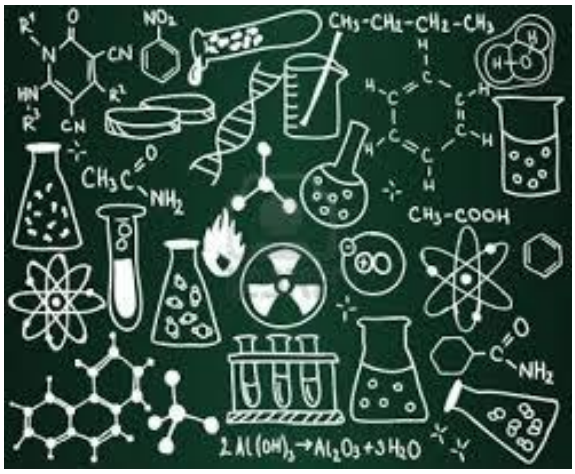
6. Read and translate the model to the annotation of the article:

ANNOTATION

1. I was supposed to annotate the following article.
2. It was published in the British journal (magazine, newspaper) …
3. The title (headline) of the article is …
4. The author of the article is …
   (The article was written by a special correspondent of the journal).
5. The article represents a definite interest from the point of view …
6. It gives facts (tables, diagrams, figures, schemes).
7. The article considers the problem of …
8. It describes (discusses) …
9. The article draws the reader’s attention to …
10. The author points out that …
11. He stresses that …
12. The writer analyses the achievements of …
13. He approves …
14. The key problem of the article is …
15. To my mind (in my opinion) …
16. The article is worth reading because the problem is of great interest (of good use, actual, informative).

Text 2

Definition



In retrospect, the definition of chemistry has changed over time, as new discoveries and theories add to the functionality of the science. The term "chymistry", in the view of noted scientist Robert Boyle in 1661, meant the subject of the material principles of mixed bodies.

In 1663, "chymistry" meant a scientific art, by which one learns to dissolve bodies, and draw from them the different substances on their composition, and how to unite them again, and exalt them to a higher perfection - this definition was used by chemist Christopher Glaser.

In 1837, Jean-Baptiste Dumas considered the word "chemistry" to refer to the science concerned with the laws and effects of molecular forces. This definition further evolved until, in 1947, it came to mean the science of substances: their structure, their properties, and the reactions that change them into other substances - a characterization accepted by Linus Pauling.

More recently, in 1998, the definition of "chemistry" was broadened to mean the study of matter and the changes it undergoes, as phrased by Professor Raymond Chang.

1. Find the English equivalents in the text:

Означати предмет, розчиняти, посилювати (звеличувати), закони та наслідки, властивості речовини, бути прийнятим, розширитися, зазнати змін.

2. Translate the following terms and terminological expressions:

The definition of chemistry, composition, molecular forces, the structure of substances, the study of matter.

3. Find the definitions:

Molecule	physical substance in general, as distinct from mind and spirit; which occupies space and possesses rest mass, esp. as distinct from energy
Substance	a particular kind of matter with uniform properties
Matter	a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction

4. Answer the following questions:

1. Has the definition of chemistry changed over time?

2. What definition was used by chemist Christopher Glaser?
3. What characterization was accepted by Linus Pauling?
4. How was the definition of chemistry broadened?

5. Give a summary of the text.

6. Make an annotation to the article:

Do Great Minds Think Alike?

(From Wavelength Intermediate. By Kathy Burke and Ben Wordon)

What makes a person so brilliant that they change the course of history? Is there a recipe for genius – a list of ingredients that all geniuses share? Perhaps not, but geniuses really seem to have quite a lot in common.

For example, geniuses often come from an unhappy background and many are orphans. One study of important creators found that twenty per cent of them lost one or both parents in childhood. Tolstoy, Michelangelo, Bach, Raphael, Wagner and Charlie Chaplin all lost parents before they were ten years old. Seventy-five per cent of the geniuses in another study came from families affected by poverty, divorce, abuse, alcoholism and mental illness.

What is the connection? Perhaps stress made the children escape into there own private worlds – they felt different from other children and so decided to become even more different. Or were they working hard to please parents who were not there?

Geniuses are also incredibly productive. Picasso is responsible for 20,000 works. Thomas Edison, inventor of the light bulb, patented 1093 inventions. Freud produced 330 publications. Of course, high productivity will include failures, but what makes geniuses different is that they do not give up when they fail – they build on failure to create their biggest successes. Freud had his breakthrough about the importance of dreams after spending years on another project, which finally came to nothing. He was already over forty – but according to one study, most great works are done between the ages of thirty-five and forty-five. Whenever their great creations come, however, one thing seems to connect all geniuses (even young ones like Mozart) – a “ten-year rule”. Geniuses have always worked hard in their chosen areas for at least a decade before they create their first masterpieces.

Finally, could genius also be a question of simple childlike curiosity? Einstein often said that his greatest discoveries came from simply asking the same kinds of questions children ask – but unlike most adults, he never stopped asking them. (*adapted from The Sunday Times by The Moscow News)*

Text 3

Chemistry as a Science

Under the influence of the new empirical methods propounded by Sir Francis Bacon and others, a group of chemists at Oxford, Robert Boyle, Robert Hooke and John Mayow began to reshape the old alchemical traditions into a scientific discipline.

Boyle in particular is regarded as the founding father of chemistry due to his most important work, the classic chemistry text *The Sceptical Chymist* where the differentiation is made between the claims of alchemy and the empirical scientific discoveries of the new chemistry. He formulated Boyle's law, rejected the classical "four elements" and proposed a mechanistic alternative of atoms and chemical reactions that could be subject to rigorous experiment.

1. Find the English equivalents in the text:

Пропагувати емпіричні методи, перетворити на наукову дисципліну, вважатися засновником, твердження алхімії, відхилити, бути предметом суворого експерименту.

2. Translate the following terms and terminological expressions:

Empirical method, a chemist, scientific discipline, scientific discovery, Boyle's law, chemical reaction.

3. Find the definitions:

Science	a scientific procedure undertaken to make a discovery, test a hypothesis, or demonstrate a known fact
Method	systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses
Experiment	the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment

4. Answer the following questions:

1. Who began to reshape the old alchemical traditions into a scientific discipline?
2. Who is regarded as the founding father of chemistry?
3. What did Boyle formulate and propose?

5. Give a summary of the text.

6. Make an annotation of the article:

The allure of aluminium

Daniel Rabinovich outlines the history, properties and uses of aluminium — one of the most versatile, pervasive and inexpensive metals today, yet it was considered a rare and costly element only 150 years ago.

It is hard to believe that aluminium was once more expensive than gold. Even though element 13 is the most abundant metal in the Earth's crust (~8%) and is present in more than 270 different minerals, its high affinity for oxygen and the chemical stability of its oxides and silicates precluded its isolation in pure form for a long time. The first pure sample of aluminium was obtained in 1827 by the German chemist Friedrich Wöhler, who also began studying its fascinating physical and chemical attributes.

The French chemist Henri Sainte-Claire Deville (1818–1881) developed a method of preparing larger quantities of aluminium in 1854, and soon published the first comprehensive book describing its manufacture, properties and emerging applications .

The attractive properties of the newfangled metal quickly became clear, including low density, high tensile strength and malleability, good thermal and electrical conductivity, and a remarkable resistance to corrosion.

It was only in 1886 that Charles M. Hall in the US and Paul L. T. Héroult in France, almost simultaneously and completely independently, devised aluminium production processes that relied on the electrolysis of alumina (Al2O3) dissolved in molten cryolite (Na3AlF6). An efficient process for the extraction and purification of alumina from bauxite, the most important aluminium ore, was developed within a couple of years by the Austrian chemist Karl Josef Bayer. By the early 1960s element 13 became the most widely used non-ferrous metal in the world, even more so than copper.

Applications of aluminium and its alloys range from construction and the transportation industry to the manufacture of electric power lines, packaging materials, cooking utensils and a myriad of other household goods.

The availability of an ever-increasing variety of aluminium coordination complexes has also prompted many recent developments in the chemistry of this

metal, often with potential applications to catalysis and organic synthesis**2**. Other active areas of research range from the preparation of unusual aluminium(i) compounds, including organometallic species**3** and metalloid clusters**4**, to the synthesis of Schiff base derivatives that effectively break down organophosphate nerve agents and pesticides5.

The element once dubbed the magic metal by *National Geographic* continues to be a source of inspiration for scientists, engineers and even artists and designers**6**. Let us remember its rich chemistry, fascinating history and multifarious applications the next time we wrap a sandwich in aluminium foil or drink a carbonated beverage from a can!

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Text 4

The theory of phlogiston (a substance at the root of all combustion) was propounded by the German Georg Ernst Stahl in the early 18th century and was only overturned by the end of the century by the French chemist Antoine Lavoisier, the chemical analogue of Newton in physics; who did more than any other to establish the new science on proper theoretical footing, by elucidating the principle of conservation of mass and developing a new system of chemical nomenclature used to this day.

Prior to his work, though, many important discoveries had been made, specifically relating to the nature of 'air' which was discovered to be composed of many different gases. The Scottish chemist Joseph Black (the first experimental chemist) and the Dutchman J. B. van Helmont discovered carbon dioxide, or what Black called fixed air' in 1754; Henry Cavendish discovered hydrogen and elucidated its properties and Joseph Priestley and, independently, Carl Wilhelm Scheele isolated pure oxygen.

English scientist John Dalton proposed the modern theory of atoms; that all substances are composed of indivisible 'atoms' of matter and that different atoms have varying atomic weights.

1. **Complete the sentences:**

1. Georg Ernst Stahl propounded the theory of …
2. … elucidated the principle of conservation of mass and developed a new system of chemical nomenclature used to this day.
3. … discovered carbon dioxide.
4. … discovered hydrogen and elucidated its properties.

2. Agree or disagree with the statement:

1. The theory of phlogiston was overturned by the end of the 18th century by the French chemist Antoine Lavoisier.
2. Joseph Priestley and Carl Wilhelm Scheele isolated pure oxygen.
3. Henry Cavendish proposed the modern theory of atoms.
4. Joseph Priestley discovered carbon dioxide.

3. Put 4 questions on the text and discuss the text with your group.

4. Make an annotation of the article:

in your element

All about arsenic

If ever there was an element that epitomizes the notion that chemicals might be good or bad depending on their use, arsenic must be it. **Katherine Haxton** explains why.

As

Elemental arsenic was first identified in 1649, but its minerals have been known since Aristotle first described them in the fourth century BC. Arsenic compounds are perhaps some of the most notorious chemicals, particularly arsenic (iii) oxide (As2O3), which has often — somewhat confusingly — simply been called ‘arsenic’. This substance, also referred to as ‘inheritance powder’ in seventeenth-century France, has been the main protagonist in many high-profile murders throughout history.

In contrast, many Victorians were fascinated by arsenic for less nefarious purposes, and frequently self-medicated with it — even using it as an aphrodisiac. Charles Darwin was said to use it to treat eczema. Arsenic compounds were also used to produce a beautiful green dye for wallpaper and other goods. Once again, however, the darker side of this element would often come to the fore, when a fungus present in damp houses converted the dye into volatile arsenic compounds and resulted in

many cases of poisoning. This route of exposure to arsenic was recently implicated in the death of Napoleon Bonaparte, exiled on St Helena in the South Atlantic1.

Arsenic is the twentieth most abundant element on earth and is fairly ubiquitous in living systems — consequently arsenic poisoning poses a real threat to many people around the world. In countries such as Bangladesh, wells are frequently dug to provide clean, fresh drinking water, eliminating the need to draw water from stagnant ponds rife with disease-causing microbes. Unfortunately the nature of the underlying geology in many areas means that the ground water is often contaminated with arsenic, and poisoning symptoms are becoming commonplace — an estimated 70 million people in Bangladesh have been exposed to high levels of arsenic.

This twenty-first-century discovery may offer some hints regarding the nineteenth-century arsenic eaters of Styria (southeast Austria), where arsenic was consumed to freshen the complexion. Reports of people consuming large (300 mg) quantities of As2O3 — a substance that is typically fatal at doses above 65 mg — without deadly consequences prompted theories that organisms may become habituated to the poison, although later studies refuted this. Whatever the eventual consensus on the Mono Lake bacteria5, arsenic continues to be one of the most fascinating elements, a would-be saviour and deadly assassin.

KATHERINE HAXTON is in the School of Physical and Geographical Sciences, Keele University, Keele ST5 5BG, UK.

Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh

NATURE CHEMISTRY | VOL 3 | SEPTEMBER 2011 | www.nature.com/naturechemistry

Text 5

The development of the electrochemical theory of chemical combinations occurred in the early 19th century as the result of the work of two scientists in particular, J. J. Berzelius and Humphry Davy, made possible by the prior invention of the voltaic pile by Alessandro Volta. Davy discovered nine new elements including the alkali metals by extracting them from their oxides with electric current.

British William Prout first proposed ordering all the elements by their atomic weight as all atoms had a weight that was

an exact multiple of the atomic weight of hydrogen. J. A. R. Newlands devised an early table of elements, which was then developed into the modern periodic table of elements by the German Julius Lothar Meyer and the Russian Dmitri Mendeleev in the 1860s. The inert gases, later called the noble gases were discovered by William Ramsay in collaboration with Lord Rayleigh at the end of the century, thereby filling in the basic structure of the table.

Organic chemistry was developed by Justus von Liebig and others, following Friedrich Wöhler's synthesis of urea which proved that living organisms were, in theory, reducible to chemistry. Other crucial 19th century advances were; an understanding of valence bonding (Edward Frankland in 1852) and the application of thermodynamics to chemistry (J. W. Gibbs and Svante Arrhenius in the 1870s).

1. Find the English equivalents in the text:

Зокрема (а саме), попередній винахід, Вольтів стовп, лужні метали, електричний струм, у співпраці з, заповнення основного складу таблиці, синтез сечовини, зводитися до хімії, вирішальне досягнення.

2. Translate the following terms and terminological expressions:

Electrochemical theory, chemical combinations, alkali metals, atomic weight, inert gases, noble gases, organic chemistry, synthesis of urea, valence bonding, thermodynamics.

3. Find the definitions:

Atomic weight	an attraction between atoms that allows the formation of chemical substances that contain two or more atoms
Atomic mass	the mass of an atomic particle, sub-atomic particle, or molecule.
Chemical bond	ratio of the average mass of a chemical element's atoms to some standard

4. Answer the following questions:

1. What made possible the development of the electrochemical theory of chemical combinations?
2. What was developed into the modern periodic table of elements?
3. What filled in the basic structure of the table?
4. What did organic chemistry follow?

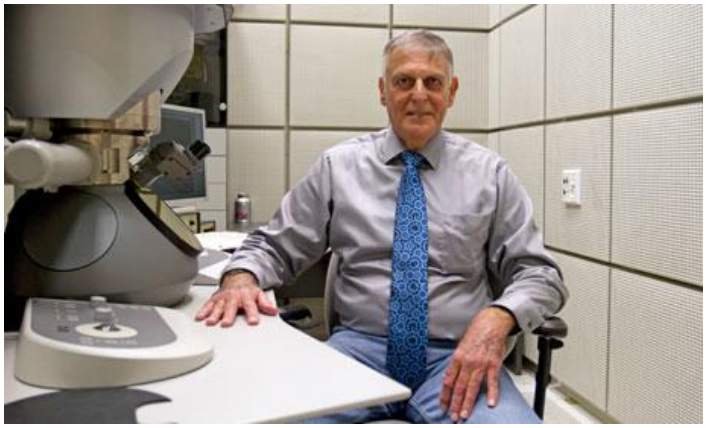
5. Give a summary of the text.

6. Make an annotation of the article:

Nobel Prize in Chemistry for dogged work on 'impossible' quasicrystals

Daniel Shechtman, who has won the chemistry Nobel for discovering quasicrystals, was initially lambasted for 'bringing disgrace' on his research group

Ian Sample, science correspondent
guardian.co.uk, Wednesday 5 October 2011 17.47 BST



Daniel Shechtman, 70, a researcher at Technion-Israel Institute of Technology in Haifa, received the award for discovering seemingly impossible crystal structures in frozen gobbets of metal that resembled the beautiful patterns seen in Islamic mosaics.

Images of the metals showed their atoms were arranged in a way that broke well-establised rules of how crystals formed, a finding that fundamentally altered how chemists view solid matter.

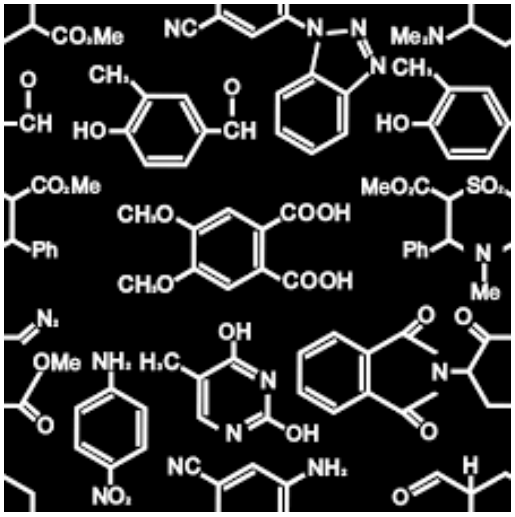
In addition to the kudos of the award, Shechtman receives 10 million Swedish kronor (£934,000).

Crystallised materials are normally made up of "unit cells" of atoms that repeat over and over to make a single, uniform structure. This kind of crystal structure makes graphite a good lubricant, for example, because it can cleave easily across certain planes of weakness.

"His discovery was extremely controversial. In the course of defending his findings, he was asked to leave his research group," the Nobel committee at the Royal Swedish Academy of Sciences said in a statement. "However, his battle eventually forced scientists to reconsider their conception of the very nature of matter … Scientists are currently experimenting with using quasicrystals in different products such as frying pans and diesel engines."

Text 6

Chemical structure



At the turn of the twentieth century the theoretical underpinnings of chemistry were finally understood due to a series of remarkable discoveries that succeeded in probing and discovering the very nature of the internal structure of atoms.

In 1897, J. J. Thomson of Cambridge University discovered the electron and soon after the French scientist Becquerel as well as the couple Pierre and Marie Curie investigated the phenomenon of radioactivity.

In a series of pioneering scattering experiments Ernest Rutherford at the University of Manchester discovered the internal structure of the atom and the existence of the proton, classified and explained the different types of radioactivity and successfully transmuted the first element by bombarding nitrogen with alpha particles.

1. **Find the English equivalents in the text:**

Теоретичний фундамент (обгрунтування) хімії, завдяки, видатні відкриття, длослідження і відкриття, дослідити, експерименти з розсіювання, існування, успішно, трансмутувати.

2. **Translate the following terms and terminological expressions:**

The internal structure of atoms, the phenomenon of radioactivity, the existence of the proton, transmuted the first element by bombarding nitrogen with alpha particles.

3. **Find the definitions:**

Atom	a stable subatomic particle occurring in all atomic nuclei, with a positive electric charge equal in magnitude to that of an electron, but of opposite sign
Electron	a stable subatomic particle with a charge of negative electricity, found in all atoms and acting as the primary carrier of electricity in solids
Proton	the basic unit of a chemical element

4. **Answer the following questions:**

1. What discoveries promoted the understanding of the theoretical background of chemistry?
2. Who discovered the electron?
3. Who investigated the phenomenon of radioactivity?
4. What were the achievements of Ernest Rutherford?

5. **Give a summary of the text.**

6. **Make an annotation of the article:**

The Nobel Prize in Chemistry 2014
Eric Betzig, Stefan W. Hell, William E. Moerner



The Nobel Prize in Chemistry 2014 was awarded jointly to Eric Betzig, Stefan W. Hell and William E. Moerner ***"for the development of super-resolved fluorescence microscopy"***

Surpassing the limitations of the light microscope

For a long time optical microscopy was held back by a presumed limitation: that it would never obtain a better resolution than half the wavelength of light. Helped by fluorescent molecules the Nobel Laureates in Chemistry 2014 ingeniously circumvented this limitation. Their ground-breaking work has brought optical microscopy into the nanodimension.

In what has become known as nanoscopy, scientists visualize the pathways of individual molecules inside living cells. They can see how molecules create synapses between nerve cells in the brain; they can track proteins involved in Parkinson's, Alzheimer's and Huntington's diseases as they aggregate; they follow individual proteins in fertilized eggs as these divide into embryos.

It was all but obvious that scientists should ever be able to study living cells in the tiniest molecular detail. In 1873, the microscopist Ernst Abbe stipulated a physical limit for the maximum resolution of traditional optical microscopy: it could never become better than 0.2 micrometres. **Eric Betzig**, **Stefan W. Hell**and **William E. Moerner** are awarded the Nobel Prize in Chemistry 2014 for having bypassed this limit. Due to their achievements the optical microscope can now peer into the nanoworld.

Two separate principles are rewarded. One enables the method *stimulated emission depletion (STED) microscopy*, developed by Stefan Hell in 2000. Two laser beams are utilized; one stimulates fluorescent molecules to glow, another cancels out all fluorescence except for that in a nanometre-sized volume. Scanning over the sample, nanometre for nanometre, yields an image with a resolution better than Abbe's stipulated limit.

Eric Betzig and William Moerner, working separately, laid the foundation for the second method, *single-molecule microscopy*. The method relies upon the possibility to turn the fluorescence of individual molecules on and off. Scientists image the same area multiple times, letting just a few interspersed molecules glow each time. Superimposing these images yields a dense super-image resolved at the nanolevel. In 2006 Eric Betzig utilized this method for the first time.

Today, nanoscopy is used world-wide and new knowledge of greatest benefit to mankind is produced on a daily basis.

Text 7

E. Rutherford's work on atomic structure was improved on by his students, the Danish physicist Niels Bohr and Henry Moseley. The electronic theory of chemical bonds and molecular orbitals was developed by the American scientists Linus Pauling and Gilbert N. Lewis.

The year 2011 was declared by the United Nations as the International Year of Chemistry. It was an initiative of the International Union of Pure and Applied Chemistry, and of the United Nations Educational, Scientific, and Cultural Organization and involves chemical societies, academics, and institutions worldwide and relied on individual initiatives to organize local and regional activities.

1. **Find the English equivalents in the text:**

Бути удосконаленим, розробити теорію, проголосити, теоретична хімія, прикладна хімія, охоплювати хімічні товариства, покладатися на ініціативу, місцеві заходи.

2. **Translate the following terms and terminological expressions:**

Atomic structure, electronic theory, chemical bonds, molecular orbitals, the International Union of Pure and Applied Chemistry.

3. **Find the definitions:**

Chemical bond	the positively charged nucleus and the negatively charged electrons circling around it, within an atom
Molecular orbital	an attraction between atoms that allows the formation of chemical substances that contain two or more atoms
Atomic structure	a mathematical function describing the wave-like behavior of an electron in a molecule

4. **Answer the following questions:**

1. Whom was E. Rutherford's work on atomic structure improved by?
2. Whom was the electronic theory of chemical bonds and molecular orbitals developed by?
3. Who declared 2011 the International Year of Chemistry?

5. Give a summary of the text.

6. Make an annotation of the article:

in your element

Green bismuth

Ram Mohan *looks at how bismuth — a remarkably harmless element among the toxic heavy metals in the periodic table — has sparked interest in areas varying from medicinal to industrial chemistry.*

Bi

Bismuth, the 83rd element in the periodic table, has been known since ancient times, but was often confused with lead and tin. In 1753, Claude Fran3ois Geoffroy from France demonstrated that bismuth is distinct from these elements. The word bismuth itself is derived from the German word ‘wismuth’ (white mass). Studies showed that it was used as early as the sixteenth century by the Incas, who mixed it with tin to prepare bismuth bronze for knives1. Bismuth was also the instrument of alchemy fraud in the London Stock Exchange — in the 1860s, a Hungarian refugee named Nicholas Papaffy convinced a large number of investors to support his alleged method to transform bismuth and aluminium into silver. This led to a surge in the price of bismuth on the metal market, and the opening of a new company in Leadenhall Street (home of the London Metal Exchange), but by then Papaffy had absconded with the rather large sum of J40,000

Bismuth is mainly found in the ores bismuthinite (bismuth sulfide) and bismite (bismuth oxide), but also occurs in its elemental state, in the form of crystals with an oxide layer of varying width that reflects iridescent colours (pictured). It is commonly obtained as a by-product in copper, lead and tin mining, and is therefore relatively inexpensive for a rare metal.

Bismuth has many interesting properties that have led to several applications in industry, and it is commonly used in solders. It is one of the few substances (water being another) that expands on solidification, and has been used to prepare low-melting typesetting alloys that need to expand to fill printing moulds. Bismuth trioxide is also the main ingredient in fireworks called dragon’s eggs — those that produce a visual display before exploding with a sharp crack. Bismuth has become popular as a replacement for the highly toxic metal lead, as it has a comparable density and many countries now prohibit the use of lead shot for hunting water birds.

Bismuth is a therefore remarkable ecofriendly metal with numerous applications in everyday life. With increasing awareness for the environment, one can expect to see a rise in the use of green metals such as bismuth in applications ranging from organic synthesis to engineering.

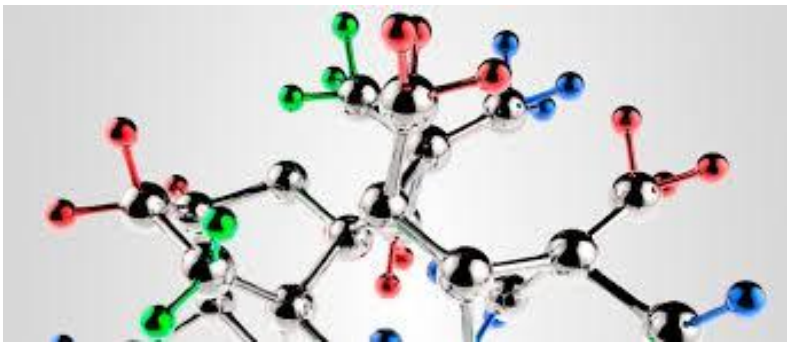
RAM MOHAN is in the Department of Chemistry, Illinois Wesleyan University, Bloomington, Illinois

Tl Pb **Bi** Po At Rn Fr Ra Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm

Nature chemistry | VOL 2 | APRIL 2010 | www.nature.com/naturechemistry

Text 8

Principles of Modern Chemistry



The current model of atomic structure is the quantum mechanical model. Traditional chemistry starts with the study of elementary particles, atoms, molecules, substances, metals, crystals and other aggregates of matter. This matter can be studied in solid, liquid, or gas states, in isolation or in combination. The interactions, reactions and transformations that are studied in chemistry are usually the result of interactions between atoms, leading to rearrangements of the chemical bonds which hold atoms together. Such behaviours are studied in a chemistry laboratory.

The chemistry laboratory stereotypically uses various forms of laboratory glassware. However glassware is not central to chemistry, and a great deal of experimental (as well as applied/industrial) chemistry is done without it.

A chemical reaction is a transformation of some substances into one or more different substances. The basis of such a chemical transformation is the rearrangement of electrons in the chemical bonds between atoms. It can be symbolically depicted through a chemical equation, which usually involves atoms as subjects. The number of atoms on the left and the right in the equation for a chemical transformation is equal. (When the number of atoms on either side is unequal, the transformation is referred to as a nuclear reaction or radioactive decay.) The type of chemical reactions a substance may undergo and the energy changes that may accompany it are constrained by certain basic rules, known as chemical laws.

1. Find the English equivalents in the text:

Агрегатний стан матерії, взаємодія між атомами, перебудова хімічних зв'язків, лабораторний посуд, символічно зобразити, хімічне рівняння, ядерна реакція, радіоактивний розпад, бути обмеженим певними правилами.

2. Translate the following terms and terminological expressions:

Quantum mechanical model, solid state, liquid state, gas state, elementary particles, chemical bonds, applied chemistry, chemical equation, chemical transformation, chemical reaction, chemical laws.

3. Answer the following questions:

1. What does traditional chemistry start with?
2. What do the interactions between atoms lead to?
3. Where are interactions, reactions and transformations studied?
4. What is a chemical reaction?
5. What is the basis of a chemical transformation?

4. Find the definitions:

Solid state	the state with the vast separation of the individual particles
Liquid	the state of matter in which materials are not fluid
Gas	the state with a definite volume but no fixed shape
Plasma	the state that does not freely exist on the Earth under normal surface conditions

5. Give a summary of the text.

6. Make an annotation of the article:

in your element

Is lithium the new gold?

Jean-marie tarascon ponders on the value of lithium, an element known for about 200 years, whose importance is now fast increasing in view of the promises it holds for energy storage and electric cars.

Although it has been known for almost two centuries, lithium is suddenly making the news: it is the primary ingredient of the lithium-ion batteries set to power the next generation of electric vehicles and, as such, could become as precious as gold in this century. It is also non-uniformly spread within the Earth's crust, sparking rumours that Andean South

American countries could soon be the ‘new Middle-East’. Together, these factors set the scene for controversial debates about the available reserves and the anticipated demands1: if all cars are to become electric within 50 years, fears of a crunch in lithium resources — and thus a staggering price increase such as that faced today with fossil fuels — are permeating.

With its atomic number of 3, lithium is located in the top left corner of the periodic table. It was Johann August Arfvedson, one of Jons Jakob Berzelius’s students, who first detected its presence in 1817 while analyzing the mineral petalite ($LiAlSi_4O_{10}$), itself discovered in 1800. Berzelius called this new element *lithos* (Greek word for stone).

Lithium, whose silvery-white colour tarnishes on oxidation when exposed to air, is the most electropositive metal (−3.04 V versus a standard hydrogen electode), the lightest (M = 6.94 g mol–1) and the least dense (ρ = 0.53 g cm–3) solid element at room temperature, and is also highly flammable. Owing to this high reactivity, lithium is present only in compounds in nature — either in brines or hard rock minerals — and must be stored under anhydrous atmospheres, in mineral oil or sealed evacuated ampoules.

Their particular physical, chemical and electrochemical properties make lithium and its compounds attractive to many fields.

JEAN-MARIE TARASCON is at the Laboratory of reactivity and solid-state chemistry, University of Picardie Jules Verne, F-80039 Amiens, France. e-mail: jean-marie.tarascon@sc.u-picardie.fr

Uuo H He **Li** Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca

Unit III

Ecology

Text 1

Ecology is the scientific study of interactions among organisms and their environment, such as the interactions organisms have with each other and with their abiotic environment.

Topics of interest to ecologists include the diversity, distribution, amount (biomass), number (population) of organisms, as well as competition between them within and among ecosystems. Ecosystems are composed of dynamically interacting parts including organisms, the communities they make up, and the non-living components of their environment.

Ecosystem processes, such as primary production, pedogenesis, nutrient cycling, and various niche construction activities, regulate the flux of energy and matter through an environment. These processes are sustained by organisms with specific life history traits, and the variety of organisms is called biodiversity. Biodiversity, which refers to the varieties of species, genes, and ecosystems, enhances certain ecosystem services.

1. Find the English equivalents:

Взаємодія між організмами, різноманітність, складатися з, складати (утворювати), діяти (починати процес), грунтоутворення, колообіг поживних речовин, ніша (схованка), потік енергії, підтримуватися організмом, стосуватися різновидів, збільшувати послуги.

2. Translate the following terms and terminological expressions:

Abiotic environment, diversity, distribution, amount (biomass), number (population) of organisms, community, non-living components, pedogenesis, nutrient cycling, flux of energy and matter, biodiversity, species, genes, ecosystems.

3. Find the definitions:

Species	a biological community of interacting organisms and their physical environment
Gene	a unit of heredity that is transferred from a parent to offspring and is held to determine some characteristic of the offspring

Ecosystem	a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding

4. Answer the following questions:

1. What does ecology study?
2. What do topics of interest to ecologists include?
3. What are ecosystems composed of?
4. What is biodiversity?

5. Give a summary of the text.

6. Read the model for an annotation of the article:

ANNOTATION

1. I have read the article in … (“Digest”, “Art News”) .
2. It is … (Ukrainian, British, American) … (newspaper, magazine, journal).
3. The title of the article is … .
4. The author of the article is … .
5. The article considers the problem of … .
6. It gives … (facts, photos, diagrams, schemes).
7. The author points out that … .
8. The article draws the readers' attention to the fact that … .
9. The author stresses that … .
10. The key problem of the article is …
11. To my mind, … .
12. The article is worth reading because the problem discussed in the article is of great interest (informative, of good use).

Text 2

Ecology is an interdisciplinary field that includes biology and Earth science. The word "ecology" was coined in 1866 by the German scientist Ernst Haeckel (1834–1919).

Ancient Greek philosophers such as Hippocrates and Aristotle laid the foundations of ecology in their studies on natural history.

Modern ecology transformed into a more rigorous science in the late 19th century. Evolutionary concepts on adaptation and natural selection became cornerstones of modern ecological theory.

Ecology is not synonymous with environment, environmentalism, natural history, or environmental science. It is closely related to evolutionary biology, genetics, and ethology. An understanding of how biodiversity affects ecological function is an important focus area in ecological studies.

1. Find the English equivalents:

Міждисциплінарна галузь, включати, закласти основи, перетворитися на, віха (основа, ключовий аспект), бути тісно пов'язаним, впливати.

2. Translate the following terms and terminological expressions

Earth science, natural selection, ecological theory, environment, evolutionary biology, genetics, ethology, ecological function.

3. Find the definitions:

Environment	the study of heredity and the variation of inherited characteristics
Genetics	the science of animal behaviour
Ethology	the surroundings or conditions in which a person, animal, or plant lives or operates

4. Answer the following questions:

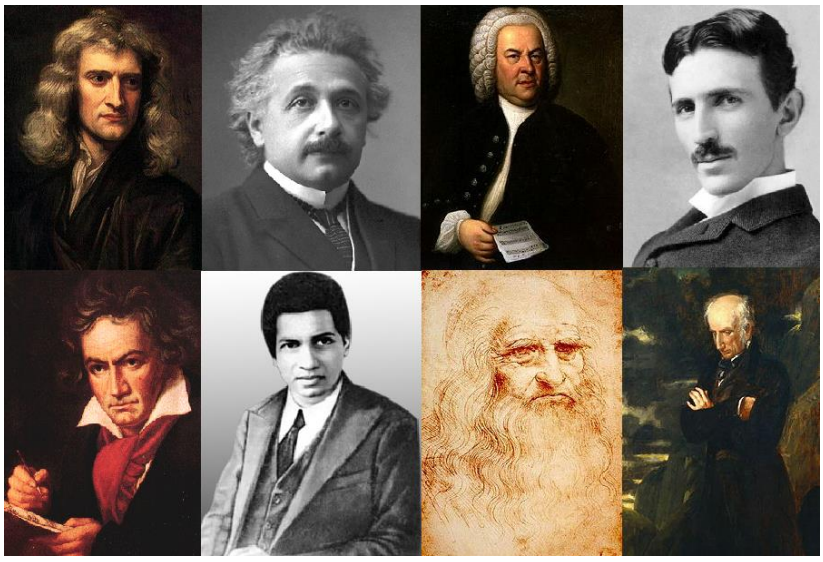
1. What does ecology include?
2. Who laid the foundations of ecology?
3. What became cornerstones of modern ecological theory?
4. What is ecology closely related to?

5. Give a summary of the text.

6. Make an annotation to the article:

Do Great Minds Think Alike?

(From Wavelength Intermediate. By Kathy Burke and Ben Wordon)



What makes a person so brilliant that they change the course of history? Is there a recipe for genius – a list of ingredients that all geniuses share? Perhaps not, but geniuses really seem to have quite a lot in common.

For example, geniuses often come from an unhappy background and many are orphans. One study of important creators found that twenty per cent of them lost one or both parents in childhood. Tolstoy, Michelangelo, Bach, Raphael, Wagner and Charlie Chaplin all lost parents before they were ten years old. Seventy-five per cent of the geniuses in another study came from families affected by poverty, divorce, abuse, alcoholism and mental illness.

What is the connection? Perhaps stress made the children escape into there own private worlds – they felt different from other children and so decided to become even more different. Or were they working hard to please parents who were not there?

Geniuses are also incredibly productive. Picasso is responsible for 20,000 works. Thomas Edison, inventor of the light bulb, patented 1093 inventions. Freud produced 330 publications. Of course, high productivity will include failures, but what makes geniuses different is that they do not give up when they fail – they build on failure to create their biggest successes. Freud had his breakthrough about the importance of dreams after spending years on another project, which finally came to nothing. He was already over forty – but according to one study, most great works are done between the ages of thirty-five and forty-five. Whenever their great creations come, however, one thing seems to connect all geniuses (even young ones like Mozart) – a "ten-year rule". Geniuses have always worked hard in their chosen areas for at least a decade before they create their first masterpieces.

Finally, could genius also be a question of simple childlike curiosity? Einstein often said that his greatest discoveries came from simply asking the same kinds of questions children ask – but unlike most adults, he never stopped asking them. (*adapted from The Sunday Times by The Moscow News)*

Text 3

Ecology is a human science as well. There are many practical applications of ecology in conservation biology, wetland management, natural resource management (agroecology, agriculture, forestry, agroforestry, fisheries), city planning (urban ecology), community health, economics, basic and applied science, and human social interaction (human ecology). For example, the *Circles of Sustainability* approach treats ecology as more than the environment 'out there'. It is not treated as separate from humans.

Organisms (including humans) and resources compose ecosystems which, in turn, maintain biophysical feedback mechanisms that moderate processes acting on living (biotic) and nonliving (abiotic) components of the planet.

Ecosystems sustain life-supporting functions and produce natural capital like biomass production (food, fuel, fiber and medicine), the regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion control, flood protection and many other natural features of scientific, historical, or economic, value.

1. Find the English equivalents:

Практичне застосування**,** прикладана наука, розглядати екологію (як), підтримувати зворотний зв'язок, стримувати процеси, підтримувати життєзабезпечуючі функції, наукове значення.

2. Translate the following terms and terminological expressions:

Conservation biology, wetland management, natural resource management, agroecology, agriculture, forestry, agroforestry, fisheries, urban ecology, biotic components, abiotic components, biomass production, regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion control, flood protection.

3. Find the definitions:

Agriculture	a place where fish are reared for commercial purposes
Forestry	the science or practice of planting, managing, and caring for forests
Fishery	the science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products

4. Answer the following questions:

5. Give a summary of the text.

6. Make an annotation of the article:

Environment and Pollution

From Nature Journal
By James Brighton

The word “environment” is used to talk about many things. People in different fields of knowledge (like history, geography or biology) use the word differently.

In biology and ecology, the environment means all of the natural materials and living things, including sunlight. It is also called the natural environment.

The professionals in this area are called environmentalists. They pay great attention to protect the environment and to keep it safe.

Nowadays the greatest problem of the natural environment is pollution. Pollution means the process or result when something is added to the environment that is harmful or poisonous to living things. This problem involves air pollution, water pollution, noise pollution, soil or land pollution, plastic pollution, and thermal pollution.

Air pollution is caused by poisonous gases, sulphur dioxide, nitrogen dioxide, carbon monoxide and very small particulates. It is also caused by the smoke and harmful gases released by the fires of vehicles, plants and factories. Concerning its impact on people, air pollution may cause breathing problems such as asthma or other health problems. It also causes diseases like cancer. As for our planet in general, air pollution causes global warming and acid rain. It results in increased temperatures, erratic rains and drought worldwide. This makes it difficult for the living organisms to survive.

Text 4

RESILIENCY: LIVELYHOODS

The dramatic rise in population in regions around the world affects job and food security and places pressures on surrounding natural resources. The US Forest Service works overseas on strengthening economic resiliency by providing assistance to communities to develop sustainable, alternative livelihoods, and by diversifying income streams.

In the Pacific Northwest, the agency works with local groups on the sustainable harvest of beargrass, an ecologically, culturally, and economically important species, coveted by the commercial floral greens industry, which generates more than $200 million a year in the region.

In Guinea and Sierra Leone, the US Forest Service, through the Sustainable and Thriving Environments for West African Regional Development (STEWARD) program, implemented the Village Savings and Loans Association program.

Previously, the people living in the region have depended solely on the Upper Guinean Forest Ecosystem, which has become severely degraded, for their livelihood. The Village Savings and Loans Association offers loans to those members who are interested in generating income from activities related to non-timber forest products or sustainable natural resource management.

Many women, who have previously been marginalized and excluded from the banking system, have emerged as a dominant group within this association.

Members are trained in savings and credit, disbursing of loans, repayment and collections and dividend sharing.

STEWARD also offers training that focus on methodology to promote climate change adaptation and biodiversity conservation.

1. **Find the English equivalents in the article:**

Впливати на продовольчу безпеку, зміцнення економічної стійкості, розробка стійких засобів існування, диверсифікація джерел доходів, сякий врожай ведмідь-трави, бути бажаним для індустрії квіткової зелені, реалізувати програму, пропонувати кредити, не деревні лісові продукти, виділення кредитів, розподіл дивідендів.

2. **Translate the following terminological expressions:**

Rise in population, surrounding natural resources, , alternative livelihoods, ecologically important species, sustainable natural resource management, to promote climate change adaptation, biodiversity conservation.

3. **Answer the following questions:**

1. What does the dramatic rise in population in regions around the world affect?
2. What does the US Forest Service work overseas on?
3. Where does the agency work with local groups on the sustainable harvest of beargrass?
4. What program did the US Forest Service implement in Guinea and Sierra Leone?
5. What does the Village Savings and Loans Association offer?
6. What does STEWARD offer?

4. **Read the text and put 4 questions to it:**

Xerophyllum tenax is a grasslike perennial in the family Melanthiaceae, closely related to lilies. It is known by a few common names, including **bear grass**, **squaw grass**, **soap grass**, **quip-quip**, and **Indian basket grass**.

It can grow to 15-150 cm in height and grows in bunches with the leaves wrapped around and extending from a small stem at ground level. The leaves are 30-100 cm long and 2-6 mm wide, dull olive green with toothed edges. The slightly fragrant white flowers emerge from a tall stalk that bolts from the base. When the flowers are in bloom they are tightly packed at the tip of the stalk like an upright club. The plant is found mostly in western North America from British Columbia south to California and east to Wyoming, in subalpine meadows and coastal mountains, and also on low

ground in the California coastal fog belt. It is common on the Olympic Peninsula and in the Cascades, northern Sierra Nevada and Rockies.

X. tenax is an important part of the fire ecology of regions where it is native. It has rhizomes which survive fire that clears dead and dying plant matter from the surface of the ground. The plant thrives with periodic burns and is often the first plant to sprout in a scorched area.

This species was long used by Native Americans who wove it into baskets. Its fibrous leaves, which turn from green to white as they dry, are tough, durable, and easily dyed and manipulated into tight waterproof weaves.

5. Make an annotation of the article:

Types of Pollution

From Global Problems
By Pilvikki Absetz

Water pollution is the presence of harmful materials in water. Pollution causes harm to organisms living in water and can also harm people's health. In extreme cases it may cause problems such as cancer.

Noise pollution or sound pollution is noise which is harmful to humans and animals. This includes the sound of vehicles, loud speakers, etc. Noise pollution can cause ear problems or even permanent deafness, especially to older people.

Soil or land pollution is when man-made chemicals get into the soil. These chemicals come from industrial activities and from bad waste disposal. Soil pollution may cause health risks. The chemicals can produce harmful vapours, or they can contaminate water supplies underneath the polluted soil.

Plastic pollution is the accumulation of plastic products in the environment that adversely affects wildlife, wildlife habitat, or humans.

A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturers. This puts back warm water, and so raises the temperature and decreases the oxygen content of the water.

Text 5

RESILIENCY: MIGRATORY CRANES

The US Forest Service works on conserving migratory birds – like different species of cranes – and their habitats, which span across landscapes and ownerships. A rapidly changing climate and pressures from development, however, threaten the viability of these ecosystems. To build resilient habitats and conserve the much-beloved cranes, the Agency works with partners such as the International Crane Foundation.

In Mongolia, the two organizations and the Mongolian Wildlife Science and Conservation Centre are working on conserving the White-naped crane, a threatened species with only about 6,000 individuals remaining in the wild. These birds nets in wetlands that are succumbing to agricultural land expansion, changes in land use practice, and impacts from hydroelectric dams both at wintering and breeding grounds. Together, the team is conducting habitant assessments based on analogous experiences in North America and provides advice on linking the findings to further conservation and management actions.

In the United States, the Agency has several programs to conserve cranes. For example, the Ocala National Forest in Florida is managing the prairie wetlands with fire to ensure the maintenance of grassy components necessary for the survival of the sandhill cranes.

1. Find the English equivalents in the article:

Збереження перелітних птахів, природнє середовище, загрожувати життєздатності екосистеми, стійке місце проживання (природнє середовище), даурський журавель, вид під загрозою зникнення, залишитися в дикій природі, гніздитися у водно-болотяних угіддях, зимівля, розмноження, травянисті компоненти, канадський журавель.

2. Translate the following terminological expressions:

Conserving migratory birds, species of cranes, the viability of ecosystems, resilient habitats, the White-naped crane, a threatened species, wetlands, habitant assessments, conservation and management actions, the sandhill crane.

3. Find the definitions of the notions:

Species	land consisting of marshes or swamps; saturated land
Habitat	a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding
Wetland	the natural home or environment of an animal, plant, or other

	organism

4. Answer the following questions:

1. What does a rapidly changing climate threaten?
2. Where does the White-naped crane nest?
3. What programs has the Agency to conserve cranes?

5. Make an annotation of the article:

The results of human activity

From Global Problems
By Jane Kalnysh

Human activity may have both positive and negative impact on the environment. The applications of technology often result in unavoidable environmental impacts. For example, the environmental impact of agriculture involves a variety of factors from the soil, to water, the air, animal and soil diversity, people, plants, and the food itself. Some of the environmental issues that are related to agriculture are climate change, deforestation, genetic engineering, irrigation problems, pollutants, soil degradation, and waste. The results of human activity may involve disasters, hurricanes, earthquakes and others.

Another problem of the natural environment is global warming, which means a slow steady rise in Earth's surface temperature. The basic cause seems to be a rise in atmospheric carbon dioxide. The use of fossil fuels like coal and oil, adds carbon dioxide to the air. The process of deforestation, that is cutting down trees, means less carbon dioxide is taken out of the atmosphere by plants.

Hotter temperatures result in sea level rise, which, in its turn, may cause coastal areas to flood. Global warming means that Antarctica and Greenland ice sheets are melting and the oceans are expanding. Many cities are under threat of flooding if the present sea level rises; London and New York are among them.

Text 6

RESILIENCY: FIRE

Threats like changing climate, insect outbreaks and droughts have made forest ecosystems around the world more vulnerable to devastating wildfires. In the western United States, they have led to lives lost,

destruction of large amounts of property, and billions of dollars of damages and firefighting expenses. Over time, wildfires will only become more prevalent and more intense.

The US Forest Service and its partners are working with communities around the world to become resilient in the face of wildfire threat. The special program involves homeowners in preparing their homes from the threat of wildfire. Firewise is a key component of Fire Adapted Communities – a collaborative approach than connects all those who play a role in wildfire education, planning and action with comprehensive resources to help mitigate risk.

In Brazil, the Forest Service, the non-governmental organizations and state firefighters collaborate to combat illegal burning in the fire vulnerable Amazon region. The special brigade has been trained to respond to fires beyond the non-profits network of registered ranches. The special warriors are learning to prevent wildfires in the lands around their village to protect their cultural sovereignty and food sources.

1. Find the English equivalents in the text:

Масова поява комах, посухи, бути уразливим, спустошливі природні пожежі, збитки, витрати пожежогасіння, поширений (розповсюджений), спільний підхід, зменшити ризик, боротися з незаконним спалюванням.

2. Translate the following words and word-combinations:

Insect outbreaks, droughts, devastating wildfires, damage, firefighting expenses, to become resilient, wildfire threat, to mitigate risk, to prevent wildfires.

3. Find the definitions to the notions:

Insect outbreak	a prolonged period of abnormally low rainfall; a shortage of water resulting from this
Drought	an uncontrolled fire in an area of combustible vegetation that occurs in the countryside or a wilderness area
Wildfire	a sudden increase in numbers of a harmful organism and especially an insect within a particular area

4. Answer the following questions:

1. What made forest ecosystems around the world more vulnerable to devastating wildfires?
2. What does the special program involve?
3. What is Firewise?

5. Make an annotation of the article:

Endangered Animals

From Global Problems
By Jennifer Brown

One more problem of the natural environment concerns animals and plants. An endangered species means a group or population of plants, animals or other organisms that is in danger of becoming extinct. The reasons may be there are few of that animal left or the climate that it lives in is changing, or the places it lives in have been destroyed. The World Conservation Union (IUCN) has worked out that endangered species are 40% of all organisms.

Many countries have laws to protect these plants and animals. These laws can save species by stopping hunting, land development or making parks and reserves. However, only a few plants and animals at risk of extinction, mostly vertebrates, are put on the lists and get legal protection. Many more species become extinct, or will become extinct, without people knowing about it. Some of the animals that are listed as endangered are: African wild dog, albatross, blue whale, crowned solitary eagle, giant panda, snow leopard, and tiger.

Thus, the contradictions between a man and nature are dramatic. The most serious problems of the natural environment are considered to be different types of pollution, the negative impact of human activity, global warming and endangered species. The practice of environment protection should involve individual, organizational and governmental levels. The humankind will be able to survive only if we all realize that environmental protection is our universal concern.

VIII. Граматичні завдання

Passive Voice

1. Choose the right form of the verb.

1. This house (to build) by my great-grandfather in 1790.
2. As a result of an earthquake the house (to burn down) there.
3. The door of this house (to close) for you tomorrow.
4. He (to recognize) by the policeman two days ago.
5. The Paris newspapers declared that the child (to call) Juliet.
6. That building (to paint) yellow some years ago.

2. Use an appropriate tense of the verb in brackets.

1. He ____ just ____ (offer) a well-paid job with Radio Four.
2. The ceremony ____ (report) in the news last night.
3. I think cinema ____ (replace) gradually by TV and computers in the next century.
4. This program became very popular after the main presenter ____ (vote) the most interesting TV personality of the year.
5. Her latest series of articles ____ (publish) in a national newspaper every month.
6. Some films should ____ (not watch) by children and they ____ (show) on TV before 22.00.

3. Transform the Active Voice into Passive:

1. They sent for a doctor.
2. They looked for the book everywhere.
3. They listened to the lecture with great interest.
4. They always look at this picture.
5. They will look through these letters tomorrow.
6. They often laughed at him.

4. Change the following into the Passive Voice. Leave out the subject of the action.

1. The girls water the flowers every day.
2. They publish this magazine in Paris.
3. We do not discuss such questions at our meeting.
4. Somebody built this castle in the 16^{th} century.
5. They did not show this film last week.
6. They will not finish this work tomorrow.
7. We shall invite him to take part in the concert.
8. The workers repaired this road last year.
9. They write compositions regularly.
10. The travellers made camp not far from the village.

5. Change the following into the Passive Voice, without leaving out the subject of the action.

1. My sister teaches me English.
2. Peter drives the car.
3. The fascists killed her father.
4. His assistant will meet the delegation.
5. Alan opened the door.
6. He put the letter in the envelope.
7. The hunter killed the bear.
8. The guide showed us the monuments of Lviv.
9. The waitress offered me a cup of tea.
10. He showed me the way to the railway station.

6. Fill in the blanks with the necessary verb form:

1. A huge housing program … (to carry out) now.
2. Something important … (to announce) over the radio now.
3. Don't enter the room. It is … (to clean) now.
4. What question … (to discuss) when you came to the meeting.
5. Your papers … (to type) from 5 till 6 tomorrow.
6. He … (to wait for) downstairs.

7. Translate into English:

1) Переклад вже закінчено. 2) Лист щойно відправлено. 3) За останні роки в нашому місті побудовано багато нових будинків. 4) Стаття ще не опублікована. 5) Це запитання вже обговорено? 6) Мене тільки що запитали про це. 7) Делегацію вже зустріли? 8) Вчора до цього часу робота вже була завершена. 9) Ми зрозуміли, що наш лист ще не отримали. 10) До того часу, коли вони приїхали, питання було вже вирішено.

8. Change these sentences into the Passive. Make the underlined words subjects of the passive sentences.

1. The police fined <u>the driver</u> for speeding.
2. People have sent <u>her</u> lots of birthday cards this year.
3. The lights went out when they were serving <u>the meal</u>.
4. Journalists asked <u>the prime minister</u> a lot of difficult questions.
5. Nobody has told <u>me</u> what to do.
6. The police were following <u>him</u> until he got to the office.

9. Choose the correct verb form.

1. The news ____ by James Cook tomorrow (will read, was read, will be read).
2. Three men ____ now about last month's bank robbery in Weymouth (are questioned, are being questioned, were being questioned).

3. According to a report, hundreds of people ____ in the streets every day (attack, are attacked, were attacked).
4. The law about TV stations ____ in parliament today (was passed, has passed, has been passed).
5. The scandal ____ by two reporters from *The Washington Post* (was uncovered, covered, was being uncovered).

10. Translate the sentences, using Passive Voice.

a)

1. Цю статтю написав англійський журналіст.
2. Переклад буде закінчено вчасно.
3. Наш будинок зараз ремонтують.
4. Обід варили, коли я прийшов додому.
5. Цей театр було побудовано до того, як ми приїхали сюди.
6. Про вас щойно говорили.
7. Твори англійських письменників публікуються у всьому світі.

b)

1. Грабіжника було заарештовано на місці злочину.
2. Пацієнта було прооперовано одразу після нещасного випадку.
3. Машину щойно вкрали.
4. Скульптуру перефарбовували весь вечір.
5. Це рішення вже прийнято міністром Бертрандом Осборном.
6. Нове попередження було надано вченими вулканічної обсерваторії до 5 години вчора.

11. Use the verbs in brackets in the Active or Passive Voice:

1. Nobody (to see) him yesterday.
2. The telegram (to receive) tomorrow in the evening.
3. He (to give) me this book next week or in a week.
4. The answer to this question can (to find) in the encyclopaedia.
5. We (to show) the historical monuments of the capital to the delegation.
6. You can (to find) interesting information about the life in the USA in this book.
7. Budapest (to divide) by the Danube into two parts: Buda and Pest.
8. Yuri Dolgoruki (to found) Moscow in 1147.
9. Moscow University (to found) by Lomonosov.
10. We (to call) Zhukovski the father of Russian aviation.

12. Translate into English using Passive Infinitive after modal verbs:

1. Руки треба мити перед кожною їжею.
2. Кімнати треба регулярно провітрювати.
3. Кішку слід годувати рибою.
4. Собаку можна годувати м’ясом та овочами.
5. Дітям треба регулярно давати фрукти ти овочі.

6. Книги треба класти в шафу або на книжкову поличку.
7. Цю картину можна повісити над каміном.
8. Як можна перекласти це слово?
9. Куди можна поставити валізи?
10. На що потрібно звернути увагу?
11. Треба записати твій номер телефону про всяк випадок.
12. Потрібно виміряти ваш кров'яний тиск та температуру.
13. Його треба запросити на мій день народження.
14. Їй можна запропонувати нову посаду або нову роботу.

The Infinitive

13. Transform the sentences using the Infinitive instead of Subordinate Clauses:

1. He was sorry *when he heard of your disappointment*. 2. Do you understand *what you have to do?* 3. He hopes *that he will get the information tomorrow.* 4. We should be sorry *if we heard bad reports of him.* 5. The candidate did not expect *that he would pass the interview.* 6. Do not promise *that you will do it,* if you are not sure of success. 7. He was annoyed *when he heard* that the Conservative party got in again. 8. She was sorry *that she had missed the beginning of the lecture.* We must wait *till we hear* the examination results before we make any plans. 10. She is happy *that she has found such a simple solution to this difficult problem.*

14. Find the Objective Infinitive Construction and translate into Ukrainian:

1. I consider them to be good specialists. 2. He heard them discuss their plan. 3. I heard him mention my name. 4. We expect writers to deal with the issues of the modern world. 5. They believed him to be honoured by the invitation to the international congress. 6. We assume these truths to be self-evident. 7. They find the experience of this conference to have been a remarkable one.

15. Translate the sentences paying attention to the Objective Infinitive Construction:

1. We know industrial electronic equipment to play a very significant role in the modern world. 2. We often watched the operator adjust the apparatus. 3. They wanted this device to be installed immediately. 4. Faraday expected electrochemistry to be widely used for peaceful construction. 5. We know electrochemistry to owe its birth to the discoveries of Volta.

16. Transform the sentences using the Objective Infinitive Construction:

1. I've never heard how he spoke about his life in India. 2. The two sides expect that negotiations will be long and difficult. 3. We expect that a scientist or a scholar will keep an open mind. 4 One can hardly expect that a true scientist will

keep within the limits of one's narrow field. 5. They thought that he was an eminent scholar. 6. We expected that the partners would agree on a number of issues. 7. We assume that these errors are of no importance. 8. We suppose that his discovery is accidental. 9. We consider that he is a real genius. 10. They estimate that the number of casualties will be much higher.

17. Translate the sentences paying attention to the Objective Infinitive Construction:

1. Вона часто спостерігала, як він годинами працював над цим експериментом. 2. Члени наукового товариства вимагають, щоб цей пристрій було спочатку протестовано. 3. Дослідники вважатимуть цей регіон єдиним джерелом мінеральних ресурсів та енергії. 4. Він знав, що ці дані використовуються в їх дослідженнях. 5. Автор змусив їх переписати два розділи. 6. Ми б хотіли, щоб ви мали свою власну думку щодо цього експерименту. 7. Вчений вважає, що це явище досить рідкісне. 8. Вони очікували, що ця спроба виявиться вдалою.

18. Translate the sentences paying attention to the Subjective Infinitive Construction:

1. Some theories, which seemed to be perfectly reasonable even a short time ago, have proved to be absolutely wrong. 2. It was hoped that this experimental method would help to solve the problem, but it proved to be quite useless. 3. The discussion proved to be very useful in helping to approach the problem in a new way. 4. The new evidence proved to confirm the theory. 5. Facts that seem insignificant at first often prove later to be of vital importance. 6. He seems to know little about research work. 7. All our efforts proved to be useless. 8. The computer is expected to save the scientist a lot of time. 9. This discovery is considered to be the result of a long and thorough investigation. 10. These phenomena are believed to be interdependent.

19. Translate the sentences keeping in mind:

1) The verbs using with the Subjective Infinitive Construction in Passive form: a) ***to believe, to consider, to hold, to think, to suppose (вважати, думати); b) to expect (очікувати), to estimate (оцінювати), to say (говорити), to report (повідомляти).***

2) The verbs using with the Subjective Infinitive Construction in Active form:

to seem, to appear (здаватися), to prove, to turn out (виявлятися), to happen (траплятися, виявлятися).

3) The expressions using with the Subjective Infinitive Construction: ***to be likely (ймовірно), to be sure, to be certain (напевно), to be unlikely (навряд).***

1. Його знали як дуже чутливого до будь-якої критики. 2. Вважають, що атомна енергія стане головним джерелом постачання енергії. 3. Кажуть, що наша лабораторія отримала нові прилади. 4. Відомо, що напівпровідники знайдуть різноманітне застосування в майбутньому. 5. Вважається, що

водень складає половину поверхні землі, води та повітря. 6. Очікується, що він поновить випробування на наступному тижні. 7. Ймовірно, ці вчені опублікують результати своїх досліджень. 8. Навряд чи він візьме участь у дискусії. 9. Напевно, він представить свою доповідь наприкінці конгресу. 10. Виявилося, що він усвідомлює всі наслідки експерименту.

20. Transform the following sentences, using the Subjective Infinitive Construction and the verb in brackets according to the model:

History repeats itself. – History is known to repeat itself.

1. Leonardo da Vinci discovered and laid down immortal principles in the theory of art (to know). 2. Leonardo da Vinci designed the first parachute (to suppose). 3. Leonardo denied himself meat out of an aversion to the killing of animals (to say). 4. Applied science will produce a vast increase in entirely new synthetic products of all kinds (to expect). 5. Rapid expansion of industrialization leads to an exhaustion of natural resources (to believe). 6. Close cooperation between scientists and scientific institutions all over the world is one of the most striking characteristics of modern science (to consider). 7. Charles Spencer Chaplin made more people laugh than any other human being in the history of the world (to know).

21. Translate the following sentences into Ukrainian:

1. Leonardo da Vinci is considered to be a pioneer in physiology and botany. 2. The Earth is said to have been part of the Sun. 3. The delegation is reported to have arrived in the capital already. 4. Moral perfection is considered to be one of the ideals of mankind. 5. Leonardo da Vinci is known to have studied optics. 6. His painting and sculpture are supposed to have opened up few fields of enquiry. 7. He is known to have studied the structure of the bones and muscles of the human body.

22. Translate the following sentences into English:

1. Відомо, що наука значно змінила умови життя сучасної людини. 2. Вважається, що Леонардо да Вінчі сконструював перший ліфт. 3. Кажуть, що цей політичний діяч досяг великих успіхів. 4. Очікується, що протиріччя між цими країнами будуть залагоджені. 5. Відомо, що Леонардо да Вінчі створив проект реконструкції Мілана. 6. Кажуть, що він достатньо розумний, щоб правильно оцінити ситуацію. 7. Очікується, що вони поновлять випробування наступного тижня. 8. Повідомляють, що президент вже прибув до столиці.

23**. Translate the sentences paying attention to the Object and Subjective Infinitive Constructions:**

1. We consider radioactive atoms to be very valuable in all sorts of ways. 2. An atom is known has been proved to hold a tremendous force, hidden in its tiny body. 3. Everything around us is known to be composed of atoms. 4. The common articles in the laboratory are known to be made of plastics. 5. In general, plastics

are known to be classified into groups according to their behaviour when they are heated. 6. The plastics have proved to be satisfactory alternatives to many other materials. 7. The 19th century is often considered to be the century of steam and electricity. 8. We know the molecules of substances to be in continual motion.

24. Translate the sentences paying attention to the Object and Subjective Infinitive Construction:

1. Відомо, що атомній енергії належить майбутнє. 2. Кажуть, що наша лабораторія отримала нові прилади. 3. Відомо, що розчин – це однорідна суміш двох або декількох речовин. 4. Ми виявили, що ці експерименти відповідали раніше прийнятим нормам. 5. Учні очікували, що магніт притягне цей предмет. 6. Відомо, що біля полюсів магніту магнітне поле сильніше.

25. Translate the sentences with Prepositional Infinitive Construction into Ukrainian:

1. It is desirable for you to know it. 1. He waited for the papers to be published. 3. There is only one thing for you to do. 4. For the experiment to be successful he had to do much work. 5. Have you got anything for me to read? 6. For the meeting to be a success much preliminary work must be done. 7. No efforts are large enough for the research to be completed. 8. We are waiting for the jury to announce their verdict. 9. It will take a number of years for the two sides to come to an agreement. 10. It will be expedient for them to postpone the visit. 11. It will be convenient for all of us to have the examination on Tuesday.

26. Complete the following sentences:

1. It is necessary for her … 2. It is advisable for them … 3. They waited for us … 4. It was important for them … 5. There was no reason for him … 6. It will be dangerous for him … 7. It was high time for them … 8. It is better for her … 9. The best thing for me was … 10. She will wait for me …

27. Make up sentences using "For … to + Infinitive" construction:

Necessary	journalists	take a different view
Important	economists	take some interest in politics
Essential	politicians	confront reality / face facts
Impossible	philosophers	deny the progress of science

28. Translate the following sentences into English:

1. Не існує серйозних перешкод тому, щоб ці країни жили у мирі. 2. Він дав нам декілька статей, щоб ми використали його дані у нашому дослідженні. 3. Лектор говорив достатньо голосно, щоб всі могли чути його. 4. Вкрай важливо, щоб ви прочитали його біографію. 5. Всі ми повинні вчитися на власному досвіді. 6. Необхідно, щоб ця проблема була вирішена негайно.

IX. Граматичний довідник

PASSIVE VOICE

1. **The Passive is formed** by using the appropriate tense of the verb ***to be*** + ***Past Participle***.

Tense	Active Voice	Passive Voice
Present Simple	They **repair** cars.	Cars **are repaired**.
Past Simple	They **repaired** the car.	The car **was repaired**.
Future Simple	They **will repair** the car.	The car **will be repaired**.
Present Continuous	They **are repairing** the car.	The car **is being repaired.**
Past Continuous	They **were repairing** the car.	The car **was being repaired**.
Present Perfect	They **have repaired** the car.	The car **has been repaired**.
Past Perfect	They **had repaired** the car.	The car **had been repaired**.
Future Perfect	They **will have repaired** the car.	The car **will have been repaired**.
Modals + be+ Past Part.	You **must repair** this car.	This car **must be repaired**.

2. **The Passive is used**:
   - When the agent (the person who does the action) is unknown, unimportant or obvious from the context.
     *My car **was stolen** yesterday. (unknown agent)*
     *The road repairs **were completed** last week. (unimportant agent)*
     *The kidnappers **have been arrested**. (by the police – obvious agent)*
   - To make statement more polite or formal.
     *My new suit **has been burnt**.(It's more polite than saying "You've burnt my new suit".)*
   - When the action is more important than the agent – as in news reports, formal notices, instructions, processes, headlines, advertisements etc.
     *Taking pictures **is not allowed.** (written notice)*
     *The local bank **was robbed** this morning. (news report)*
     *Bread **is baked** in an oven for about 45 minutes. (process)*
   - To put emphasis on the agent.
     *The Tower of London **was built** by William the Conqueror.*

INFINITIVE

Infinitive forms	Active Voice	Passive Voice
Indefinite	to offer	to be offered
Continuous	to be offering	-------
Perfect	to have offered	to have been offered
Perfect Continuous	to have been offering	-------

1. The **Indefinite Infinitive** refers to the present or future: *I'd like **to go** for a walk.*
2. The **Continuous Infinitive** is used with *appear, claim, seem, pretend, must, can't, happen, should, would etc* to describe an action happening now: *He must **be working** in the garden now.*
3. The **Perfect Infinitive** is used with *appear, happen, pretend, seem etc* to show that the action of the infinitive happened before the action of the verb: *He claims **to have met** the Queen.*
4. The **Perfect Continuous Infinitive** with *appear, seem, pretend etc* to put emphasis on the duration of the action of the infinitive, which happened before the action of the verb: *She seems **to have been working** all morning.*

The *to*-infinitive is used:

1. to express purpose: *She went out **to buy** some milk.*
2. after certain verbs (*advise, agree, appear, decide, expect, hope, promise, refuse etc):*
   *He promised **to be** back at 10 o'clock.*
3. after certain adjectives (*angry, happy, glad etc): She was glad **to see** him.*
4. after question words (*where, how, what, who, which, but not after why): Has she told you where **to meet** them?* But: *I don't know why he left so early?*
5. after *would like/would love/would prefer* to express specific preference): *I'd love to go for a walk.*
6. after nouns: *It's a pleasure **to work** with you.*
7. after *too/enough* constructions: *He's too short **to reach** the top shelf. He isn't tall enough **to reach** the top shelf.*
8. with *it + be + adj (+ of + object): It was nice of him **to remember** my birthday.*
9. with *only* to express unsatisfactory result: *He called me only **to say** that he would be late.*

The infinitive without *to* is used:

1. after modal verbs (*must, can, may, will etc): You must **be** back at 12 o'clock.*
2. after *had better/would rather: I'd rather **had stayed** in last night.*
3. after *make/let/see/hear/feel* + object: *Mum let me **watch** TV. I made him **apologise.***

But: in the passive form: *be made/be heard/be seen* + *to*-infinitive: *He was made **to apologise.***

Note: *help* is followed by a *to*-infinitive or an infinitive without *to: She helped me **(to) wash** the dress.*

The Objective Infinitive Complex

The Objective Infinitive Complex consists of a noun in the Common Case or a personal pronoun in the Objective Case and the infinitive. The nominal part of

the complex denotes the subject or the object of the action expressed by the infinitive.

In the sentence this complex has the function of a complex object.

The Objective Infinitive Complex is used:

a) after the verbs denoting perceptions of senses (***to see, to hear, to feel, to watch, to observe, to notice)***; infinitive without *to* is used after these verbs, e.g.: *They all watched* ***him walk*** *up the hill.*
b) after the verbs denoting wish, intention, emotions (***to want, to wish, to desire, to like, to dislike, to hate, to intend, should/would like****),* e.g.: *He intended* ***me to go*** *with him to the theatre.*
c) after the verbs denting mental activity (***to consider, to believe, to think, to find, to know, to expect, to suppose)*** , e.g.: *We consider* ***him to be*** *an interesting person.*
d) after the verbs denoting request, permission, advice, compulsion (***to order, to ask, to request, to allow, to permit, to advise, to recommend, to cause, to force, to make, to let);*** infinitive without *to* is used after ***to make*** and ***to let***, e.g.: *We made* ***George work***.

The Subjective Infinitive Complex

The Subjective Infinitive Complex consists of a noun in the Common Case or a personal pronoun in the Nominative Case and the infinitive.

The nominal part of the complex may denote both the subject and the object of the action expressed by the infinitive.

The Subjective Infinitive Complex is used:

a) with the verbs ***to say*** and ***to report*** (in the Passive Voice), e.g.: ***The delegation*** *is reported* ***to have arrived*** *in Geneva.*
b) with the verbs (in the Passive Voice) denoting mental activity (***to consider, to believe, to think, to know, to expect, to suppose)*** , e.g.: ***The meeting*** *is expected* ***to begin*** *this morning.*
c) with the verbs (in the Passive Voice) denoting sense perceptions (***to see, to hear, to feel, to watch, to observe, to notice****),* e.g.: ***He*** *was seen* ***to enter*** *the house.*
d) with the verbs (in the Passive Voice) denoting request, permission, advice, compulsion (***to order, to ask, to request, to allow, to permit, to advise, to recommend, to cause, to force, to make, to let);*** e.g.: ***They*** *were ordered* ***to leave*** *the hall.*
e) with the verbs ***to seem, to appear, to happen, to chance, to turn out, to prove,*** e.g.: ***She*** *seemed not* ***to listen*** *to him.*
f) with the expressions ***to be sure, to be certain, to be likely, to be unlikely,*** e.g.: ***He*** *is certain* ***to be sleeping***.

The Prepositional Infinitive Complex

The infinitive complex preceded by the preposition ***for*** is called the Prepositional Infinitive Complex. It may be used in the functions of a subject, predicative, object, attribute and adverbial modifier of result and purpose.

It is time ***for us to go****. He waited* ***for her to speak****. There's nobody here* ***for him to play with.*** *It was too dark* ***for her to see him****.*

X. Література

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