Міністерство освіти і науки України
Луцький національний технічний університет

English for Academic Purposes

Навчальний посібник

для здобувачів

третього (освітньо-наукового)

рівня вищої освіти

Луцьк 2026

УДК 811.111:378:147 (075.8)
М 29

Рекомендовано
Вченою радою Луцького національного технічного університету
(протокол №12 від 28 травня 2026 року)

Рецензенти:
Коляда Е.К., кандидат філологічних наук, професор, завідувач кафедри практики англійської мови ВНУ імені Лесі Українки;

Черняк О. П., кандидат філологічних наук, доцент кафедри іноземних мов та перекладу ВНУ імені Лесі Українки;

Рогач О. О., кандидат філологічних наук, професор кафедри прикладної лінгвістики ВНУ імені Лесі Українки

Мартинюк А. П., Киселюк Н.П. English for Academic Purposes: *навчальний посібник*. Луцьк: ЛНТУ, 2026. 168 с.

Мета посібника – формування мовної компетентності (лексичної, граматичної); розвиток мовленнєвих компетентностей, а саме: читання, говоріння, слухання та соціокультурної компетентності здобувачів третього (освітньо-наукового) рівня вищої освіти. Посібник структурований на основі комунікативного підходу та фокусується на професійно-науковому спілкуванні в усній і письмовій формах.

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Передмова

Навчальний посібник «English for Academic Purposes» розроблений для здобувачів третього (освітньо-наукового) рівня вищої освіти Луцького національного технічного університету. Видання має на меті підготовку майбутніх докторів філософії до ефективного функціонування в сучасному міжнародному науковому та професійному середовищі.

Головною метою посібника є формування комплексної мовної компетентності (лексичної та граматичної) та розвиток ключових мовленнєвих навичок: читання, говоріння й слухання. Навчальний матеріал структурований на основі комунікативного підходу, що дозволяє аспірантам опанувати стратегії професійно-наукового спілкування як в усній, так і в письмовій формах.

Основними завданнями курсу є:

- вдосконалення знань і вмінь, набутих на попередніх етапах навчання.
- розвиток навичок роботи з оригінальною науковою літературою, яка має безпосереднє відношення до теми дисертаційного дослідження аспіранта.
- опанування специфіки наукового перекладу, термінології та жанрових особливостей академічного письма.

Зміст посібника охоплює широкий спектр тем, актуальних для сучасної наукової діяльності. Зокрема, розглядаються питання методології досліджень, етики використання штучного інтелекту в науці, а також підготовки до участі в міжнародних конференціях і симпозіумах. Окрім суто наукового аспекту, значна увага приділяється практичним ситуаціям, з якими дослідник може зіткнутися під час закордонних відряджень: від орієнтації в місті до професійного етикету в готелі та закладах харчування.

Лексико-граматичний блок фокусується на складних аспектах академічної англійської, таких як вживання пасивного стану, безособових форм дієслова (інфінітив, герундій, дієприкметник) та дотримання специфічного порядку слів в наукових текстах.

Інтеграція академічного навчання з практичними дослідженнями та орієнтація на міжнародну співпрацю роблять цей посібник важливим інструментом для зміцнення репутації ЛНТУ як сучасного центру інновацій та інтелектуального прогресу. Видання сприятиме не лише успішному захисту дисертації, а й підвищенню конкурентоспроможності молодих вчених на світовому рівні.

MODULE I.
Foundations of Scientific Thinking

Unit 1.
Scientific Horizons: Research and Innovation at LNTU

Warming-up activities

Discuss the following questions:

1. What is research?
2. Why is research important for university students?
3. What kinds of research are carried out in your department?

Task 1. Read and learn the Vocabulary Notes.

research — наукове дослідження
science — наука
scientific — науковий
scientist — вчений
to carry out an investigation — вести дослідження
to work out — розробляти
to improve — вдосконалювати
to develop — розвивати, створювати
applied — прикладний
as well as — а також
to be of practical value — мати практичне значення
to supervise — здійснювати керівництво
supervisor/ advisor — науковий керівник
per year — на рік
annually — щорічно
to obtain results — отримувати результати
mutually beneficial — взаємовигідний
Specialized Academic Board — спеціалізована вчена рада
to initiate — започатковувати, запроваджувати
to confer a PhD — присвоювати науковий ступінь доктора філософії
to award a PhD — отримати ступінь доктора філософії

Task 2. Make up sentences with the words and word combinations given in the task 1.

Task 3. Read the text and discuss it. Write a synopsis of the text in five sentences.

RESEARCH IN LNTU

Research conducted by LNTU professors and students serves as the basis for training and education, supporting their continuous intellectual growth and the preparation of specialists of world-class standards.

For years, the scientists at the University have been conducting fundamental research in physics, mathematics, theoretical mechanics, chemistry, and economics. As a result, such trends as Agricultural Machine Building, Science of Materials, Powder Metallurgy, Composite Materials, Semiconductors, Power Supply, and Economics have been initiated and developed.

In particular, the scientific school of Agricultural Machine Building is working to improve the design of agricultural machinery. The scientific school of Materials Science is developing theoretical and applied principles for self-organizing functional materials, enabling the development of a series of entirely new composite materials, as well as intensive technologies for their production and treatment. Successful investigations in the Mechanics of Deformed Solid Body are carried out by professors of the University.

The scientific trend of the Physics department is Physics of Semiconductors. A cycle of fundamental investigations into the electronic properties of multivalley semiconductors with radiation effects has been carried out.

The work of great practical value in the field of Composite Materials is headed by Prof. Povstianoi O. The problems of Powder Metallurgy are actively being addressed. They cover a wide range of problems: physics and sintering processes, micromechanics, mechanics of powders, and compaction of composites. The work is supervised by Prof. Rud' V.

The Economics school, headed by Prof. Vakhovych I., Dr. of Economics, encompasses investigations of problems in the region's social and economic development, energy conservation, and industrial management.

Research at LNTU is characterized by high performance and the practical value of the results. It is proven by 15-20 patent applications per year. Annually, the University scientists publish 4-5 monographs and over 300 articles. The results of investigations contribute to the development of mutually beneficial economic and academic contacts with foreign countries, such as Poland, Czechia, Romania, Germany, Belgium, Sweden, and Switzerland.

At the University, there are several Specialized Academic Boards for conferring doctoral and candidate's degrees in Technical and economic sciences. They confer academic degrees in engineering and economics in the following scientific specialties: Finance, Banking, and Insurance; Entrepreneurship, Trade, and Exchange Activity; Economics; Marketing; Applied Mechanics; Applied Mathematics; Tourism; Software Engineering;

Materials Science; Management; Industrial Engineering; Automobile Transport.

Research activity at LNTU plays a crucial role in advancing science, technology, and education. The University's achievements in both fundamental and applied research confirm its reputation as a modern center of innovation and intellectual progress. By integrating academic studies with practical investigations and fostering international cooperation, LNTU continues to make a significant contribution to the development of national and global scientific potential.

Task 4. Translate the following words and word combinations:

Дослідницька робота, ґрунтовні дослідження, світові стандарти, порошкова металургія, енергопостачання, машинобудування, матеріалознавство, теоретичні та прикладні засади, механіка деформованого твердого тіла, властивості напівпровідників, практичне значення, розвиток регіону, менеджмент у промисловості, енергозбереження, високий рівень виконання, отримані результати, взаємовигідні контакти, присвоювати науковий ступінь, публікувати статті, регіональна економіка.

***Task 5.* Find synonyms in the list below, arrange them in pairs:**

1) device, research, technology, branch, obtain, importance, collaborator, team, scientific adviser, to enable, thesis, journal, to prove a thesis, to collect, data, to encounter, to be engaged in, to be through with, scientific papers, rapidly;

2) quickly, publications, instrument, technique, to finish, to be busy with, field, to get, significance, to come across, information, to gather, coworker, group, supervisor, to defend a dissertation, scientific magazine, dissertation, to allow, investigation.

***Task 6.* Find antonyms in the list below, arrange them in pairs:**

1) theory, to obtain, rapidly, experimentator, to finish, to increase, new, experienced, unknown, wide, passive, to enable, high, complicated;

2) simple, low, practice, to give, to disable, active, slowly, theoretician, narrow, famous, to start, to decrease, old, inexperienced.

Task 7. Choose the right option

1. Research work performed by LNTU professors and students forms the basis of: a) sports and social activities. b) training and education. c) administrative management.

2. Scientists of the University carry out fundamental investigations in: a) Physics, Mathematics, and Economics. b) Biology, Medicine, and Pharmacy. c) History, Literature, and Arts.

3. The scientific school of Agricultural Machine Building is working on the problem of: a) regional social development. b) improving agricultural machinery design. c) powder metallurgy and sintering processes.

4. The Science of Materials school develops functional materials with the ability to: a) self-organize. b) conduct electricity without resistance. c) resist radioactive effects only.

5. The scientific trend of the Physics department at LNTU is: a) Power Supply. b) Physics of Semiconductors. c) Theoretical Mechanics.

6. Every year, the high level of research performance at LNTU is proved by: a) 4-5 monographs. b) over 300 articles. c) 15-20 patents for inventions.

7. Specialized Academic Boards at the University confer academic degrees in: a) Engineering and Economics. b) Law and Political Science. c) Medicine and Chemistry.

Task 8. Answer the questions.

1. What role does research work play in the professional development of LNTU professors and students?
2. In which fundamental sciences have the university's scientists been carrying out investigations for many years?
3. What specific scientific trends have been initiated and developed as a result of these fundamental investigations?
4. What is the primary focus of the scientific school of Agricultural Machine Building?
5. What unique ability do the functional materials developed by the Science of Materials school possess, and what does this enable?
6. What is the main research trend of the Physics department, and what have they investigated regarding semiconductors?
7. Which professors are mentioned as heads or supervisors of research in the areas of Composite Materials, Powder Metallurgy, and Economics?
8. What specific problems are being investigated by the Economics school under the leadership of Prof. Iryna Vakhovych?
9. What statistics prove the high level of research performance at LNTU regarding patents, monographs, and articles?
10. With which foreign countries does LNTU maintain mutually beneficial economic and academic contacts?
11. In which fields of science do the Specialized Academic Boards at LNTU confer Doctor's and Candidate's Degrees?
12. Which scientific specialties are available for conferring academic degrees at the university?
13. How does the text describe LNTU’s reputation in the context of advancing science and technology?

Task 9. **Make up English-Ukrainian pairs of words equivalent in meaning:**

to publish, sphere, research, to include, importance, to develop, to collaborate, enterprise, scientific adviser, scientific degree, to be awarded, department, to encounter, branch, research team, data, to participate, to take post-graduate courses, to prove a thesis (dissertation);

захищати дисертацію, навчатись у аспірантурі, опублікувати, галузь, бути нагородженим, включати (в себе), (наукове) дослідження, важливість, кафедра, зустрічати(сь), дослідницька група, дані (інформація), розробляти, співпрацювати, брати участь, вчений ступінь, науковий керівник, підприємство, сфера.

Task 10. Translate the following sentences into English.

Дослідницька робота, яку виконують викладачі та студенти ЛНТУ, є основою для підготовки фахівців світових стандартів.

1. Вчені університету вже багато років проводять фундаментальні дослідження у галузі фізики, математики та економіки.
2. Наукова школа сільськогосподарського машинобудування розробляє проблему вдосконалення конструкції сільськогосподарських машин.
3. Функціональні матеріали мають здатність самоорганізовуватися, що дозволяє створювати абсолютно нові композитні матеріали.
4. Науковий напрям кафедри фізики пов'язаний із дослідженням властивостей напівпровідників.
5. Наукова школа економіки займається проблемами соціально-економічного розвитку регіону та енергозбереження.
6. Високий рівень наукових досліджень підтверджується отриманням 15-20 патентів на винаходи щороку.
7. Щорічно науковці університету публікують понад 300 статей та кілька монографій у наукових виданнях.
8. Результати досліджень сприяють розвитку взаємовигідних контактів з іноземними країнами, такими як Польща та Німеччина.
9. Університет має спеціалізовані вчені ради для присвоєння наукових ступенів доктора та кандидата наук.
10. Наукові ступені присвоюються з таких спеціальностей, як прикладна механіка, менеджмент та програмна інженерія.
11. Інтеграція академічного навчання з практичними дослідженнями зміцнює репутацію ЛНТУ як сучасного центру інновацій.

Speaking Practice

Task 11.

a) Interview

You are interviewed by a correspondent about scientific work in Lutsk National Technical University. Answer his/her questions and represent the University in the best way.

b) Dialogue

You meet a foreign colleague at an international conference. Discuss the research work being performed at your universities.

c) Role-play

Imagine you are presenting your research project at an international conference.

– Introduce yourself and your topic.

– Describe your research and its results.

– Answer one question from the audience.

Writing Task

Task 12. **Write a short essay (10–12 sentences) on one of the topics:**

1. Research at my faculty.
2. Why I want to be a researcher.
3. The importance of international cooperation in science.

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video "What's the point of doing fundamental science?" and do video comprehension tasks.

1) Match the terms used by Professor Arkani-Hamed with their correct definitions or descriptions based on the sources:

Terms	Definitions
1. The Hierarchy Problem	**A.** A self-deprecating term for researchers who are seen as overly focused on abstract, seemingly impractical problems
2. Emergent Spacetime	**B.** Secondary technologies or benefits that result from fundamental research, such as MRI machines or the World Wide Web
3. Spin-offs	**C.** A major unsolved problem in physics concerning why the Higgs particle is much lighter than the Planck scale

4. Economic Return on Investment (ROI)	**D.** A theoretical concept where space and time are not fundamental inputs but are "outputs" from deeper laws
5. Navel-gazing academics	**E.** The quantified financial benefit a society receives from funding research (e.g., $1.2 returned for every $1 spent)

2) Choose the most accurate answer based on the lecture transcript:

1. What is the estimated economic value of a single PhD to the economy, according to the US Census Bureau?

A) $500,000
B) $1.5 million
C) Approximately $3 million

2. What fraction of a nation's GDP is typically spent on even the most expensive fundamental science experiments?

A) 1%
B) One part in 10,000
C) 5%

3. According to Arkani-Hamed, what is the "best answer" to why we do fundamental research?

A) To solve immediate world problems like hunger.
B) To generate massive economic spin-offs.
C) Because of human wonder and curiosity.

4. How does the speaker describe the "standard scientific method" (hypothesis -> experiment -> falsification) taught in schools?

A) It is the only way to ensure accuracy.
B) It is "stupid" and far more chaotic in reality.
C) It is the foundation of all his breakthroughs.

3) Fill in the blanks using information from the sources:

1. Professor Arkani-Hamed proposed the theory of _____ to explain why is weaker than other forces.
2. The next-generation particle collider (after the LHC) is expected to be approximately _____ in circumference.
3. The _____ was originally developed at _____ in the late 1980s to help physicists share data.
4. Steven Weinberg stated that the effort to understand the universe lifts human life above the level of …….. and gives it the grace of …… . __

Grammar Focus: The Passive Voice

The Passive Voice is often used in scientific and academic writing when the focus is on the action or result, rather than on the person performing the action.

It is formed with the verb **'to be' + Past Participle** of the main verb.
Examples from the text:
• Fundamental investigations are carried out by scientists.
• The results of research are published annually.
• The work of great practical value is headed by Prof. Povstianoi O.
• The scientific school is developed by the leading specialists of the University.
• Many patents are received every year.

Exercise 1. Use the correct form of the verb in Passive Voice.

1. New composite materials (develop) by the Science of Materials department.
2. Theoretical principles (study) by professors and students.
3. Modern technologies (apply) in different branches of industry.
4. Several patents (receive) every year.
5. Important experiments (conduct) at LNTU laboratories.
6. The results of investigations (publish) in international journals.
7. Many research projects (support) by the government.
8. Scientific conferences (organize) at the University annually.

Exercise 2. Transform Active to Passive

1. Scientists carry out fundamental investigations in physics and mathematics. (Passive: Fundamental investigations in physics and mathematics...)

2. The University scientists publish over 300 articles annually. (Passive: Over 300 articles...)

3. Prof. Rud' V. supervises the work on Powder Metallurgy. (Passive: The work on Powder Metallurgy...)

4. Physicists at CERN originally developed the World Wide Web in the late 1980s. (Passive: The World Wide Web...)

5. The US Census Bureau calculates that a PhD adds $3 million to the economy. (Passive: It ... that $3 million ... to the economy by a PhD).

6. The audience is recording this lecture. (Passive: This lecture...)

Exercise 3. Identify the Passive Voice in a Scientific Context.

"Research work performed by LNTU professors... is the ground for constant

intellectual growth".

"Such trends as Agricultural Machine Building... have been initiated and developed".

"The work is supervised by Prof. Rud' V.".

"Research work in LNTU is characterized by a high level of performance".

"This is proved by 15-20 patents for inventions per year".

Reflection

- What new vocabulary have you learned from this unit?
- What kind of research would you like to participate in?
- How can you apply research skills in your future career?

Unit 2
From Bachelor to PhD: Understanding Academic Degrees

Warming-up activities

Discuss the following questions:

1. What academic degrees are offered in your country?
2. What is the difference between a Bachelor's and a Master's degree?
3. What academic degree is required to become a university lecturer or researcher in Ukraine today?

Task 1. Read and learn the Vocabulary Notes.

academic degree — академічний / науковий ступінь
Bachelor's degree — ступінь бакалавра
Master's degree — ступінь магістра
Doctorate — докторський ступінь
PhD (Doctor of Philosophy) — доктор філософії
undergraduate — студент бакалаврату
postgraduate — студент магістратури / аспірантури
doctoral student (PhD student) — аспірант
course of study — курс навчання
final examinations — підсумкові іспити
thesis — дисертація / наукова робота
doctoral dissertation — докторська дисертація
defence (of a dissertation) — захист дисертації
award a degree — присуджувати ступінь
original contribution to knowledge — оригінальний внесок у науку
field of study — галузь знань
faculty — факультет

higher education system — система вищої освіти
equivalent (to) — еквівалентний
academic research — академічне дослідження

Task 2. Make up sentences with the words given in task 1.

Task 3. Read the text and discuss it. Write a synopsis of the text in five sentences.

ENGLISH DEGREES

The English system of academic degrees is rather complicated and is therefore often puzzling for foreigners. The practice also varies to some extent from one institution to another.

Bachelor's Degree

A Bachelor's degree is typically awarded upon completion of a three-year course, which most students begin at the age of 18 or 19 after leaving high school. In most institutions, the awarding of the degree depends entirely on final examinations, although some universities now also require a dissertation or a final project.

The name of a particular degree consists of the word *Bachelor* (from the Latin *baccalaureatus*, meaning "crowned with laurel") followed by the name of the faculty. Thus, the first degree in the Faculty of Arts is called a *Bachelor of Arts*, while in the Faculty of Science it is called a *Bachelor of Science*, and so on.

These degrees are often referred to by their initials, both in speech and in writing, for example:

- Arts — BA
- Science — BSc

Master's Degree

Originally, the Master's degree was awarded upon acceptance of a thesis based on a short research project, usually soon after graduation. It was regarded as an introduction to serious academic research, that is, work on a doctoral thesis.

In some universities, this practice still exists. However, in recent years there has been an increasing tendency to award the Master's degree (MA or MSc) after the completion of a one-year postgraduate course involving advanced study and examinations.

Another postgraduate degree is the Master of Philosophy (MPhil). Despite its name, this degree is not restricted to philosophy. It is offered in all faculties, and students may obtain an MPhil in engineering, mathematics, economics, or other disciplines. In this context, the word *philosophy* is used in the broad sense of *the term, rather than referring to it* as a specific field of study.

In Ukraine, Bachelor's and Master's degrees are part of the higher education system, but they are traditionally distinguished from academic (research) degrees, which are awarded after postgraduate research.

Doctorate

The doctorate is officially called the Doctor of Philosophy, but it is usually referred to as a PhD. The word order follows the original Latin form (*philosophiae doctor*). As with the MPhil, the term philosophy does not indicate a field of study and is used for all academic disciplines.

A PhD is awarded upon the acceptance of a doctoral dissertation that must represent an original contribution to knowledge. Research for this degree usually takes about three to four years, although the required time may vary depending on the field of study.

Traditionally, postgraduate researchers in Ukraine were awarded the degree of Candidate of Sciences, which was generally regarded as equivalent to the PhD in the English-speaking academic world. Today, however, doctoral students in Ukraine defend a PhD degree, following reforms that aligned Ukrainian higher education with European and international standards. As a result, the degree of Candidate of Sciences is no longer awarded.

Senior Doctorates

In addition to the PhD, there exists another type of doctorate known as a senior doctorate, which should not be confused with the PhD. The title of a senior doctorate depends on the field of specialization, for example:

- Doctor of Letters (DLitt) — for arts and humanities subjects (from the Latin *doctor litterarum*)
- Doctor of Science (DSc) — for scientific disciplines

These degrees are higher than the PhD and are comparable in status to the Ukrainian Doctor of Sciences degree. However, unlike the Ukrainian doctorate, senior doctorates in the UK do not involve the defence of a new dissertation. Instead, candidates submit a collection of their published academic works to a committee, which decides whether the body of research justifies the award of the degree.

There is no exact equivalent to the Ukrainian Doctor of Sciences degree in the English higher education system.

Task 4. Translate the following words and word combinations:

Повністю залежати, після закінчення школи, короткотривале дослідження, протягом останніх років, зростаюча тенденція, обмежений до філософії, вважатися науковим ступенем, порядок слів, назва є незмінною для всіх факультетів, вважатися еквівалентом, відрізнятися від останнього, не передбачати написання дисертації, подавати публікації, заслуговувати на присудження ступеня.

Task 5. Choose the right variant

1. A Bachelor's degree is usually awarded at the end of …

a) one-year course.

b) doctorate.

c) a three-year course.

2. The name of a Bachelor's degree is followed by …

a) the Master's degree.

b) an advanced examination degree.

c) the name of the faculty.

3. Master's degree was awarded on acceptance of …

a) final examinations, although some institutions now demand a dissertation too.

b) a thesis based on a short period of research.

c) published works submitted to a Board.

4. The new Master's degree is called ….

a) Master of Science.

b) Master of Letter.

c) Master of Philosophy.

5. Research for PhD degree usually takes …

a) about three years.

b) a short period, usually soon after graduation.

c) a year's postgraduate course of study.

6.The degree of a Senior Doctor is comparable in importance to …

a) Doctor of Science.

b) the Ukrainian doctor's degree.

c) Doctor of Letter.

7. A person wishing to apply for a Senior Doctor's degree submits …

a) a thesis which must be an original contribution to knowledge.

b) a dissertation.

c) his published works to a board.

Task 6. Answer the questions.

1.Why is the English system of degrees puzzling to foreigners?

2.When is a Bachelor's degree awarded?

3.What does the awarding of the degree depend on?

4.How is the first degree in the faculty of Arts called?

5.When was a Master's degree awarded?

6.What is the practice nowadays?

7.Are the terms Bachelor's and Master's considered to be academic degrees in Ukraine?

8.When is a *PhD* awarded?

9.What is the other type of doctorate?

10.What is the difference between the English senior doctorate and the

Ukrainian doctor's degree?

Task 7. Translate the following sentences.

1. У багатьох навчальних закладах ступінь бакалавра присвоюють після останнього іспиту. 2. Слово «бакалавр» – латинського походження. 3. Ступінь магістра присвоюється після проведення та захисту невеликого наукового дослідження. 4. В Україні ступені бакалавра та магістра не вважаються науковими ступенями. 5. Англійський ступінь доктора філософії не має жодного відношення до філософії як науки. 6. Європейський науковий ступінь доктора наук відповідає українському ступеню кандидата наук. 7. Для отримання вищого докторського ступеня не потрібно захищати докторську дисертацію. 8. Вищий докторський ступінь присуджується, якщо наукові публікації претендента варті присудження цього ступеня. 9. Наукові праці претендента на вищий докторський ступінь оцінюються спеціальною комісією.

Task 8. Define briefly the subject of the investigation you carry out. Say whether you will describe the study or restrict yourself to some part of it. Tell the group when the investigation was conducted or started, and if it is still underway.

Speaking Practice

Task 9. Prepare a short 1–2 minute talk on ONE of the following topics:

- My academic path and future degree
- Bachelor's and Master's degrees: similarities and differences
- Why I would / would not like to become a doctoral student
- The PhD degree in Ukraine today

Try to use at least 5 words from the Vocabulary Notes.

Writing Task

Task 10. Write a short academic paragraph (150–180 words) on ONE of the following topics. Use at least 8 words from the Vocabulary Notes.

1. The structure of academic degrees in Ukraine today
2. Comparing Bachelor’s, Master’s and PhD degrees
3. Why a PhD is considered an original contribution to knowledge

Guidelines

Your paragraph should include:

- a clear topic sentence
- 2–3 supporting ideas

- appropriate academic vocabulary
- correct use of linking words (e.g., *however, therefore, in addition, as a result*)

Video Insights: Postgraduate Research in Motion

Task 11. Watch the video "Different Types of Degrees" and do video comprehension tasks.

1) Match the terms from the sources with their definitions before watching the video (Pre-watching (Vocabulary Warm-up)

Senior Doctorate	a) A degree requiring a doctoral dissertation that represents an original contribution to knowledge.
Postgraduate	b) A student who has completed a first degree and is studying for a Master's or PhD.
PhD	c) A high-level degree awarded based on a collection of published works rather than a new dissertation.
Undergraduate	d) A student currently studying for their first degree (e.g., Bachelor's).

2) ***Choose the correct option based on the information in the video and the provided sources.***

1. How many credit hours are typically required to receive an associate degree?
   A) 30 credit hours
   B) 60 credit hours
   C) 120 credit hours
2. Which degree is described as providing the best "Return on Investment" (ROI) on average?
   A) Associate degree
   B) Bachelor's degree
   C) PhD (Doctorate)
3. What is a major financial advantage of undergraduate loans compared to Grad Plus loans?
   A) Undergraduate loans have higher credit limits.
   B) Undergraduate loans have lower interest rates (3–5%).
   C) Undergraduate loans are automatically forgiven after graduation.
4. Generally, how many total years of study (including a bachelor's) does it take to complete a master's degree?

A) 4 years
B) 6 years
C) 8 years

5. What is the primary goal of obtaining a PhD (Doctorate of Philosophy)?
A) To qualify for entry-level English 101 positions.
B) To become a practicing medical doctor for checkups.
C) To move the field forward and discover completely new things.

6. What is a "dissertation" in the context of a PhD program?
A) A 60-hour prerequisite exam.
B) Original research that must be defended in front of experts.
C) A collection of general education certificates.

7. On average, how long does a PhD program take to complete on its own?
A) 2 years
B) 4 years
C) 8 years

8. Which of the following is categorized as a "Professional Degree" in the source?
A) JD (Juris Doctor / Law)
B) Associate of Arts
C) PhD in Philosophy

9. What is a key characteristic of professional degrees compared to PhDs?
A) They require a dissertation and defense.
B) They directly lead into a specific career (e.g., lawyer or pharmacist).
C) They are generally the least expensive degrees.

10. From a strictly financial standpoint, what does the source say about getting a PhD?
A) It is the most reliable way to increase your salary.
B) It is almost never worth it for financial reasons.,
C) It is only worth it if you complete it in under two years.

Grammar Focus: Infinitive

1. Infinitive with *to*

The **infinitive with *to*** is commonly used in academic English to:

- express **purpose**
- describe **requirements**
- explain **results or intentions**

Examples:

- Students apply for a PhD to conduct academic research.
- A doctoral dissertation must be defended to obtain a PhD degree.
- A Master's programme prepares students to continue postgraduate studies.

2. Infinitive after adjectives

- The infinitive is often used after adjectives to describe **necessity, importance, or difficulty**.

Examples:

It is necessary to complete a course of study.
It is important to defend a doctoral dissertation.
It is difficult to combine academic research and full-time work.

3. Infinitive after verbs

Many verbs are followed by the infinitive in academic contexts, for example:

agree, decide, plan, aim, hope, intend, want, expect

Examples:

Many graduates plan to continue their studies.
Doctoral students aim to make an original contribution to knowledge.
Universities expect students to pass final examinations.

4. Infinitive after nouns

The infinitive can follow certain nouns to explain their function or purpose.

Examples:

- the opportunity **to obtain** an academic degree
- the requirement **to submit** a thesis
- the decision **to apply** for postgraduate study

In English, sometimes we use the **bare infinitive** (the base form of the verb without *to*). This is common in academic and formal contexts.

1**. After modal verbs**

- **can, could, may, might, must, shall, should, will, would**

Example:

- Students must pass the final examinations.
- Doctoral candidates can submit their dissertations electronically.

2. After verbs of perception

- **see, hear, watch, feel, notice, observe**

Example:

- The supervisor watched the student present the research findings.
- I heard him defend his thesis successfully.

3. After *let*, *make*, *have* (causative verbs)

- let = дозволяти, make = змушувати, have = доручати / наказувати

Example:

- The professor let the students ask questions.
- The committee made the candidate revise the thesis.
- The supervisor had the student check the references.

4. After expressions with *why*, *what*, *how* (in questions with causative

meaning)

Example:

- I don’t know what make them say that.
- Can you explain how let them proceed?

5. After *would rather / had better / rather than*

Example:

- Students would rather submit their essays online.
- Doctoral candidates had better defend their thesis on time.

Complete the sentences with the correct form of the verb in brackets.

1. The supervisor let the student _____ (present) her research findings to the committee.
2. Candidates are required _____ (submit) their doctoral dissertations by the end of June.
3. The committee watched the candidate _____ (defend) his thesis confidently.
4. The academic council will _____ (decide) whether the Master’s programme will continue.
5. Students must _____ (complete) all assignments before the final exams.
6. I had the research assistant _____ (check) all references for accuracy.
7. Many postgraduate students would rather _____ (conduct) independent research than take additional classes.
8. The lecturer could _____ (hear) the students _____ (discuss) the key concepts of the course.
9. The department head made the candidate _____ (revise) the methodology section of the thesis.
10. It is necessary _____ (analyze) the data carefully to draw valid conclusions.

Reflection

Answer the following questions in 3–5 sentences each. Use the vocabulary and grammar you have learned in this unit.

1. What have you learned about academic degrees in English-speaking countries and in Ukraine?
   - Reflect on the differences between Bachelor's, Master's, PhD, and senior doctorates.
   - Mention how the Ukrainian system has changed in recent years.
2. Which aspects of academic English (vocabulary, grammar, or reading skills) were the most challenging for you in this unit?
   - Think about infinitives with or without *to*, academic vocabulary,

or comprehension.
    - Explain why it was difficult and how you can improve.
3. How can you apply what you learned in this unit in your own academic work or future studies?
    - Consider writing assignments, presentations, or discussions.
    - Give an example of how you might use the vocabulary or grammar in real academic contexts.

Unit 3
Academic Research and Higher Education Systems

Warming-up Activities
Discuss the following questions in pairs or small groups:

- What are the main differences between PhD programmes in Ukraine and in other countries you know?
- What do you think are the most important requirements for a successful doctoral student?
- Why is original research essential for obtaining a PhD?
- How do publications and conference abstracts contribute to a doctoral candidate's success?
- Would you consider pursuing a PhD in Ukraine or abroad? Why or why not?

Task 1. Read and learn the Vocabulary Notes.

academic degree — науковий / академічний ступінь
PhD (Doctor of Philosophy) — доктор філософії
Doctor of Sciences — доктор наук
aspirant / postgraduate — аспірант / здобувач PhD
research proposal — науково-дослідницька пропозиція
original research — оригінальне дослідження
thesis / dissertation — дисертація
defence of a thesis — захист дисертації
avtoreferat (long abstract) — автореферат
conference abstracts — тези конференцій
supervisor — науковий керівник
department / faculty council — кафедра / факультетська рада
entrance examinations — вступні іспити
approval — затвердження
scientific council — наукова рада
reviewer — рецензент
state grants — державна стипендія

university lecturer — викладач університету
career prospects — перспективи кар'єри
completion rate — відсоток успішного завершення програми
university lecturer — викладач університету
career prospects — перспективи кар'єри

Task 2. Make up sentences with the words given in task 1.

Task 3. Read the text and discuss it. Write a synopsis of the text in five sentences.

POSTGRADUATE RESEARCH WORK IN UKRAINE

The system of higher academic degrees in Ukraine has recently been aligned with Western standards. Previously, the equivalent of a PhD was the degree of Kandidat Nauk, while the Doctor of Sciences corresponded to the "upper doctorate."

Today, students pursue PhD degrees in line with international practices. Applicants for doctoral studies have to write a paper (about 20 pages long) on the problems that they intend to research. The paper is reviewed by the applicant's supervisor, and then the applicant takes the entrance exams. If admitted, the applicant becomes a postgraduate.

Both full-time and correspondence postgraduate courses last four years.

The research theme is usually selected by the supervisor and then approved by the department and the faculty council. Original research is an absolute requirement. Thesis are written in Ukrainian. The average length is 150 pages, with a maximum of 200 pages.

Before submitting the thesis, the candidate must publish several articles and several abstracts of their conference papers. Publication of the thesis is not required; however, a lengthy abstract (approximately 20 pages) is published and sent to the country's major academic libraries and to prominent specialists in the field.

The finished thesis is submitted by the supervisor for review by two or three professors, after which it is discussed at a departmental meeting. The text is either accepted or amendments and improvements are suggested. When the final version is submitted, a special scientific council appoints two independent reviewers (no reviewer may be a member of the supervisor's department. If the reviews are positive, a public defence takes place. The degree is awarded by the scientific council, but the diploma is issued by the Ministry of Education and Science. Completion rates are high: 80-90 % of aspirants defend their dissertations.

Postgraduates receive monthly grants from the state. Graduates often become university lecturers. Holders of a *PhD* can earn two or even three times as much as other lecturers.

Task 4. Answer the questions using the active vocabulary: What do we call:

a) a person who studies in the postgraduate courses:

b) a person (a professor) who helps a postgraduate in his research;

c) a written research work which a postgraduate must submit to the scientific council;

d) a person who reviews the thesis;

e) the procedure when postgraduates submit their thesis to the scientific council.

Task 5. Read the following statements from the text and comment them:

1. The names of higher degrees in Ukraine are different from the Western degrees. What is the difference between our and Western degrees?

2. A correspondence postgraduate course lasts 4 years. Why does it last longer than a full-time course? When and how do correspondence postgraduate students study?

3. Original research is an absolute requirement. How original must your research be? If you write a dissertation, where do you express the originality and newness of your work?

4. A public defence is usually quite an ordeal. What are the difficulties of public defence? What must a postgraduate prepare for this procedure? Ask your friends or colleagues about their experience of this kind.

Task 6. Read the text again and answer the questions:

1. How has the system of academic degrees in Ukraine changed in recent years?
2. Which academic degrees in Ukraine were traditionally considered equivalent to Western doctoral degrees?
3. What requirements must applicants meet before being admitted to doctoral studies in Ukraine?
4. How long does postgraduate (PhD) study last in Ukraine today?
5. Who is responsible for selecting and approving the research topic?
6. What are the main requirements for a doctoral thesis in Ukraine?
7. Why are publications and conference abstracts required before the thesis defence?
8. How is the thesis reviewed before the public defence takes place?
9. What career opportunities are typically available to PhD graduates in Ukraine?

Task 7. Translate the sentences:

1. Кандидати (вступники) до аспірантури повинні написати реферат (20 сторінок). 2. Вони складають вступні іспити. 3. Навчання в аспірантурі триває 4 роки. 4. Тема дисертації обирається (пропонується) науковим

керівником. 5. Оригінальне дослідження є обов'язковою вимогою. 6. Аспірант повинен мати кілька публікацій - статті та тези конференцій. 7. Автореферат повинен бути надрукований і розісланий опонентам, провідним спеціалістам у цій галузі та в основні наукові бібліотеки України. 8. Вчена рада університету призначає двох опонентів. 9. Якщо відгуки позитивні, відбувається захист дисертації. 10. Аспіранти отримують щомісячні державні стипендії.

***Task 8. Agree to the statements of your friend. Use the following expressions of agreement*:**

You are right; You are quite (absolutely) right; It is quite true that ...; What you say is correct...I agree entirely with you.; N is definitely right when saying that ... .

Example: - *Mike is a postgraduate student in the statistics department at Lutsk National Technical University.*

- *You are quite right. He is a post-graduate student*

1. You work under Dr. Marchuk, don't you?
2. You have graduated from Lutsk National Technical University, haven't you?
3. You take part in the research carried on in your department. Am I right?
4. You have published several research papers in journals, haven't you?
5. You collaborate with your colleagues. Is it true?
6. You have obtained valuable information, haven't you?

Speaking Practice

Task 9. Disagree with the statements of your friend. Use the following expressions of polite disagreement:

I'm afraid you are wrong (mistaken); As a general rule, you are quite right, but in this case, I think.; What you say seems to be general opinion, but.; I agree with you to a certain extent, but.; A large part of what you say is true, but.; I disagree with your assessment.\

Example: -*This research student has already passed all his candidate examinations, hasn't he?*

- *I'm afraid you are mistaken. He has only passed his philosophy exam.*

1 His friend has finished the experimental part of his dissertation, hasn't he?
2 Your colleagues do not assist you in your research. Aren't I right?
3 The article doesn't contain any valuable information, does it?
4 He has taken part in many international scientific conferences, hasn't he?
5 My coworker is rather an experimenter than a theorist, isn't he?
6 He didn't use any new method in his research. Do you agree with me?

Task 10. Agree or disagree to the following statements

Example: - *I know that the University trains post-graduate students.*

- *Yes, you are right. Besides, our University does research.*
- *No, I see you are misinformed. Our University does not train postgraduate students. It trains only undergraduates.*

1. I found that almost all collaborators of your department combine activities in research with experimental work.
2. I believe you base your experiments on theoretical considerations.
3. A doctoral thesis (dissertation) is a serious effort, and it must mark a considerable advance in a given sphere of knowledge.
4. This branch of knowledge has been rapidly developing in the last two decades.
5. Doctoral candidates are not supposed to pass their examination in a foreign language.
6. I always discuss the obtained data with my research adviser.

Task 11. Answer the following questions

Example: - *I work in close contact with my research adviser. And what about you.*
- *I work in close contact with my research adviser too*.

1. I work in close contact with the collaborators of our department. And what about you?
2. My friend works in close contact with the scientists of the Russian Academy of Sciences. And what about your friend?
3. Our University works in close contact with Lublin Polytechnics University. And what about yours?
4. My scientific adviser works in close contact with the scientists of Germany. And what about your scientific adviser?

Task 12. Speak on the following problems and discuss them with your colleagues:

1. The theme of your research. Who selected it? Why is it interesting for you? How important is it for your field of science (industry)?

2. Entrance exams. What exams for the postgraduate courses did you pass? How did you pass them? What did you have to prepare?

3. Postgraduate courses. Advantages and disadvantages of studying at such courses.

Writing Task

Task 12. **Write a short academic text (180–220 words) on ONE of the following topics**:

1. Postgraduate research work in Ukraine: requirements and challenges
2. The PhD degree in Ukraine in comparison with an English-speaking country
3. Why original research is essential for obtaining a PhD

Use at least 8 words from the Vocabulary Notes.

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video"How does a PhD work? The FULL guide!" and do video comprehension tasks.

1) Decide whether the following statements are True (T), False (F), or Not Given (NG) according to the video transcript. Support your answer with citations from the source.

1. An international student in Australia might be highly motivated to finish within three years due to the potential cost of an extension.
2. The speaker suggests that a PhD is highly directed and structured, similar to an undergraduate degree.
3. According to the "sphere of knowledge" metaphor, a PhD represents a significant, large-scale expansion of human understanding.
4. A "PhD by publication" typically requires closer to five peer-reviewed papers to satisfy examiners.
5. Examiners for the viva are always assigned randomly by the university administration without the student's input.

2) Complete the summary of the PhD research process using terms found in the transcript.

To ensure that their work is truly (1) _____, a student must first conduct a (2) _____ to identify gaps in existing knowledge. This process is increasingly becoming (3) _____, involving overlaps between fields like chemistry and engineering. Once data is collected, the student must package it into a (4) _____ or a series of papers. This work is then sent to (5) _____ who judge whether the research is (6) _____ enough to pass their "filter".

3) ***Match the potential PhD outcomes (A–D) with their descriptions based on the speaker's experience:***

Outcome	Description
A. Outright Fail	1. The student must spend about six more months doing experiments to fix fundamental scientific flaws
B. Major Corrections	2. The most common result, involving minor spelling mistakes or missing initials in references
C. Pass with Minor Corrections	3. An extremely rare occurrence where the work is deemed perfect and robust as presented
D. Pass with No Corrections	4. A very rare event in the speaker's career where the candidate does not satisfy the requirements at all

4) Based on the transcript, answer the following questions in 2-3 sentences:

1. What is the primary purpose of the "viva" or oral defense?
2. How long can a typical oral defense last, and what happens immediately after the candidate finishes their presentation?
3. Why might some universities choose not to hold an oral defense?

Grammar Focus: Word Order in Academic Style

In academic English, word order plays a crucial role in making ideas clear, logical, and formal. Unlike informal speech, academic writing prefers balanced, predictable sentence structures that help the reader follow complex arguments.

1. Basic Word Order

The standard word order in academic statements is: Subject + Verb + Object / Complement

Postgraduate students conduct original research.
The thesis is reviewed by independent experts.

2. Position of Adverbs

In academic style, adverbs are usually placed:

- before the main verb
- after the verb “to be”
- at the beginning of a sentence to organise ideas

The degree is usually awarded after a public defence.
Applicants are often required to publish articles.
In recent years, doctoral programmes have changed significantly.

Avoid placing adverbs between a verb and its object.

3. Long Subjects and Information Flow

Academic sentences often have long subjects. To keep clarity:

- place known information first
- put new or important information at the end of the sentence.

The doctoral research process in Ukraine has undergone significant changes in recent years.

4. Passive Voice and Word Order

Passive constructions are common in academic writing because they focus on processes and results, not the person.

The thesis is submitted to the scientific council.
The diploma is issued by the Ministry of Education.

5. Avoiding Informal Emphasis

Academic English avoids:

- starting sentences with *and / but / so*
- placing key information too early for emotional effect.

Instead, use formal connectors:

However, the duration of study has been extended to four years.
Therefore, original research is a mandatory requirement.

Rewrite the sentences so that they follow appropriate academic word order and style. **Do not change the meaning of the sentences.**

1. Usually students before the defence publish several research articles.
2. Has changed significantly in recent years the system of postgraduate education in Ukraine.
3. Must be approved by the faculty council the topic of the research.
4. Often applicants after admission begin independent research work.
5. Is submitted to independent reviewers the final version of the thesis.
6. In Ukraine awarded is the PhD degree after a public defence.
7. Publish doctoral candidates conference papers regularly.
8. Reviewed by two experts is the dissertation before the defence.

Reflection

Answer the following questions in 3–5 sentences each.

1. What new information did you learn about postgraduate research work and the PhD degree in Ukraine?
2. Which aspects of the doctoral research process seem the most challenging and why?
3. How has this unit helped you better understand academic style and structure in English?
4. In what ways can you apply the knowledge from this unit to your future academic or professional work?
5. How has your attitude towards postgraduate studies or academic research changed after studying this unit?

Progress Check
Module I
Foundations of Scientific Thinking

1. According to the text, research work at LNTU serves as the primary basis for: a) Administrative reorganization. b) Training, education, and preparing specialists of world standards. c) Developing social media marketing strategies. d) Organizing sports events for students.

2. Which scientific school at LNTU focuses on the ability of materials to "self-organize"? a) Agricultural Machine Building. b) Economics. c) Science of Materials. d) Physics of Semiconductors.

3. The Physics department at LNTU is specifically known for its fundamental investigations into: a) Quantum theology. b) Electronic properties of multi-valley semiconductors. c) Classical mechanics of liquids. d) Renewable energy in agriculture.

4. How many patents for inventions does LNTU typically obtain annually? a) Over 300. b) Exactly 100. c) 15–20. d) 4–5.

5. In the English higher education system, a Bachelor's degree is typically awarded after a course of: a) One year. b) Two years. c) Three years. d) Five years.

6. What does the term "postgraduate" refer to in the context of academic degrees? a) A student who has not yet finished high school. b) A student pursuing a Master's or PhD degree after graduation. c) A lecturer without a scientific degree. d) A retired professor.

7. In some UK universities, the Master of Philosophy (MPhil) degree is: a) Restricted only to the study of philosophy. b) Awarded only to undergraduate students. c) A research degree offered in various faculties, including engineering and economics. d) Equivalent to a high school diploma.

8. A PhD dissertation is defined by its requirement to represent: a) A summary of existing textbooks. b) An original contribution to knowledge. c) A translation of a supervisor's work. d) A collection of personal opinions without data.

9. Which degree was traditionally considered equivalent to a PhD in the Ukrainian academic system? a) Bachelor of Science. b) Master of Arts. c) Candidate of Sciences. d) Senior Doctorate.

10. How long do full-time postgraduate (PhD) courses typically last in Ukraine today? a) Two years. b) Three years. c) Four years. d) Six years.

11. What is the standard length for a PhD thesis in Ukraine according to the sources? a) 50–100 pages. b) 150–200 pages. c) Exactly 300 pages. d) Over 500 pages.

12. Before a PhD defense in Ukraine, a candidate is required to publish: a) A full-length book. b) At least one newspaper article. c) A number of articles and conference abstracts. d) Their entire thesis on social media.

13. What is an "avtoreferat" in the Ukrainian PhD process? a) A certificate of attendance. b) A 20-page lengthy abstract of the thesis sent to libraries and specialists. c) A contract between a student and a supervisor. d) A list of all books read during the course.

14. Who is responsible for selecting the research theme for a postgraduate student in Ukraine? a) The Ministry of Education. b) The student’s family. c) The supervisor, with approval from the department and council. d) An independent reviewer from abroad.

15. Which body officially issues the PhD diploma in Ukraine after a successful defense? a) The University Library. b) The Specialized Scientific Council. c) The Ministry of Education and Science. d) The Rector of the University.

16. In academic word order, which of the following is correct? a) Usually students publish articles before the defense. b) Students usually publish articles before the defense. c) Publish articles students usually before the defense. d) Before the defense publish usually students articles.

17. The term "supervisor" (or "advisor") describes a person who: a) Only marks the final exams. b) Provides academic guidance and oversees a postgraduate's research. c) Funds the university's research projects. d) Cleans the laboratory equipment.

18. Why is the "Passive Voice" frequently used in scientific writing? a) Because it is easier to write. b) To focus on the action or results rather than the person performing them. c) To make the text sound more emotional. d) To avoid using complex vocabulary.

19. Senior doctorates in the UK (like DSc) are different from the PhD because they: a) Require a new dissertation defense. b) Are lower in status. c)

Involve submitting a collection of published works for evaluation. d) Are awarded only to international students.

20. Which of these is a mandatory requirement for a PhD thesis in Ukraine? a) It must be written in English only. b) It must be an original research. c) It must include 50 monographs. d) It must be defended in secret.

Academic English Grammar Assessment

1. Complete the sentence using the correct Passive Voice form: "Every year, several patents for inventions _____ by the University scientists." A. obtain B. are obtained C. obtained D. are obtaining

2. Which sentence follows the correct academic word order regarding adverbs? A. Usually students publish research articles before the defence. B. Students publish research articles usually before the defence. C. Students usually publish research articles before the defence. D. Before the defence students publish usually research articles.

3. In academic writing, the Passive Voice is preferred because it focuses on: A. The person performing the action. B. The action or the result itself. C. Emotional emphasis. D. Making the sentence as short as possible.

4. Choose the correct form: "Students apply for a PhD _____ original academic research." A. conduct B. for conduct C. to conduct D. conducting

5. After modal verbs like *must* or *can*, we use: A. The infinitive with *to*. B. The bare infinitive (without *to*). C. The gerund (-ing form). D. The past participle.

6. Complete the sentence: "The supervisor made the candidate _____ the methodology section of the thesis." A. to revise B. revise C. revising D. revised

7. Identify the correct Passive construction: "The results of the investigations _____ in international journals annually." A. are published B. publish C. are publish D. have publish

8. Which of the following is a characteristic of academic word order? A. Starting sentences with "But" or "And". B. Placing adverbs between a verb and its object. C. Placing known information first and new information at the end. D. Using informal emphasis for emotional effect.

9. Choose the correct option: "It is necessary _____ the data carefully to draw valid conclusions." A. analyze B. to analyze C. analyzing D. analyzed

10. "The professor let the students _____ questions after the presentation." A. to ask B. ask C. asking D. asked

11. Which sentence is written in the correct academic style? A. But the system of education has changed significantly. B. In recent years, the system of education has changed significantly. C. The system of education has changed in recent years significantly. D. Significantly changed has the system of education in recent years.

12. Complete the sentence: "Doctoral students aim _____ an original contribution to knowledge." A. make B. to make C. making D. for making

13. In the sentence "The diploma _____ by the Ministry of Education," the correct verb form is: A. issued B. is issued C. is issue D. issues

14. After verbs of perception like *see* or *hear*, we often use: A. The bare infinitive. B. The infinitive with *to*. C. The past perfect. D. Only the gerund.

15. Choose the correct word order: "The research theme must _____ by the faculty council." A. be approved B. approved be C. be approve D. approve be

16. "Postgraduate students would rather _____ independent research than take additional classes." A. to conduct B. conduct C. conducting D. conducted

17. Complete the sentence: "A doctoral dissertation must _____ to obtain a PhD degree." A. defend B. be defended C. to be defended D. is defended

18. Which connector is most appropriate for academic word order to show a result? A. So B. Therefore C. And D. Like

19. "The supervisor had the research assistant _____ all references for accuracy." A. check B. to check C. checking D. checked

20. Identify the mistake in word order: "Often applicants after admission begin independent research work." The correct version should be: A. Applicants often begin independent research work after admission. B. Often

after admission begin applicants independent research work. C. Applicants begin often independent research work after admission. D. Applicants after admission often begin independent research work.

Complete the sentences by filling in the gaps with the appropriate academic terms from the box provided above.

original research, literature review, interdisciplinary, thesis, viva, novel, scholarship, examiners.

1. A PhD program is a major undertaking that typically requires three to four years of **(1)** _____ to satisfy a panel.
2. To avoid doing "rubbish experiments," a student must conduct a **(2)** _____ at the beginning of their studies to find gaps in existing knowledge.
3. Modern research is increasingly becoming **(3)** _____, often overlapping fields like chemistry, physics, and engineering.
4. To convince a checking panel, the student's work must be deemed **(4)** _____ and represent a "tiny little bump" in the sphere of human knowledge.
5. International students often rely on a **(5)** _____ to waive fees and cover living costs while they focus purely on their studies.
6. After packaging years of work into a **(6)** _____, it is sent to **(7)** _____ who judge whether the research is robust enough to pass.
7. The final stage of the process is often an oral defense, commonly known as a **(8)** _____, where experts "dig and probe" into the candidate's knowledge.

objectivity, intellectual honesty, falsify, humility, testable, critical thinking, hypothesis, physical world.

1. Science is defined not just by answers, but as a **method of thought** used to test and **(1)** _____ ideas.
2. Because science seeks to explain the **(2)** _____, it does not deal with non-physical elements like love, jealousy, or morality.
3. A **(3)** _____ is considered an "educated guess" that translates wondering into **(4)** _____ questions.
4. Scientists must maintain **(5)** _____, meaning they do not allow their personal feelings to influence their records and conclusions.
5. Through **(6)** _____, a researcher tests all possible methods and asks "how" and "why" before arriving at a suggestion.
6. Practicing **(7)** _____ is crucial for safety; for instance, giving a

truthful report of observations prevents others from being put in danger.

7. A scientist who possesses **(8)** _____ is willing to admit errors and recognize when others have better ideas.

Specialized Academic Board, original contribution, postgraduate, senior doctorate, supervisor, academic degrees.

1. In the English system, a PhD is awarded upon the acceptance of a dissertation that represents an **(1)** _____ to knowledge.
2. Unlike the PhD, a **(2)** _____ (such as a DSc or DLitt) is awarded based on a collection of published academic works rather than a new dissertation.
3. In Ukraine, the system of **(3)** _____ has recently been aligned with international standards, replacing the Candidate of Sciences with the PhD.
4. A **(4)** _____ student in Ukraine must have their research theme approved by the department and the faculty council.
5. The research process is typically overseen by a **(5)** _____, who also reviews the applicant's initial paper before entrance exams.
6. In Ukraine, the **(6)** _____ is responsible for conferring the degree, although the final diploma is issued by the Ministry of Education.

MODULE II.
Foundations of Scientific Inquiry

Unit 4
Science as a Human Endeavour

Warming-up activities

Discuss the following questions:

1. What comes to your mind when you hear the word science: knowledge, experiments, technology, or something else? Why?
2. Do you think science is more about discovering facts or changing the world? Give an example.
3. In what ways does science influence your everyday life or the society you live in?

Task 1. Read and learn the Vocabulary Notes.

science — наука
scientific knowledge — наукові знання
human activity — діяльність людини
curiosity — допитливість, цікавість
natural phenomenon — природне явище
observation — спостереження
experimental fact — експериментальний факт
principle — принцип
theory — теорія
generalization — узагальнення
research — дослідження
discovery — відкриття
technology — технологія
society — суспільство
environment — середовище
openness — відкритість
freedom of thought — свобода мислення
critical thinking — критичне мислення
provisional knowledge — тимчасові / попередні знання
human endeavour — людське прагнення, діяльність

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***set of circumstances*** — a number of conditions or facts, connected with an event or person, that belong together because they are similar or complementary to each other.
2. ***to give rise to something*** — to be the cause of something, to suggest
3. ***in orderly fashion*** — in well-arranged order.
4. ***to keep pace with the times*** — to progress.
5. ***to increase the extent of our contact with unexplored areas*** — to widen and deepen the research.
6. ***to science we owe*** — we feel grateful to science for...
7. ***to mould the environment*** — to guide, control or influence the surrounding world.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

WHAT IS SCIENCE?

What is science? Science is, first of all, a human activity. Sciences arouse out of man's efforts to survive, his natural curiosity, his search for order in the surrounding world. It arouses from man's efforts to understand nature and

himself.

In science, you study both nature and human nature, encompassing living and non-living aspects. The fundamental aim of science is to describe the facts of nature and natural events. The basis of science is the belief that natural events have natural causes. When science seeks the cause of a natural phenomenon, it is essentially looking for a set of circumstances that gave rise to the event, circumstances that themselves evolved from a still earlier set of conditions. Science facilitates this search by observing facts and organizing them in an orderly fashion.

A secondary purpose of science is the formulation, on the basis of experimental facts, of principles and theories that are the generalizations and which will lead to new studies and increased knowledge.

What distinguishes science from other activities is that it enables a person to see the world "as it really is". This may mean different things to different people at different times. Over the ages, science has found the world to be flat at one time, round at another, and more recently "egg-shaped", to be the centre of the Universe, and, later, only a speck in the cosmos, to be made up of four fundamental substances and, later, of more than one hundred fundamental substances.

This does not mean that science is unreliable. That means that science keeps pace with the times. Every new discovery widens the horizon and expands our knowledge of previously unexplored areas.

We all know that science plays an important role in the societies in which we live. Through technology, science improves society's structure and helps people gain greater control over their environment. To science we owe most of our comforts, our leisure, our health and longevity, our ability to mould the environment, to communicate instantly, and to move swiftly over the Earth.

Science is an occupation for people who are open-minded and capable of putting their beliefs to many tests. There is always room for freshness, newness, and brightness in it. The openness and freedom of science make it the most advanced kind of thought humanity has so far developed.

Task 5. Translate the following words and word combinations:

Людська діяльність, зусилля людини, природна цікавість, оточуючий світ, основна мета, шукати причину, природне явище, спричинити подію, у добре встановленому порядку, вести до нових досліджень, основні речовини, цятка в космосі, недосліджені області, здоров’я і довголіття, контролювати навколишнє середовище, відкритість та свобода.

Task 6. Read the following statements from the text and comment them:

1) Science is, first of all, a human activity. Why is science

considered to be the first of activities?

2) The fundamental aim of science is to describe the facts of nature and natural events. Has science got any other aims? Give the examples.
3) Science enables a person to see the world "as it really is". Can you prove this statement?
4) At different times, science treated the same facts in different ways. Does it mean that science is unreliable? Why?
5) Science plays an important role in the societies in which we live. What role does science play in your life? What science do you deal with? How is your future occupation connected with science?

Task 7. Answer the questions.

General Comprehension

1. How does the text define science?
2. What factors led to the emergence of science as a human activity?
3. What is the fundamental aim of science mentioned in the text?
4. What belief serves as the basis of all scientific investigation?
5. How does science process and organize observed facts?
6. What is the secondary purpose of science regarding experimental facts?
7. How has the scientific view of the Earth changed over the ages?
8. Why does the author argue that science is not "unreliable" despite changing its conclusions?
9. What role does technology play in the relationship between science and society?
10. What specific benefits do humans "owe" to science for their daily lives?
11. What qualities must a person possess to be successful in the occupation of science?
12. Why is science considered the most advanced kind of thought humanity has developed?

Conceptual & Analytical Questions

1. What does it mean to see the world "as it really is" in a scientific context?
2. How does the text explain the concept of science "keeping pace with the times"?
3. What is the significance of "falsifiability" in the scientific process?
4. Why is science described as an "invitation" rather than a set of fixed rules?
5. Why does scientific inquiry purposefully exclude abstract concepts like "morality" or "jealousy"?
6. Explain the transition from "individual wondering" to "testable questions." Why is this important?

7. What is meant by "provisional knowledge" (temporary knowledge) in science?

Task 8. Translate the following sentences.

1. Наука — це, перш за все, людська діяльність, яка виникла через природну допитливість людини.
2. Фундаментальна мета науки полягає в тому, щоб описати факти природи та природні явища.
3. В основі науки лежить переконання, що всі природні явища мають природні причини.
4. Наука допомагає шукати причини подій, спостерігаючи факти та впорядковуючи їх у належний спосіб.
5. На основі експериментальних фактів дослідники формулюють принципи та теорії, які є узагальненнями.
6. Що відрізняє науку від інших видів діяльності, так це її здатність показувати світ таким, яким він є насправді.
7. Наука завжди йде в ногу з часом, тому наукові знання часто є тимчасовими.
8. Кожне нове відкриття розширює горизонт і наші знання про раніше недосліджені області.
9. Завдяки технологіям наука покращує структуру суспільства та допомагає людям контролювати навколишнє середовище.
10. Науці ми завдячуємо нашим комфортом, здоров'ям, довголіттям та можливістю миттєво спілкуватися.
11. Наука — це заняття для людей, які мають відкритий розум і здатні піддавати свої переконання багатьом випробуванням.
12. Відкритість і свобода мислення роблять науку найбільш прогресивним видом думки, який коли-небудь розробило людство.
13. Дослідники використовують критичне мислення, щоб перетворити індивідуальні роздуми на запитання, які можна перевірити.
14. Наука функціонує переважно як метод мислення, а не просто як набір готових відповідей.
15. Розуміння фізичного світу допомагає нам знайти рішення для таких глобальних проблем, як забруднення та зміна клімату.

Speaking Practice

Task 9. Work in small groups. Discuss the questions below, referring to the text "What Is Science?" and to your own research experience where possible. Support your ideas with clear arguments.

1. How does the text conceptualise science as a human activity rather than a collection of facts? How does this view relate to your field of research?

2. The text emphasises that scientific knowledge changes over time. How should this influence the way research results and theories are evaluated?
3. To what extent can science help us see the world "as it really is"? Are there limits to scientific explanation?
4. How does science contribute to social development through technology, and what responsibility does this place on researchers today?
5. Which qualities of a scientist mentioned in the text are most essential for doctoral research? Justify your answer.

Writing Task

Task 10. Write a short academic essay (220–280 words) based on the text "What Is Science?" and your own research experience. Choose ONE of the following topics:

1. Science as a Human Activity: Continuity and Change
2. The Role of Science in Understanding Reality
3. Why Scientific Knowledge Is Never Final

Requirements:

Your essay should: demonstrate a clear academic structure (introduction, development, conclusion); refer to key ideas from the text; include examples from your field of study where appropriate; use formal academic style and appropriate linking devices.

Assessment Focus:

- clarity and coherence of argument
- depth of analysis
- academic vocabulary and style
- accuracy and appropriacy of language

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video"What is Science?" and do video comprehension tasks.

1) Choose the most appropriate answer based on the video transcript.

1. How does the source define the core nature of science?
   a) A definitive collection of answers regarding the universe.
   b) A method of thought and a set of rules used to test and falsify ideas.
   c) A physical study of human emotions and morality.
2. What is the significance of "falsifiability" in the scientific process?
   a) It ensures that every hypothesis is eventually proven correct.
   b) It means an idea can be tested and, if the data dictates, proven wrong.

c) It allows scientists to ignore the physical world in favor of theoretical guesses.

3. According to the transcript, why is science described as an "invitation"?

a) It invites individuals to ask the world how it works through testable questions.

b) It is an invitation to accept existing knowledge without questioning.

c) It invites researchers to focus exclusively on non-physical elements like justice.

2) ***Complete the following sentences using specific terms from the source.***

Science is driven by (1) _____ and action, functioning primarily as a (2) _____ rather than a fixed result. It seeks to explain the (3) _____ world, purposefully excluding abstract concepts such as (4) _____ or jealousy. By formulating a (5) _____ — which is described as an "educated guess" — scientists can translate individual wondering into questions that allow our (6) _____ knowledge to grow. Ultimately, this process helps us understand the (7) _____ of global problems like climate change and pollution

Task 3: Provide detailed answers (4–6 sentences) by synthesizing information from the source and your knowledge of doctoral research.

1. The "Method of Thought" vs. Outcomes: The source states that science "refers to how you do things rather than what answer you get". How should a PhD candidate apply this principle when their research results "turn out to be completely wrong"?

2. The Boundaries of Scientific Inquiry: Why does science refrain from dealing with elements like "morality" or "justice," and how does this focus on the "physical world" help in achieving "testable" results?

3. Collaborative Progress: Explain the transition from "individual wondering" to "testable questions which others can also get involved in". Why is this transition vital for the "well-being of all life forms"?

Grammar Focus: Hedging and Authorial Stance in Academic Discourse

In academic communication, researchers present claims cautiously and make their authorial position clear. Rather than stating facts absolutely, writers signal probability, limitation, and interpretation. This practice, known as hedging, is central to responsible scholarly discourse.

1. Modal Verbs for Cautious Claims

Modal verbs help soften statements and indicate degrees of certainty.

- *may / might / could* — possibility
- *cannot be ruled out* — partial uncertainty

Scientific knowledge may change over time.

This result could indicate a broader tendency.

Avoid strong modals (*must, will*) unless the evidence is indisputable.

2. Impersonal and Passive Structures

Impersonal constructions allow the writer to distance themselves from the claim and focus on evidence.

- *It may be argued that…*
- *It appears that…*
- *The data were analysed using…*

These structures are typical of research articles and dissertations.

3. Reporting Verbs and Academic Stance

Reporting verbs express the researcher's position toward previous studies.

- neutral: *describe, report, observe*
- tentative: *suggest, indicate, imply*
- critical: *question, challenge, dispute*

Previous studies suggest that scientific models evolve over time.

4. Limits of Scientific Claims

Hedging reflects the understanding that:

- scientific knowledge is provisional,
- conclusions are based on available evidence,
- further research may be required.

The findings should be interpreted with caution.

Grammar Practice: Impersonal and Passive Structures in Academic Discourse

Exercise 1. Explain the transformation of the following "Personal Opinions" into formal "Academic Statements." Use distancing constructions such as "It appears that…", "It may be argued that…", "It is often observed that…", or the Passive Voice to enhance the scholarly tone and reflect a proper scientific attitude.

1. Subject: Return on Investment (ROI) for Degrees

• Personal Opinion: Shane Hummus thinks the bachelor's degree gives the best return on investment.

• Academic Transformation: It appears that the bachelor's degree, on average, provides the most favorable return on investment compared to other types of undergraduate or graduate credentials.

2. Subject: The Rigor of Postgraduate Research

• Personal Opinion: PhD students work 8 to 12 hours a day in a lab.

• Academic Transformation: It is often observed that doctoral candidates are required to perform hands-on work for extensive hours in laboratory or office settings to ensure the verification of their data.

3. Subject: Financial Costs of Professional Education

• Personal Opinion: Professional degrees are the most expensive but pay the most.

• Academic Transformation: It may be argued that while professional degrees are characterized by high tuition costs, they also tend to result in the highest average lifetime earnings.

4. Subject: The Role of Imagination in Research

• Personal Opinion: I believe scientists must have a good imagination to create new theories.

• Academic Transformation: It is suggested that a successful scientist needs to be highly imaginative to look for relationships in complex and incomplete data and to formulate hypotheses.

5. Subject: Challenging Established Authority

• Personal Opinion: Researchers should not just believe what famous professors say.

• Academic Transformation: It is argued that a successful researcher should remain skeptical and reject authority as the sole basis of truth, choosing instead to verify statements through experimental methods.

Exercise 2. Transform the following "Personal Opinions" into formal "Academic Statements." Use distancing constructions such as "It appears that…", "It may be argued that…", "It is often observed that…", or the Passive Voice to enhance the scholarly tone and reflect a proper scientific attitude.

1. Subject: The Nature of Scientific Curiosity

• Personal Opinion: I think scientists are just like children because they are always curious about everything.

2. Subject: Reliance on Authoritative Sources

• Personal Opinion: Researchers should just trust what is written in old textbooks because famous scholars have already proven those facts.

3. Subject: Human Reliability in Investigations

• Personal Opinion: I believe that a researcher’s personal feelings and bias don't really affect the results of an experiment.

4. Subject: The Necessity of Personal Observation

• Personal Opinion: I feel that researchers don't need to be good observers anymore because modern devices can do all the work for them.

5. Subject: Handling Errors and Intellectual Honesty

• Personal Opinion: If a student makes a mistake in a mixture, they should probably hide it to avoid facing criticism from their team.

6. Subject: The Role of Imagination in Data Analysis

• Personal Opinion: I guess that imagination is only for artists, and scientists should only focus on facts without trying to see "hidden" relationships.

7. Subject: Skepticism and Evidence

• Personal Opinion: Scientists must accept any statement as true as long as it comes from a powerful person in the university.

8. Subject: Risk-Taking and Innovation

• Personal Opinion: I think that successful researchers always play it safe and never take risks when they try to find original ideas

Reflection

Answer the following in 3–5 sentences each:

1. What new insights about science and its role in society did you gain from this text?
2. How do curiosity, observation, and critical thinking interact in scientific research? Can you give an example from your field?
3. How can adopting a scientific attitude improve your own research or professional work?

Unit 5
Thinking and Acting Like a Researcher

Warming-up activities

Discuss the following questions:

1. What personal qualities or attitudes do you think are most essential for a successful researcher, and why?
2. How does curiosity influence the way scientists select problems and conduct research? Can you give an example from your field?
3. Why is skepticism and self-criticism important in scientific work? How can these attitudes improve research outcomes?

Task 1. Read and learn the Vocabulary Notes.

scientific attitude — наукове ставлення, підхід
observation — спостереження
objectivity — об'єктивність
skepticism — скептицизм
imagination — уява
hypothesis — гіпотеза
research problem — дослідницька проблема
underlying relationship — прихований зв'язок
data — дані
analysis — аналіз
evidence — доказ, свідчення
critical thinking — критичне мислення
self-criticism — самооцінка, самокритика
persistent — наполегливий
logical thought — логічне мислення
verification — перевірка, верифікація
experimental method — експериментальний метод
scientific discovery — наукове відкриття
impartiality — неупередженість
underlying cause / relationship — основна (прихована) причина / зв'язок
man is the least reliable of scientific instruments — людина є найменш надійним науковим інструментом
to disturb impartial investigation — заважати неупередженому дослідженню
to provide a truthful report — надати правдивий звіт
to generate new and original ideas — створювати нові та оригінальні ідеї
complex phenomena — складні явища
to refine methods — вдосконалювати методи

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***to be full of curiosity*** — to be full of desire to learn or know.
2. ***pure and applied knowledge*** — theoretical and practical body; facts accumulated by mankind.
3. ***to solve the problem*** — to find the answer (to), to explain a question proposed for solution.
4. ***to apply persistent and logical thought*** — to use practically constantly

repeated and correct reasoning of an idea (concept).

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

THE SCIENTIFIC ATTITUDE

What is the nature of the scientific attitude, the attitude of the man or woman who studies and applies physics, biology, political science, chemistry, psychology, engineering, management, medicine, or any other science?

What are these special methods of thinking and acting? First of all, it seems that a successful scientist is full of curiosity; he wants to find out how and why the universe works. He usually focuses on problems he sees as lacking a satisfactory explanation, and his curiosity prompts him to look for underlying relationships, even when the available data seem unconnected. Moreover, he believes he can improve the existing conditions, whether in pure or applied knowledge, and enjoys trying to solve these problems, which entails this.

He is a good observer, accurate, patient, and objective, and applies persistent, logical thought to his observations. He utilizes the facts he observes to the fullest extent. For example, trained observers obtain a vast amount of information about a star (e.g., distance, mass, velocity, size) primarily from the accurate analysis of the simple lines that appear in a spectrum.

He is skeptical — he does not accept statements that are not based on the almost complete evidence available — and therefore rejects authority as the sole basis of truth. Scientists always verify statements and conduct experiments carefully and objectively to confirm their findings.

Furthermore, he is not only critical of the work of others but also of his own, since he knows that man is the least reliable of scientific installments and that a number of factors tend to disturb impartial and objective investigation.

Lastly, he is highly imaginative, as he often has to find relationships in data that are not only complex but also frequently incomplete. Furthermore, he needs imagination to formulate hypotheses about how the process works and how events unfold.

These seem to be some of the ways in which a successful scientist or technologist thinks and acts.

Task 5. Translate the following words and word combinations:

Спрямовувати увагу, існуючі умови, спостереження, доступні дані, задовільне пояснення, здаватися непов’язаними між собою, прикладні знання, велика кількість інформації, точний аналіз, відкидати авторитетні джерела, перевіряти твердження, надійний науковий інструмент, неупереджене дослідження.

Task 6. Read the following statements from the text and comment on them:

1. A successful scientist is full of curiosity. 'Curiosity' is a quality of children. Can we treat a scientist like a child? Is it necessary for a grown-up person who deals with science to be curious? Why?

2. A successful scientist is a good observer. Nowadays, there are many different devices for observation, so perhaps it's unnecessary for a scientist to be a good observer, as these devices can do all the work.

3. Authoritative sources are proven by different scholars, so they are reliable. Why should a successful scientist reject them?

4. Do you agree with the statement that a successful scientist needs imagination? Prove it.

Task 7. Put questions to the underlined words.

1. A successful scientist wants <u>to find out how and why the universe works</u>.

2. <u>A successful scientist</u> utilizes the facts he observes to the fullest extent.

3. Trained observers obtain a very large amount of information <u>from the accurate analysis</u>.

4. Scientists always check statements <u>to verify them</u>.

5. A man is <u>the least reliable</u> scientific installment.

6. A successful scientist must look for <u>relationships in data</u>.

Task 8. Translate the following sentences.

1. Справжній вчений повинен бути допитливим для того, щоб виявляти та досліджувати невідомі явища природи. 2. Проблеми та явища, які не мають задовільного пояснення, завжди привертають увагу вчених. 3. Хороший вчений повинен бути спостережливим, терплячим та об’єктивним для того, щоб проаналізувати та застосувати свої спостереження на практиці. 4. У своїх дослідженнях вчені ніколи не покладаються лише на авторитетні та перевірені джерела і таким чином рухають науку уперед. 5. Для підтвердження своїх гіпотез вчені проводять багато експериментів. 6. Щоб зробити щось неможливе дослідники повинні мати добре розвинену уяву.

Task 9. Speak on the following problems and discuss them with your colleagues:

a) You are a successful scientist. Give some useful advice to your young colleague about the qualities he/she should possess.

b) Discuss the qualities you consider to be the most and the least important for a good scientist.

Speaking Practice

Task 10. Work in small groups or pairs. Discuss the questions below, using ideas from the text "The Scientific Attitude" and your own research experience. Support your points with specific examples from your field. Prepare a 2-minute academic summary of your discussion to present to the class.

1. The text lists qualities of a successful scientist such as curiosity, skepticism, objectivity, and imagination. Which of these qualities do you think is the most critical in your research discipline, and why?
2. How can a researcher balance self-criticism with confidence in their own findings?
3. In your opinion, how do observation and imagination complement each other in the process of scientific discovery?
4. How does rejecting authority and verifying evidence personally influence the quality and reliability of research?
5. Can the principles described in the text (curiosity, skepticism, persistence) be applied outside the sciences? Provide examples.

Task 11. Writing Task

Write a short academic essay (250–300 words) on ONE of the following topics, using insights from the text "The Scientific Attitude":

Topics:

1. The Role of Curiosity and Skepticism in Scientific Research
2. Balancing Observation, Imagination, and Objectivity in Your Field
3. Applying the Scientific Attitude Beyond the Sciences

Guidelines:

- Maintain a formal academic style and structured essay: introduction, main body, conclusion.
- Include at least 5–7 key vocabulary items from your unit (e.g., curiosity, skepticism, observation, imagination, hypotheses, impartial, objective).
- Support your essay with examples from research or practical experience.
- Use hedging and cautious academic language: *may, might, it appears that, suggests, indicates*.

Assessment Criteria:

- Relevance and clarity of ideas
- Coherence and logical organisation
- Use of academic vocabulary and hedging
- Depth of analysis and critical thinking

Video Insights: Postgraduate Research in Motion

Task 12. Watch the video" Scientific Attitudes?" and do video comprehension tasks.

1) Choose the correct scientific attitude that matches the described behavior according to the source.

1. A researcher records the exact reaction of a plant to touch without allowing personal feelings to influence the conclusion. This is an example of:
   a) Inventiveness
   b) Objectivity
   c) Open-mindedness
2. A scientist tests all possible methods and asks "how" and "why" questions before arriving at a final suggestion. This demonstrates:
   a) Curiosity
   b) Responsibility
   c) Critical thinking
3. A student admits they used the wrong ingredients in a mixture and accepts a better idea from a teammate. Which attitude is being practiced?
   a) Risk-taking
   b) Humility
   c) Intellectual honesty

2) Complete the following sentences using the specific terminology from the transcript.

In the field of science, successful individuals are often (1) _____ for information, especially when observations do not (2) _____. This curiosity drives them to understand the underlying causes of phenomena, such as how bridges (3) _____ weight. Furthermore, scientists must practice (4) _____, which involves providing a (5) _____ report of their observations to ensure that others are not put in danger. Because they are (6) _____, they are willing to present their work despite the possibility of facing (7) _____.

3) Answer the following questions in 4–6 sentences, drawing on the source and your academic experience.

1. Intellectual Honesty vs. Personal Error: According to the source, why is "intellectual honesty" vital for public safety, and how does it relate to the attitude of "humility" when a scientist makes a mistake?
2. The Role of Risk in Innovation: The transcript mentions that scientists are "risk takers". Explain how this attitude, combined with "inventiveness," allows

a researcher to generate "new and original ideas" in a competitive academic environment.
3. Collaborative Ethics: Describe how "open-mindedness" facilitates a better research environment. Why is it important to "ask for permission" before giving feedback to colleagues?

Grammar Focus: Complex Noun Phrases

In academic writing, especially at the postgraduate level, ideas are often expressed using complex noun phrases. These allow you to pack information densely, reduce repetition, and maintain formal style.

1. Structure of Complex Noun Phrases

A complex noun phrase can include:

- Pre-modifiers: adjectives, nouns, participles, or relative clauses before the head noun
- Head noun: the main noun of the phrase
- Post-modifiers: prepositional phrases, relative clauses, or participles after the head noun

Example:

The persistent and logical analysis of observational data by trained scientists

- Pre-modifiers: *persistent and logical*
- Head noun: *analysis*
- Post-modifiers: *of observational data by trained scientists*

2. Using Participles and Nominalisations

Participles and nominalised verbs are common in academic texts:

- *observing → the observing of stars*
- *investigate → the investigation of relationships in data*

Example:

The careful observation of complex phenomena often leads to new hypotheses.

3. Embedded Clauses

Relative clauses can be embedded in noun phrases to add precise information:

Example:

1) The hypothesis that underlies the experimental design is based on previous research. 2) The scientist who conducted the observations analysed the data systematically.

4. Academic Advantages

Using complex noun phrases helps to:

- make sentences more concise, avoiding multiple short clauses

- emphasise key concepts rather than the subject
- create a formal and professional tone suitable for publications and dissertations

Practice Task: Complex Noun Phrases

Task 1: Identify and analyse. Read the sentences below. Identify the head noun, pre-modifiers, and post-modifiers in each complex noun phrase.

1. The persistent and logical analysis of observational data by trained scientists leads to new insights.
2. The formulation of testable hypotheses is a key aspect of scientific thinking.
3. The critical evaluation of existing theories allows researchers to refine their methods.
4. The careful observation of complex phenomena often results in unexpected discoveries.

Task 2: Transform Sentences. Rewrite the following sentences using complex noun phrases to make them more formal and concise.

1. Scientists observe the stars carefully, and they analyse the data they collect.
2. Researchers perform experiments, and they check the results very carefully.
3. The scientist is critical of his work. The scientist is critical of others' research.
4. Students design experiments that test how chemicals react under different conditions.

Tip: Use pre-modifiers, post-modifiers, participles, and nominalisations to combine ideas into a single noun phrase.

Task 3: Create your own, using vocabulary from this unit (curiosity, observation, hypothesis, analysis, verification, evidence), write 3 complex noun phrases describing aspects of scientific research.

Example: *The systematic verification of experimental evidence by careful observers*

Reflection

Answer the following questions in 3–5 sentences each. Use ideas from the text and your own research experience.

1. Which qualities of a successful scientist described in the text do you find most relevant to your own research, and why?
2. How does the combination of curiosity, skepticism, and imagination influence the process of scientific discovery? Can you provide an example

from your field?
3. How can adopting a scientific attitude improve the quality and reliability of research in disciplines outside the natural sciences?

Unit 6
From Hypothesis to Theory

Warming-up activities

Discuss the following questions:

1. Is there a universal "scientific method," or do different sciences require entirely different methods?

2. Why is the "recognition of the problem" considered the very first step in any investigation?

3. In your opinion, what should have more influence on a scientist's conclusion: the reputation of a famous colleague or experimental data? Why?

Task 1. Read and learn the words and word combinations.

to recognize – визнавати
recognition - визнання
sequence of procedures – ряд процедур
to establish – встановлювати, визначати
to obtain – отримувати
to list – перераховувати
solution – рішення, вирішення, розв'язання
abandonment of the hypothesis – відмова від гіпотези
to discard – відкидати, залишати
substantiating data – достовірні дані
eventually – кінець кінцем, зрештою
rank – розряд, ранг
to sway – мати вплив, переконувати
solely – виключно, тільки
sequence of procedures — ряд процедур
to establish — встановлювати/визначати
substantiating data — достовірні дані
to discard/abandon a hypothesis — відкинути гіпотезу
rank of a theory — розряд (ранг) теорії
to be swayed solely by — бути переконаним виключно (чимось)
to shift – змінюватися, переміщуватися, переноситися

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***sequence of procedures*** — the regular order of doing things.
2. ***the emphasis passed from ... to*** — something became more important

than which accounts.

3. ***satisfactorily for*** — which is a good explanation.

4. ***of amount of substantiating data*** — number of facts that support hypothesis.

5. ***hypothesis advances to the rank of a theory*** — hypothesis gradually changes into a theory.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

SCIENTIFIC METHOD AND METHODS OF SCIENCE

It is sometimes debated whether there is a single "scientific method" or merely various methods used across different sciences. However, as human knowledge of natural phenomena has increased, it has become clear that a special sequence of procedures is essential to establish the working principles of science. This well-defined procedure, where the emphasis shifts from the knowledge itself to the method of obtaining it, is known as the Scientific Method.

The standard procedure involves several critical steps:

1. Recognition of the problem: Identifying the specific issue to be investigated.

2. Collection of relevant facts: Gathering as much data and information as possible.

3. Proposing a hypothesis: Analyzing the data to suggest a solution or an "educated guess".

4. Performance of test experiments: Testing the deductions arising from the hypothesis.

5. Evaluation of results: Acceptance, modification, or abandonment of the hypothesis based on the experimental evidence.

If a hypothesis is discarded, a new one must be established, and the process repeats until an explanation is found that satisfactorily accounts for all known facts. As the amount of substantiating data grows, a hypothesis may eventually advance to the rank of a theory and be accepted as true.

Generally, a researcher adopts the most obvious hypothesis first — the one that offers the simplest explanation at the moment. However, true scientists are swayed solely by experimental evidence. They are not governed by emotional reactions, the majority's opinion, or the reputation of the individual who advanced the idea. Instead, they constantly check their conclusions by experiment, guided exclusively by the results obtained.

Task 5. Translate the following words and word combinations:

Метод дослідження, застосовувати ряд процедур, встановлювати

принципи, визнання проблеми, контрольні експерименти, відкидати гіпотезу, перейти до розряду теорії, найочевидніша гіпотеза, найпростіше пояснення, висувати гіпотезу, перевіряти висновки, керуватися отриманими результатами.

Task 6. Choose the right variant

1. People's growing knowledge of nature is the result of …
a) proving obvious hypothesis;
b) a successful experiment;
c) application of a particular method of investigation.
2. If the hypothesis is discarded …
a) relevant facts or data will be collected;
b) a new hypothesis will be set up;
c) a scientist will offer the simplest explanation of the observed facts.
3. In general a scientist adopts first …
a) the most obvious hypothesis;
b) known experimental facts.
c) the method by which knowledge was obtained.
4. The true scientists are swayed only by …
a) the reputation of the man who advanced the hypothesis;
b) what the majority of people think about a certain fact;
c) experimental evidence.

Task 7. Put questions to the underlined words.

1.The steps will be repeated until an explanation is found.
2. The hypothesis advances to the rank of a theory.
3. In general one adopts first the most obvious hypothesis.
4. The true scientists are swayed only by experimental evidence.
5. True scientists will constantly check their conclusions and hypotheses by experiment.

Task 8. Translate the following sentences.

1. Виникнення наукового методу було спричинене збільшенням людських знань про природу і навколишнє середовище. 2. Порядок проведення певних дій спонукав встановлення наукових принципів дослідження. 3. Наукове дослідження проводиться у декілька етапів. 4. Постановка проблеми та аналіз даних є невід'ємними складовими наукового дослідження. 5. Якщо гіпотеза не підтверджується експериментами, то висувається нова гіпотеза і вчені шукають її підтвердження. 6. Зазвичай спочатку приймається найочевидніша і найпростіша на даний момент гіпотеза. 7. Справжній вчений керується лише підтвердженими експериментальними даними і завжди перевіряє свої висновки та гіпотези.

Speaking task

Task 9. Speak on the following problems and discuss them with your colleagues:

a) methods, you are going to apply in your investigation;

b) the hypothesis existing in the area of your investigation.

c) Describe the materials and methods used in one of your own investigations.

Writing Task

Task 10. Write a report on your own research activities.

Define the subject of your current research work. Say how long this work has been underway. Indicate the current interest in the problem. State the problem and define the aim of your report. Indicate the reporting period. Describe the requirement for the study with respect to the materials, equipment, methods, or specific conditions that were to be met at different stages of the research. Report the main results of your current work and make an attempt at their preliminary interpretation. Outline the part of the research that still remains to be done and the time necessary to bring it to a conclusion. Write a few words about the possible significance of your current research in case it is completed successfully.

Additional reading

Task 11. Read the text and answer the questions.

SCIENTIFIC METHOD AND METHODS OF SCIENCE

It is sometimes said that there is no such thing as the "scientific method"; there are only methods used in science. Nevertheless, it seems clear that there is often a specific sequence of procedures involved in establishing the principles of scientific work. This sequence is as follows: (1) a problem is recognized, and as much information as possible is collected; (2) a solution (i.e., a hypothesis) is proposed and the consequences arising out of this solution are deduced; (3) these deductions are tested by experiment, and as a result the hypothesis is accepted, modified or discarded.

Task 12. Check up for comprehension.

Find two sentences that express two different viewpoints on the existence of the "scientific method". 2. What words show that the first sentence is an opinion? 3. What words show that these viewpoints are in opposition? 4. Find the words equivalent to "scientific method". 5. What procedure does the scientist follow in his research?

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video"The Scientific Method: Steps, Terms and Examples" and do video comprehension tasks.

1) Conceptual Vocabulary & Terminology. Based on the video transcript, match the scientific elements with their doctoral-level descriptions.

Element	Description
Question	1. A potential answer or a prediction of the outcome
Hypothesis	2. Knowledge gained through the senses or specialized scientific equipment
Experiment	3. The initial proposal of a specific problem that requires a solution
Observation	4. An ordered investigation intended to prove or disprove a potential answer
Data Analysis	5. A statement determining if the original prediction was supported or refuted
Conclusion	6. The process of comparing experimental results with the initial prediction

2) Critical Analysis of the "Method". Answer the following questions based on the sources:

1. **Disciplinary Variations:** Why does the speaker claim that "the steps involved in the scientific method vary widely among different scientific disciplines"? Give examples of how a chemist's method might differ from a botanist's.

2. **Terminology Shift:** Why is it considered more accurate to describe the parts of the scientific method as "elements" rather than "steps"?.

3. **The Feedback Loop:** Using the internet connection example, explain how a conclusion can inspire a new question and lead to another cycle of the scientific process.

3) Task 3: Fluidity vs. Prescribed Steps (Discussion). In your doctoral research, you often deal with complex, non-linear problems. Reflect on the following statements from the sources:

• "The scientific method is much more fluid than you might think".

• "Real scientists may go back and repeat steps many times before they come to any conclusions."

GRAMMAR FOCUS: CONDITIONALS (TYPE 1)

In scientific texts, First Conditionals are used to describe standard procedures, logical sequences, and predictable experimental outcomes. They help formulate a clear algorithm of actions: if a certain condition is met in the present, a specific result follows in the future.

1. Structure

The standard formula for describing the scientific method is:

• *If + Present Simple (condition), Future Simple (result).*

2. Examples from the Sources

The sources provide a clear example of how this structure describes the cyclical nature of scientific inquiry:

• "If the hypothesis is discarded as the result of the test experiments, a new one will be set up...".

• "...and steps three, four, and five will be repeated until an explanation is found...".

3. Usage Notes

• Passive Voice: Because scientific style demands objectivity, the passive voice is frequently used within conditional sentences (e.g., *is discarded*, *will be set up*, *will be repeated*).

• Time Clauses (Until / As soon as): In subordinate clauses of time that often accompany conditionals, the Present Simple is used to express a future action, such as in the phrase "until an explanation is found".

Exercise 1. ***Complete the sentences using the logic of the scientific method and the correct verb forms:***

1. If the scientist (collect) _____ relevant facts, the analysis of data (be) _____ more accurate.
2. A new solution (be proposed) _____ if the first hypothesis (not account) _____ satisfactorily for the facts.
3. If the amount of substantiating data (become) _____ larger, the hypothesis (advance) _____ to the rank of a theory.
4. If the research team (obtain) _____ substantiating data, the paper (be published) _____ in a reputable journal.
5. A theory (be accepted) _____ as true if the experimental results (account) _____ satisfactorily for all facts.
6. If you (apply) _____ this special sequence of procedures, you (establish) _____ the working principles of your study

Exercise 2. ***Translate the following sentences, paying attention to the "If..., will..." structure:***

1. If the hypothesis is not confirmed by experiments, a new hypothesis will be set up.
2. If scientists seek confirmation, they will constantly check their

conclusions by experiment.

3. If the test results are successful, the hypothesis eventually may be accepted as true.

4. If the amount of substantiating data becomes larger, the hypothesis will advance to the rank of a theory.

5. If a scientist applies this special sequence of procedures, he will establish the working principles of science.

6. If the true scientists are guided solely by experimental evidence, they will not be swayed by emotional reactions

Exercise 3. ***Create your own conditional sentences using the following phrases:***

- (to recognize the problem / to collect information);
- (to discard the hypothesis / to set up a new one);
- (to obtain substantiating data / to establish working principles)
- (to analyze data / to propose a solution).
- (to follow the scientific method / to be swayed solely by experimental evidence).
- (to modify the hypothesis / to perform new test experiments)

Reflection

1. How does following a "sequence of procedures" influence the reliability of your research?

2. Why is the "abandonment of a hypothesis" considered a constructive step in the scientific method?

3. How do you ensure that your conclusions are guided solely by experimental evidence rather than emotional reactions or the reputation of others?

Progress Check
Module II
Foundations of Scientific Inquiry

1. Choose the right option.

Section 1: The Nature of Science (Units 4)

1. According to the text, what is the primary definition of science? A. A collection of unchangeable facts B. A human activity aimed at understanding nature C. A set of technological inventions D. A study of non-physical moral

values

2. What does science look for when it seeks the cause of a natural phenomenon? A. A set of circumstances that gave rise to the event B. Personal opinions of famous researchers C. A supernatural explanation D. A way to ignore previous conditions

3. Why is science described as "keeping pace with the times"? A. It never changes its theories B. It adapts as new discoveries expand the horizon of knowledge C. It only focuses on modern history D. It follows political trends rather than facts

4. What distinguishes science from other activities? A. It guarantees absolute truth immediately B. It enables a person to see the world "as it really is" C. It focuses only on what we want to believe D. It is practiced only in laboratories

5. Science purposefully excludes which of the following elements? A. Living organisms B. Natural phenomena C. Love, jealousy, and morality, D. Physical interaction

6. What is the significance of "falsifiability" in science? A. It means scientists should lie about their data B. It means an idea can be tested and proven wrong if the data dictates, C. it ensures that every hypothesis becomes a theory D. It proves that science is unreliable

7. How does science contribute to society through technology? A. By allowing people to gain increasing control over their environment B. By limiting the freedom of thought C. By focusing solely on abstract concepts D. By stopping all natural changes

8. In science, what is a hypothesis described as? A. A final answer to a problem B. An "educated guess" about how something works, C. A proven fact D. A random thought without evidence

9. The fundamental aim of science is to: A. Control people's thoughts B. Describe the facts of nature and natural events C. Create complex languages D. Prove that nature is chaotic

10. Science is described as an "invitation" because it: A. Invites us to accept authority without question B. Invites individuals to ask the world how it works through testable questions, C. Only invites famous people to participate D. Invites us to ignore physical evidence

Section 2: Scientific Attitudes (Unit 5)

1. Which attitude involves recording observations "as they are" without personal feelings? A. Inventiveness B. Objectivity, C. Humility D. Risk-taking

2. A scientist who listens to and respects the ideas of others demonstrates: A. Skepticism B. Curiosity C. Open-mindedness D. Intellectual honesty

3. What does "intellectual honesty" mean in a scientific context? A.

Stealing ideas from others B. Giving a truthful report of observations C. Ignoring mistakes to keep a job D. Only reporting successful experiments

4. Why is humility important for a successful researcher? A. It helps them hide their research B. It allows them to admit errors and recognize better ideas C. It prevents them from asking questions D. It makes them rely solely on authority

5. Critical thinking in science involves asking not just "what," but also: A. "Who cares?" B. "How" and "why" questions C. "Where is the money?" D. No questions at all

6. Which quality helps a scientist find relationships in complex and incomplete data? A. Humility B. Imagination C. Respect for others D. Responsibility

7. Why should a scientist be skeptical of authority as the sole basis of truth? A. Because all authorities are always wrong B. Because scientific statements must be based on evidence and verification C. Because it is fun to disagree D. Because scientists do not like rules

8. "Man is the least reliable of scientific instruments" suggests that: A. Humans should not do science B. Personal factors can disturb impartial and objective investigation C. Machines do not need scientists D. Observation is not important

9. A scientist who tries new ideas even at the risk of failure is a: A. Critical thinker B. Risk taker C. Good observer D. Skeptic

10. Curiosity prompts a scientist to look for: A. Simple answers only B. Underlying relationships between seemingly unconnected data C. Ways to avoid research D. Evidence that supports their feelings

11. "Scientific attitude" refers to: A. A person's height and weight B. Special methods of thinking and acting C. Having a degree from a famous university D. Dressing like a researcher

12. When a scientist "asks for permission" before giving feedback, they show: A. Fear B. Open-mindedness and professional ethics C. Lacking confidence D. Curiosity

13. Accuracy, patience, and persistence are qualities of a: A. Good observer B. Risk taker C. Creative writer D. Social media influencer

14. What is "inventiveness" in science? A. Copying existing results B. Generating new and original ideas C. Following a textbook exactly D. Relying on old theories

15. A scientist's responsibility means they should: A. Let others do all the work B. Actively participate in tasks and perform their duties C. Ignore the cleanliness of their laboratory D. Constantly remind others to do their homework

Section 3: The Scientific Method (Unit 6)

1. The "Scientific Method" is best described as: A. A lucky guess B. A special sequence of procedures to establish working principles C. A list of facts to be memorized D. A method used only by chemists

2. What is often the very first step in the scientific process? A. Drawing a conclusion B. Proposing a problem or asking a question C. Publishing a book D. Discarding a hypothesis

3. An observation is a statement of knowledge gained through: A. Dreams and intuition B. The senses or scientific equipment C. Reading fiction D. Asking for a friend's opinion

4. What happens if an experiment disproves a hypothesis? A. The scientist stops working B. A new hypothesis is set up and the process is repeated C. The data is hidden D. The hypothesis is immediately called a theory

5. When does a hypothesis advance to the rank of a theory? A. After one successful experiment B. When the amount of substantiating data becomes larger and larger C. When a scientist becomes famous D. When it is written in a newspaper

6. In the scientific method, "analysis" primarily involves: A. Making a guess B. Comparing the results of the experiment to the prediction C. Collecting irrelevant facts D. Changing the data to fit the hypothesis

7. True scientists are swayed only by: A. The reputation of the person who made the hypothesis B. What the majority of people think C. Experimental evidence D. Their own emotional reactions

8. Which hypothesis does a scientist usually adopt first? A. The most complicated one B. The most obvious and simplest explanation of observed facts C. The one that was proven 100 years ago D. A hypothesis that cannot be tested

9. The scientific method is described as "fluid" because: A. It only deals with liquids B. The steps don't always occur in the same order and can feed back, C. It changes every day for no reason D. It is not based on rules

10. A "prediction" in the scientific process is: A. A guess about the weather B. What the scientist thinks the outcome will be when testing the hypothesis C. A final statement of truth D. An observation of the past

Section 4: Grammar & Academic Discourse (Unit 4)

1. In academic writing, "hedging" is used to: A. State facts as absolute truths B. Signal probability, limitation, and interpretation C. Make the text as long as possible D. Hide the researcher's name

2. Which modal verb is commonly used for making cautious claims (hedging)? A. Must B. Will C. May / Might / Could D. Should (for absolute

certainty)

3. Which sentence is an example of an impersonal/passive structure used in science? A. I think the results are good. B. It may be argued that the data indicates a trend. C. My mom said the internet is broken. D. Scientists are very happy people.

4. In the complex noun phrase "The persistent and logical analysis of observational data," the head noun is: A. Persistent B. Analysis C. Data D. Observational

5. Using complex noun phrases helps a researcher to: A. Make sentences more informal B. Avoid repeating the word "scientist" C. Pack information densely and maintain a formal style, D. Use more emotional language

Module III

The Evolution of Science: From Traditional Methods to the AI Revolution

Unit 7
AI in Academic Research

Warming-up activities

Discuss the following questions:

1. The Shift from "Cheating" to "Tool": Previously, the use of generative AI was often viewed as cheating, but major publishers like Nature, Science, and Elsevier have now established formal rules for its use. How has the perception of AI shifted in your specific research field, and do you feel more comfortable using it now that there are clear guidelines for disclosure?
2. Transparency vs. Basic Editing: Current guidelines require researchers to disclose transparently and in detail which AI tools they used (including versions like GPT-4 or Claude) and how they were used, unless the tools were only for basic spelling and grammar (like Grammarly). In your opinion, where is the "fine line" between using AI to improve readability and using it to inappropriately alter the conclusions of your original research?
3. Accountability and the "Plausibility Machine": Sources describe AI as a "plausibility machine" that can provide information that sounds correct but is actually fabricated or misrepresented. Since AI cannot be held accountable or satisfy the criteria for authorship, how do you personally ensure that every claim and reference in your work truly represents your own "meat brain" ideas and not a machine's hallucination?

Task 1. Read and learn the Vocabulary Notes.

artificial Intelligence (AI) — штучний інтелект
integrity — доброчесність / цілісність
disclosure — розкриття / декларування (використання інструментів)
transparency — прозорість
manuscript — рукопис
acknowledgement section — розділ подяк
disclosure statement — заява про розкриття інформації
methods section — розділ методів
large language model (LLM) — велика мовна модель
readability — читабельність / легкість читання
academic tone — академічний тон
fabricate — фальсифікувати / вигадувати (дані)
misrepresent — спотворювати / неправильно представляти
primary research data — первинні дані дослідження
alter images — змінювати зображення
accountability — підзвітність / відповідальність
"plausibility machine" — машина правдоподібності
authorship — авторство
justify — обґрунтовувати
peer-review process — процес рецензування (експертної оцінки)
breach confidentiality — порушити конфіденційність
feedback — відгук / коментар

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***Requirement of disclosure*** — the fundamental rule of transparency that obligates researchers to report the use of generative AI in any part of their manuscript.
2. ***Improve the readability*** — using AI tools exclusively for "language stuff," such as correcting grammar or academic tone, without adding new research ideas.
3. ***Fabricate or misrepresent data*** — an unethical practice of using AI to create fake results or misleadingly alter research images.
4. **"*Plausibility machine*"** — a term used to describe AI's ability to produce information that sounds correct but is actually fabricated or false.
5. ***Breach confidentiality*** — the risk of breaking privacy rules by uploading an unpublished manuscript into a large language model during the peer-review process.

6. ***Justify their research*** — the essential duty of a human author to explain and take full responsibility for their ideas, which a machine cannot do.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

Navigating the New Rules of AI in Academic Research

For a long time, the academic community viewed the use of Artificial Intelligence (AI) with suspicion, often labeling it as "cheating." However, major publishers —including Nature, Science, Wiley, and Elsevier — now recognize AI as a tool, provided that researchers follow strict ethical guidelines. As a PhD student, understanding these rules is vital for maintaining the integrity of your doctoral dissertation and future publications.

The Requirement of Disclosure

The most fundamental rule is transparency. If you use generative AI or AI-assisted tools to develop any part of your manuscript, you must disclose this fact. Journals usually require this information to be placed in the acknowledgement section, a disclosure statement, or, sometimes, the methods section. You must provide specific details, such as the type of tool used and the specific version of the large language model (e.g., GPT-4 or Claude).

Language vs. Original Research

Publishers distinguish between using AI for "language stuff" and for "original research". AI tools should only be used to improve the readability and the academic tone of your writing. You are permitted to use AI to structure your conclusions or clear up your grammar. However, you must never use AI to:

• Fabricate or misrepresent primary research data.

• Create or alter images in a way that is unethical or misleading.

• Add new ideas or conclusions that were not part of your own work.

Note that standard tools used for basic spelling, grammar, and general editing—like Grammarly or spell-checkers—generally do not fall under these strict disclosure requirements.

Accountability and Authorship

As the researcher, you are fully responsible for every word and reference in your paper. Because AI is a "plausibility machine," it can often produce information that sounds correct but is actually fabricated. You must verify every claim just as if you were writing from your own "meat brain". Furthermore, AI cannot be listed as an author. Authors must be able to justify their research and be held accountable for their ideas—something a machine like Chat GPT cannot do.

Confidentiality in Peer Review

If you are invited to participate in the peer-review process, be extremely cautious. Most journals, such as Science, strictly forbid reviewers from using

AI to generate reviews because uploading a manuscript into a large language model can breach confidentiality. While some editors allow AI to be used on a limited basis to improve the language of the feedback, this must be done transparently and declared upon submission.

Summary for the Researcher: think of AI as a highly advanced dictionary or editor, not as a co-author or a lab assistant. By being transparent about your tools and remaining accountable for your data, you can use AI to enhance your writing while ensuring your original contribution to knowledge remains credible and ethically sound.

Task 5. Translate the following words and word combinations:

Дотримуватися суворих етичних вказівок, підтримувати цілісність (доброчесність) дисертації, вимога розкриття інформації (декларування), фундаментальне правило прозорості, розділ подяк або розділ методів, академічний тон, структурувати висновки або виправляти граматику, фальсифікувати або спотворювати первинні дані, нести повну відповідальність за кожне слово, обґрунтовувати дослідження, порушувати конфіденційність у процесі рецензування, достовірний та етично бездоганний оригінальний внесок у знання.

Task 6. Choose the right variant

1. Major publishers like Nature and Science now recognize AI as a tool, provided that...

a) it is used to generate original research data;

b) researchers follow strict ethical guidelines and maintain transparency;

c) the AI is listed as a lead author in the manuscript.

2. If a PhD student uses a large language model (LLM) to develop a manuscript, they must...

a) use it only for basic spelling and grammar without any reporting;

b) disclose specific details, such as the tool type and version (e.g., GPT-4), in the acknowledgement or methods section;

c) keep this fact confidential to avoid accusations of "cheating."

3. According to the guidelines, it is permissible to use AI for...

a) adding new ideas or conclusions that were not part of the original work;

b) fabricating or misrepresenting primary research data;

c) improving the readability and academic tone of the writing.

4. AI cannot be listed as an author because...

a) machines like ChatGPT cannot be held accountable for their ideas or justify the research;

b) it is considered a "plausibility machine" that only produces fabricated facts;

c) standard spell-checkers already perform the same functions.

5. Reviewers are generally forbidden from using AI to generate reviews because...

a) uploading a manuscript into an LLM can breach confidentiality;

b) AI produces feedback that is too academic for most journals;

c) it is only allowed for the methods section, not for feedback.

Task 7. Put questions to the italicized words.

1. Researchers must place information about AI use in the **acknowledgment section**.

2. You must provide the **specific version of the large language model**, such as GPT-4.

3. AI tools should only be used to improve **the readability and the academic tone** of your writing.

4. **The researcher** is fully responsible for every word and reference in the paper.

5. Uploading a manuscript into a large language model can **breach confidentiality**.

Task 8. Translate the following sentences.

1. Протягом тривалого часу наукова спільнота ставилася до штучного інтелекту з підозрою, часто називаючи його використання «шахрайством». 2. Провідні видавництва тепер визнають ШІ як інструмент за умови, що дослідники дотримуються суворих етичних вказівок. 3. Найважливішим правилом є прозорість, тому ви повинні розкривати факт використання генеративного ШІ у будь-якій частині вашого рукопису. 4. Дослідник зобов’язаний надати конкретні деталі, такі як тип інструменту та версія великої мовної моделі (наприклад, GPT-4). 5. ШІ-інструменти дозволено використовувати лише для покращення читабельності та академічного тону вашої роботи. 6. Категорично заборонено використовувати ШІ для фальсифікації первинних даних дослідження або додавання нових ідей, які не є частиною вашої власної праці. 7. Оскільки ШІ є «машиною правдоподібності», дослідник несе повну відповідальність за кожне слово та посилання у статті. 8. Рецензентам суворо заборонено використовувати ШІ для створення відгуків, оскільки завантаження рукопису в систему може порушити конфіденційність.

Speaking task

Task 9. **Discuss the following problems with your colleagues:**

• Problem A: Describe the specific AI-assisted tools you plan to use for your

dissertation. How will you ensure you are only using them for "language stuff" and not for "original research"?

• Problem B: Discuss the dangers of AI-generated reviews. Why is it vital for the academic community to maintain confidentiality during the peer-review process?

• Problem C: Explain why authorship requires the ability to justify research. Why can a machine like ChatGPT never satisfy the criteria for being an author?

Writing Task: AI Ethics and Disclosure in Research

Task 10. **Instructions:** Choose *one* of the following prompts and write a response of *250–300 words.* In your writing, ensure you use the academic terminology found in the sources (e.g., *disclosure*, *accountability*, *plausibility machine*, *transparency*).

Option 1: The Reflective Essay (Argumentative)

Major publishers like Nature, Science, Wiley, and Elsevier now recognize AI as a tool rather than a method of "cheating," provided that strict ethical guidelines are followed. Discuss the distinction between using AI for "language stuff" (readability and tone) versus "original research". In your essay, explain why AI cannot satisfy the criteria for authorship and why the human researcher must remain fully responsible for every word and reference.

Option 2: The Practical Application (Disclosure Statement)

Imagine you are preparing a manuscript for a high-impact journal. You used a large language model (e.g., GPT-4) to help structure your conclusions and improve the academic tone of your "Methods" section.

1. Write a formal Disclosure Statement as it would appear in your manuscript, providing specific details about the tool and its version.

2. Follow this with a short paragraph explaining how you verified the data to ensure the AI did not fabricate or misrepresent your primary research data.

Option 3: Ethical Case Study (Critical Thinking)

During the peer-review process, a reviewer is tempted to use AI to generate feedback for a colleague's manuscript to save time. Write a critical response explaining why this action is considered a breach of confidentiality and a "big no-no" in the academic community. Discuss the summary of the researcher's role: why AI should be viewed as an "advanced dictionary or editor" rather than a lab assistant or co-author.

Writing Requirements (Checklist):

• Acknowledge the publishers' shift: Mention that AI is now a recognized tool, not necessarily "cheating".

• Emphasize Accountability: Clearly state that the author is responsible for verifying claims against their own "meat brain".

• Highlight Restrictions: List at least two things AI must never be used

for (e.g., altering images or adding new ideas).

• Discuss Transparency: Explain where in the manuscript (e.g., acknowledgement or methods section) the AI use should be declared.

Expert Insight: While the sources focus on the ethical "how-to," remember that the goal of these rules is to ensure that your original contribution to knowledge remains credible. As an expert, I would also suggest checking the specific "Instructions for Authors" for each individual journal, as some may have even stricter requirements than the general guidelines mentioned in the sources.

Video Insights: Postgraduate Research in Motion

Vocabulary from the source:

Emergent behavior — непередбачувана нова поведінка системи.
Backpropagation — метод зворотного поширення помилки для навчання нейромереж.
Edge devices — периферійні пристрої, що приймають рішення автономно.
Nefarious use cases — зловмисні варіанти використання.
Mitigating risk — пом'якшення (мінімізація) ризиків.
Commercial incentive — комерційний стимул, що прискорює "гонку озброєнь" у сфері ШІ

Task 11. Watch the video"A.I. Revolution" and do video comprehension tasks.

1) The video describes different ways machines learn. Match the example with the correct paradigm described in the sources:

Learning Paradigm	Example from the Video
Supervised Learning	A. AI playing against itself millions of times to improve at Go.
Reinforcement Learning	B. Feeding AlphaGo a large data set of expert games.
Self-Supervised Learning	C. Training on vintage Atari games where the AI is rewarded for high scores.
Generative AI (LLMs)	D. Predicting the next word in a sentence by consuming massive amounts of internet text.

2) Based on the transcript, trace the development of AI from rule-based systems to neural networks. Answer the following questions:

1. Rule-Based vs. Neural Networks: How did IBM’s Deep Blue (1997) differ in its decision-making process compared to modern neural networks? Mention the "tree of possibilities" versus "pattern recognition".

2. The Biological Inspiration: According to Manolis Kellis, how does the human brain update its "neural network," and how is this process mirrored in artificial neural networks through "weights" and "training"?.

3. The Breakthrough: Why was the dream of neural networks (imagined by Turing) impossible to achieve until the early 2000s? What role did "extraordinary data sets" play?

3) Critical Thinking: Evaluate the "dark side" of the AI revolution:

1. **Deepfakes and Disinformation:** Hany Farid describes a "lowered barrier to entry" for manipulating reality. Explain the mechanism of GANs (Generative Adversarial Networks) involving a "generator" and a "discriminator".
2. **The Extinction Risk:** Why did AI pioneers like Yoshua Bengio sign a warning comparing the risk of AI to pandemic or nuclear war?.
3. **The Auditability Problem:** Why is it considered almost impossible to "audit" modern AI systems? How does this complicate the implementation of "guardrails" or regulations?

GRAMMAR FOCUS: GERUND

The **Gerund** (the *-ing* form of a verb used as a noun) is a vital grammatical tool for describing scientific processes, ethical obligations, and research behaviors.

1. Gerund After Prepositions

The most common use of the Gerund in academic writing is following a preposition. This structure helps link a purpose or a method to an action:

• **Purpose:** The text states that understanding AI rules is "vital **for maintaining** the integrity of your doctoral dissertation".

• **Distinction:** Publishers often "distinguish **between using** AI for 'language stuff' and for 'original research'".

• **Prohibition:** Journals "strictly forbid reviewers **from using** AI to generate reviews".

• **Method:** A researcher enhances their work "**By being** transparent about your tools".

2. The Gerund as a Subject (Naming an Action)

The Gerund is frequently used as the subject of a sentence to turn a specific action into a general concept or a rule. This is common in the sources when discussing risks:

• **Risk assessment:** The text warns that "**uploading** a manuscript into a large language model can breach confidentiality". In this sentence, "uploading" acts as the noun (the subject) that causes the breach.

3. Naming Scientific or Professional Processes

The sources use the Gerund to name established categories of work or academic tasks. This allows the author to group various activities together:

• **Basic tasks:** Reference is made to "standard tools used for basic **spelling**, grammar, and general **editing**". Here, "spelling" and "editing" are gerunds that identify specific categories of language support that generally do not require strict disclosure.

4. Gerund Phrases for Contextual Actions

Gerund phrases help provide more information about how an action is performed or the attitude behind it:

• **Perception:** For a long time, the academic community viewed AI with suspicion, "often **labeling** it as 'cheating'".

• **Verification:** A researcher must focus on "**ensuring** your original contribution to knowledge remains credible".

Why the Gerund is Important for PhD Students

In the context of the sources, using the Gerund allows for a more **objective and academic tone**. Instead of focusing on "who" is doing the action, the Gerund focuses on the **action itself** (e.g., *disclosure*, *fabricating*, *verifying*).

Key Ethical Reminders using Gerunds:

• **Disclosure** of AI tools is the fundamental rule of **transparency**.

• **Fabricating** or **misrepresenting** primary research data is strictly prohibited.

• **Justifying** research is a human requirement that AI cannot fulfill

Exercise 1. Put the verbs in brackets into the gerund form, drawing on the context of the rules for using AI in academic research. Pay attention to the prepositions preceding the gerund.

1. For a long time, the academic community was suspicious of AI, often (label) it as "cheating".
2. Understanding ethical guidelines is vital for **(maintain)** the integrity of your doctoral dissertation.
3. Publishers usually distinguish between **(use)** AI for "language stuff" and for original research.
4. AI tools should only be used for **(improve)** the readability and the academic tone of your writing.
5. Researchers are permitted to use AI for **(structure)** their conclusions or **(clear up)** their grammar.
6. As a researcher, you must verify every claim just as if you were **(write)** from your own "meat brain".
7. Journals strictly forbid reviewers from **(use)** AI to generate feedback.
8. **(Upload)** a manuscript into a large language model can breach confidentiality.

9. By **(be)** transparent about your tools and **(remain)** accountable for your data, you can enhance your writing legally.

10. Following these rules is essential for **(ensure)** your original contribution to knowledge remains credible.

Exercise 2. ***Choose the correct gerund form to complete the sentences describing ethical norms. Note that some actions are prohibited according to the sources.***

1. Standard tools used for basic **(spelling / fabricating)** and general **(editing / misrepresenting)** do not fall under strict disclosure requirements.

2. Authors must be able to justify their research, which involves **(accountable / being)** held responsible for their ideas.

3. **(Listing / Declaring)** AI as an author is strictly prohibited by major publishers.

4. Ethical research involves **(avoiding / adding)** new ideas or conclusions generated by AI that were not part of your own work.

5. Transparently **(declaring / uploading)** the use of AI tools upon submission is required if the technology was used to improve the language of the feedback.

Reflection

1. How does the "requirement of disclosure" regarding the specific type and version of AI tools (e.g., GPT-4 or Claude) enhance the transparency of your manuscript?

2. Why is distinguishing between "language stuff" and "original research" considered a vital boundary for maintaining the integrity of a doctoral dissertation?,

3. Given that AI is a "plausibility machine," how do you personally ensure that your conclusions are justified by verified facts rather than "fabricated information" produced by the tool?

4. How does uploading a manuscript into an AI model during the peer-review process threaten the ethical standard of confidentiality?

Unit 8
Pure and Applied Science: Two Sides of the Same Coin

Warming-up activities

Discuss the following questions:

1) In your opinion, what primarily drives scientific progress: the human desire to understand the fundamental laws of the universe or the urgent need to solve practical problems?

2. If you were a government official, how would you balance research funding between abstract theoretical studies and projects that promise immediate technological results?

3. Can a scientist truly ignore the potential practical consequences of their discovery, even if their research is purely theoretical?

Task 1. Read and learn the words from the Vocabulary Notes.

pure science — фундаментальна (чиста) наука
applied science — прикладна наука,
interconnection — взаємозв'язок
development of theories (models) — розробка теорій (моделей)
working laws or principles — робочі закони або принципи,
to disregard application — не брати до уваги (ігнорувати) застосування
practical affairs — практичні справи,
basic research — базове (фундаментальне) дослідження,
apparent connection — очевидний зв'язок
to increase control over environment — посилювати контроль над довкіллям
techniques, processes, and machines — техніки, процеси та машини
investigating the strength of materials — дослідження міцності матеріалів
sampling procedures — процедури вибірки
practical extensions — практичні продовження (розширення)
metal fatigue — втома металу
estimating the age of objects — оцінка віку об'єктів
direct stimulus — прямий стимул
gap or limitation — прогалина або обмеження
highly developed instruments — високовдосконалені інструменти
mutually dependent and interacting — взаємозалежні та взаємодіючі
more apparent than real — більш уявний, ніж дійсний

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***to be primarily concerned with*** — to be originally or principally involved or interested in...

2. ***to be sufficiently validated*** — to make legally valid as; much as it needed.

3. ***to have (no) apparent connection*** — to have (no) evident (visible) relation.

4. ***to improve the sampling procedures*** — to make better the procedures of selecting samples, specimen.

5. *to* ***be evident*** — to be clear, easy to see.

6. ***to apply a particular concept*** — to use practically a specific (unusual) idea, notion.

7. ***to reveal a gap or limitation (in)*** ... — to show a blank space or restriction (in).

8. ***pure scientist*** — a scientist who deals with pure (theoretical or abstract) science, knowledge.

9. ***to be able (unable) to undertake*** — to be able (unable) to.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

PURE AND APPLIED SCIENCE

As students of science, you are probably sometimes puzzled by the terms "pure" and "applied" science. Are these two activities totally different, with little or no interconnection, as is often implied? Let us begin by examining what each does.

Pure science is primarily concerned with the development of theories (or, as they are frequently called, models) establishing relationships between the phenomena of the universe. When they are sufficiently validated, these theories (hypotheses, models) become the working laws or principles of science. In carrying out this work, the pure scientist usually disregards its application to practical affairs, confining his attention to explanations of how and why events occur, hence, in physics, the equations describing the behaviour of fundamental particles, or in biology, the establishment of the life cycle of a particular species of insect living in a Polar environment are said to be examples of pure science (basic research), having no apparent connection (for the moment) with technology, i.e. applied science.

Applied science, on the other hand, is directly concerned with the application of the laws of pure science to the practical affairs of life and with increasing man's control over his environment, thereby leading to the development of new techniques, processes, and machines. Such activities as investigating the strength and uses of materials, extending the findings of pure mathematics to improve the sampling procedures used in agriculture or the social sciences, and developing the potentialities of atomic energy are all examples of the work of the applied scientist or technologist.

It is evident that many branches of applied science are practical extensions of purely theoretical or experimental work. Thus, the study of activity began as a piece of pure research, but its results are now applied in a great number of different ways — in cancer treatment in medicine, the development of fertilizers in agriculture, the study of metal fatigue in

engineering, in methods of estimating the ages of objects in anthropology and geology, etc. Conversely, work in applied science and technology frequently acts as a direct stimulus to the development of pure science. Such an interaction occurs, for example, when the technologist, in applying a particular concept of pure science to a practical problem, reveals a gap or limitation in the theoretical model, thus pointing the way for further basic research. Often, a further interaction occurs, since the pure scientist is unable to undertake this research until another technologist provides him with more advanced instruments.

It seems, then, that these two branches of science are mutually dependent and interacting, and that the so-called division between the pure scientist and the applied scientist is more apparent than real.

Task 5. Translate the following words and word combinations:

Прикладна наука, не мати взаємозв'язків, розвиток теорії, зв'язки між явищами, робочі закони, практичне застосування, встановлення життєвого циклу, чиста наука, збільшення людського контролю, розвиток нових технологій, соціальні науки, практичне поширення, метод оцінки, прямий стимул, подальше дослідження, забезпечувати інструментами, поділ між теоретичною та прикладною науками.

Task 6. Fill in the blanks with the appropriate words or phrases from the text to complete the statements accurately.:

1. Pure science is primarily concerned with _____ .
2. The pure scientist usually disregards _____.
3. Applied science is directly concerned with _____ .
4. Many branches of applied science are _____.
5. The study of activity began as a piece of _____ .
6. The results of pure research are now applied in _____ .
7. Work in applied science and technology frequently acts as _____.
8. Pure and applied sciences are mutually _____ .
9. The pure scientist usually confines his attention to explaining _____, often disregarding their practical application.
10. Developing new ____, _____, and _____ is a direct result of applying scientific laws to practical affairs

Task 7. Put questions to the underlined words.

1. You are sometimes puzzled by the terms "pure" and "applied" science.
2. Pure science is concerned with the development of theories.
3. The pure scientist usually confines his attention to explanations of how and why events occur.
4. Applied science is directly concerned with the application of the working laws of pure science to the practical affairs of life.
5. Many branches of applied science are practical extensions of purely

theoretical or experimental work.

6. Work in applied science frequently acts as a direct stimulus to the development of pure science.

7. The pure scientist is unable to undertake this further research until another technologist provides him with more highly developed instruments.

Task 8. Answer the questions.

1. What is the primary objective of pure science according to the source?
2. How do theoretical models evolve into the "working laws or principles of science"?
3. In what way does the focus of an applied scientist differ from that of a pure scientist?
4. According to the text, what is the main purpose of developing new techniques and machines in applied science?
5. Can you provide examples of pure research mentioned in the source that initially had no apparent connection to technology?
6. How has the study of radioactivity transitioned from pure research to practical application in various fields?
7. How can a technologist provide a direct stimulus for further basic research in pure science?
8. Why is the pure scientist often dependent on the technologist to continue their research?
9. What does the author mean by stating that the division between pure and applied science is "more apparent than real"?
10. How do these two branches of science demonstrate mutual dependence and interaction?

Task 9. Translate the following sentences.

1. Чиста та прикладна науки тісно пов’язані між собою. 2. Теоретична (чиста) наука займається розвитком теорій та встановленням зв’язків між різними явищами. 3. Якщо гіпотези підтверджуються, вони стають робочими законами. 4. Прикладна наука застосовує робочі закони теоретичної науки у практичних цілях. 5. Прикладна наука розробляє нові технології та створює різні механізми та машини. 6. Прикладна наука має великий вплив на різні галузі теоретичних та експериментальних досліджень. 7. Результати теоретичних досліджень завжди широко застосовуються у медицині, машинобудуванні, сільському господарстві тощо. 8. Інколи теоретичні дослідники не можуть продовжувати своє дослідження без спеціальних інструментів, запропонованих практичною наукою. 9. Теоретична і прикладна науки є взаємозалежними і не можуть обійтися одна без одної.

Task 10. Make a list of the most important points for you in the text

Speaking Task

Task 11. Speak on the following problems and discuss them with your colleagues:

1. The Primary Objectives of Pure vs. Applied Science.
2. The Transition from "Pure Model" to "Working Law".
3. Radioactivity: From Theoretical Wonder to Practical Tool.
4. The Feedback Loop: How Technology Stimulates Theory.
5. Mutual Dependence and the Technological Barrier.
6. Deconstructing the "Artificial Division".

Writing Task: The Synergy of Pure and Applied Science

Type of Task: Academic Essay / Synthesis Report Word Count: 250–300 words **Target Audience:** PhD Students and Researchers

Topic: *"The division between the pure scientist and the applied scientist is more apparent than real."* ***Discuss this statement based on the provided sources, illustrating the mutual dependence between theoretical research and technological application.***

Instructions:

In your writing, you must address the following points:

1. Define both pure and applied science and their primary objectives according to the sources,.
2. Explain the process of how a theoretical model becomes a "working law" and its subsequent role in technology.
3. Provide examples of how pure research can transition into practical extensions in various fields like medicine or engineering.
4. Analyze the feedback loop: How does applied science stimulate further basic research and what role do technologists play in the progress of pure science,?
5. Use academic hedging (e.g., it may be argued, appears to be, could potentially) and maintain an objective authorial stance.

Model Outline (for guidance):

• Introduction: Introduce the so-called puzzle of "pure" vs. "applied" science. State the thesis that they are not isolated activities but interconnected branches of a unified scientific process,.

• Body Paragraph 1: Definitions and Goals. Contrast the "how and why" focus of pure science (models/hypotheses) with the "practical affairs" and environment control focus of applied science,. Mention that once validated, theories serve as the working laws for technologists.

• Body Paragraph 2: The Practical Extension (The Case of Radioactivity). Use the example of radioactivity to show how a piece of pure research eventually serves medicine, agriculture, and geology.

• Body Paragraph 3: Mutual Dependence. Discuss how technologists reveal

gaps in theoretical models and provide the highly developed instruments necessary for further pure research.
• Conclusion: Summarize that because these branches are mutually dependent and constantly interacting, any rigid division between them is artificial.

Key Vocabulary to include (Active Lexicon):

• Validated hypotheses / Working laws
• Practical extensions
• Direct stimulus
• Mutual dependence
• Theoretical models vs. Practical affairs

Video Insights: Postgraduate Research in Motion

Task 11. Watch the video"*What is Basic Science? What is Applied Science?*" and do video comprehension tasks.

Exercise 1. True or False?

1. Basic science aims to develop products with immediate commercial value.
2. The immediate goal of pure science is "knowledge for knowledge's sake."
3. Applied science is used to find cures for specific diseases or save animals from disasters.
4. Many scientists believe that applied science can successfully exist without the results of basic science.
5. Basic science never results in any practical application in the end.
6. Many scientists argue that a basic understanding of scientific principles must exist before any practical application can be developed.
7. The protection of animals from natural disasters is considered a goal of basic science according to the source.
8. Applied science is specifically designed to address and solve real-world problems.

Exercise 2. Multiple Choice. Choose the right option.

1. What is the primary aim of applied science?
   A) To expand knowledge regardless of its application.
   B) To solve real-world problems.
   C) To avoid commercial value in scientific research.
2. According to the source, basic science is NOT focused on:
   A) Expanding the general pool of knowledge.
   B) Developing a service of immediate public value.
   C) Seeking knowledge for its own sake.
3. The relationship between basic and applied science is that:

A) They are completely independent of each other.
B) Basic science relies on the results of applied science.
C) Applied science relies on the results generated through basic science.

4. According to the source, what is the relationship between basic and applied science?
A) They operate completely independently of one another.
B) Applied science relies on the results produced by basic science.
C) Basic science is only useful if it has an immediate commercial value.

5. Which of these is an example of the practical focus of applied science mentioned in the video?
A) Expanding knowledge for its own sake.
B) Finding a cure for a particular disease.
C) Disregarding the short-term application of knowledge.

6. The source states that basic science is NOT primarily focused on:
A) Expanding the general pool of human knowledge.
B) Developing products or services of immediate commercial value.
C) Seeking a basic understanding of how the world works.

Exercise 3. Sentence Completion. Fill in the gaps according the video.

1. Basic science seeks to expand knowledge regardless of the short-term application of that knowledge.
2. Applied science or technology aims to use science to solve real-world problems.
3. Improving a crop yield is one example of a problem that applied science tries to solve.
4. Many scientists think that a basic understanding of science is necessary before an application is developed.
5. While basic science focuses on "knowledge for knowledge's sake," this does not rule out the possibility that it may eventually result in a practical application.
6. One major goal of technology, as a form of applied science, is to improve crop yields for agricultural benefit.
7. Applied science or technology is often seen as a way to use science to solve real-world problems.

Exercise 4. Short Answer Questions. Answer the following questions according to the video.

1. Does basic science exclude the possibility of future applications?
2. What does applied science use to achieve its goals?

GRAMMAR FOCUS: Participles and Participial Phrases

In academic and scientific discourse, **participles and participial phrases** are essential tools for creating concise, objective, and information-dense sentences. Based on the provided sources regarding pure and applied science, these structures are used to define concepts, describe ongoing processes, and establish logical connections between ideas.

1. The Present Participle (Participle I: -ing)

The present participle is frequently used in scientific texts to provide additional information about a noun or to describe how an action is performed.

• **Defining and Describing:** Participle phrases often replace relative clauses (e.g., *theories that establish*) to define scientific concepts more compactly. For example, pure science involves the development of models "establishing relationships between the phenomena of the universe". Similarly, it describes specific subjects of study, such as a "species of insect living in a Polar environment" or "equations describing the behaviour of fundamental particles".

• **Expressing Result or Consequence:** In describing the impact of applied science, participles indicate a logical outcome: applied science focuses on the practical affairs of life, "thus leading to the development of new techniques, processes, and machines". In the YouTube source, applied science is described as solving real-world problems, "making it possible" to improve crop yields or find cures.

• **Describing Simultaneous Actions:** Participles can explain the specific focus of a researcher during their work. A pure scientist disregards immediate application, "confining his attention to explanations of how and why events occur".

2. The Past Participle (Participle II: -ed/3rd Form)

The past participle typically carries a passive meaning in these texts, describing the state of an object or the results of a completed action.

• **Describing Validated States:** Scientific theories only become working laws when they are "sufficiently validated".

• **Indicating Origin or Method:** Participle II is often used to show where data or tools come from. Applied science is said to rely on results "generated through basic signs [science]". It also describes specific methodologies, such as "sampling procedures used in agriculture".

• **Naming and Categorizing:** It is common to use past participles to introduce alternative terminology: theories are "frequently called models".

3. Participial Phrases after Prepositions

In scientific writing, the *-ing* form (often functioning as a gerund or participle) frequently follows prepositions to describe the circumstances or methods of an investigation.

• **Describing Research Activities:** The sources use these phrases to set

the stage for an action: "In carrying out this work," a pure scientist may disregard practical application.

• **Specifying Application:** Interaction between branches occurs when a technologist, "in applying a particular concept," reveals a gap in the theoretical model.

• **Identifying Fields of Use:** These structures identify specific areas of expertise, such as "methods of estimating the ages of objects in anthropology and geology".

Academic Insight: Conciseness and Objectivity

From a stylistic perspective, the use of these phrases reflects the "scientific attitude" mentioned in our conversation history. By using participles like "interacting" or "mutually dependent," writers emphasize the relationship between concepts rather than the researchers themselves. This shifts the focus to the evidence and the "working laws" being discussed,. Furthermore, using participles allows for the "feedback loop" to be described efficiently—for instance, how applied science acts as a "direct stimulus" by "pointing the way for further basic research"

Exercise 1: Transforming Relative Clauses into Participial Phrases

Scientific writing values conciseness. Rewrite the following sentences by replacing the underlined relative clauses with a ***Present Participle (-ing)*** *or* ***Past Participle (-ed)****.*

1. Pure science is primarily concerned with the development of models **which establish** relationships between phenomena.

Rewrite: Pure science is primarily concerned with the development of models _____ relationships between phenomena.

2. These theories, **which are sufficiently validated**, become the working laws of science.

Rewrite: These theories, _____ _____, become the working laws of science.

3. In biology, establishing the life cycle of an insect **which lives** in a Polar environment is an example of pure science.

Rewrite: ...the life cycle of an insect _____ in a Polar environment...

4. Applied science relies on the results **which were generated** through basic science.

Rewrite: Applied science relies on the results _____ through basic science.

5. The technologist reveals a limitation in the model, **which points** the way for further research.

Rewrite: The technologist reveals a limitation in the model, _____ the way for further research.

Exercise 2: Multiple Choice – Participle I vs. Participle II. Choose the correct participle form to complete the academic statement.

1. The pure scientist usually disregards application, **confining / confined** his attention to explanations of how events occur.
2. Mathematics can be used to improve the sampling procedures **using / used** in agriculture.
3. Applied science is **linking / linked** to the development of new techniques and machines.
4. Radioactivity is now used in methods **estimating / estimated** the ages of objects in anthropology.
5. Basic science seeks to expand knowledge, **disregarding / disregarded** its short-term application.

Exercise 3: Sentence Completion (Vocabulary and Context)

Fill in the blanks using words: ***validated, practical, interacting, generated, stimulus****.*

1. Pure science is not focused on developing a product of immediate _____ value.
2. Once hypotheses are sufficiently _____, they serve as the principles of science.
3. Applied science acts as a direct _____ to the development of pure research.
4. The two branches of science are mutually dependent and _____.
5. Applied science relies on the results _____ through basic science.

Reflection

1. To what extent do you agree with the statement that the division between pure and applied science is "more apparent than real"?
2. How does your own research illustrate the "interaction" where a practical problem reveals a "gap or limitation" in an existing theoretical model?
3. In your specific field, can "knowledge for knowledge's sake" eventually result in unexpected real-world applications, similar to the transition of radioactivity into medicine and engineering?
4. How dependent is your current research progress on the "highly developed instruments" provided by technologists?

Unit 9
Scientific Research and Academic Excellence

Warming-up activities

Discuss the following questions:

1. The Role of Institutional Integration: How does the integration of education and research within a university help students and postgraduates acquire the necessary practical skills in their specific fields of science?
2. Theoretical vs. Applied Research: Since postgraduate research can be "theoretical and applied, often both," which approach do you think is more challenging to defend before an Academic Council, and why?
3. The Impact of Supervision: In what ways can a scientific adviser effectively assist a researcher during the complex process of investigation and the subsequent preparation of a thesis?

Task 1. Read and learn the Vocabulary Notes.

integrate education with research — інтегрувати навчання з дослідженнями
g**raduation paper** — випускна кваліфікаційна робота
guidance of a supervisor (scientific adviser) — керівництво наукового керівника
p**rofessional staff members** — професійний штат співробітників
a**cademic degree** — науковий ступінь
r**esearch team** — дослідницька група
m**aintain close links** — підтримувати тісні зв'язки
p**ostgraduate student** — аспірант
s**enior staff member** — старший науковий співробітник / досвідчений викладач
c**andidate or doctorate degree** — ступінь кандидата або доктора наук
c**arry out investigations** — проводити дослідження
p**repare a thesis** — готувати дисертацію
p**ractically applicable** — такий, що має практичне застосування
q**ualifying exams** — кваліфікаційні іспити
c**ore subjects** — профільні дисципліни
t**heoretical and applied research** — теоретичне та прикладне дослідження
p**rogress in work** — прогрес у роботі
d**raft of the thesis** — чернетка дисертації
s**ubmit to the Academic Council** — подати до вченої ради
d**efend before the Academic Council** — захищати (дисертацію) перед вченою радою
award the higher academic degree — присудити вищий науковий ступінь

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***to acquire skills in research*** — to gain practical knowledge and ability to conduct an investigation.

2. ***ranging from very basic to very practical*** — extending from fundamental theoretical to applied practical (research).

3. ***staff members*** — those working in an establishment, institution or organization.

4. ***to prepare a paper*** — to prepare a scientific contribution to be read to a learned society or to be published.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

RESEARCH WORK (GENERAL REVIEW)

Our University successfully integrates education with research. The final stages of the University programme include developing research skills. The students conduct research mainly for their graduation paper, which reflects their knowledge and practical skills in their field of science. Research can be led out under the guidance of a supervisor (scientific advisers).

The University has a broad programme of activities ranging from the very basic to the very practical and can perform various research. The University professional staff members number some thousand employees engaged in multiple research projects in different branches of science. Their achievements have been recognized and staff members, two-thirds of whom have academic degrees, have been honoured by the presentation of titles, certificates, and awards. Many of the scientists are known internationally for their contributions. Research teams, working on various scientific projects, collaborate with their colleagues abroad and maintain close links with many research institutes and universities worldwide.

A great number of postgraduate students undertake a programme of study and research under the supervision of senior staff members who hold a candidate's or a doctorate's degree. The postgraduate course lasts four years, during which time the young scientists and researchers carry out their investigations and prepare a thesis on it. Their work should be conducted at a high scientific and technical level, and the results should be practically applicable.

The postgraduate course programme provides for attending seminars and colloquiums, taking qualifying exams in the core subjects, in philosophy and English, preparing research publications and written reports on the work carried out.

Postgraduate research may be theoretical and applied, or both. The scientific adviser assists his postgraduate students in many ways. He regularly meets them to discuss the progress in their work and to advise them on solving their current problems. While the thesis is being written, the supervisor reviews its major sections and makes critical comments on each draft. Postgraduates are assisted in preparing articles and papers for their research. When the postgraduate completes his or her thesis, he/she submits it to the Academic Council of the University and further defends it before the Academic Council. If the thesis meets all necessary requirements, it is accepted by the Academic Council, which takes the decision to award the postgraduate the higher academic degree.

Task 5. Translate the following words and word combinations:

Поєднувати освітню та дослідницьку роботу, проводити дослідження, викладацький колектив університету, різноманітні проекти, науковий ступінь, бути нагородженим, звання, дослідницький колектив, співпрацювати з закордонними колегами, письмовий звіт, поточні проблеми, приймати рішення, поєднувати освітню та дослідницьку роботу, проводити дослідження, викладацький колектив університету, різноманітні проекти, науковий ступінь, бути нагородженим, звання, дослідницький колектив, співпрацювати з закордонними, письмовий звіт, поточні проблеми, приймати рішення.

Task 6. Identify the nouns, adjectives, adverbs and verbs in the following groups of words. Use the appropriate ones in the sentences below. Choose the correct form of the word.

1. a) research; b) to research; c) researcher

1. There is clearly a need for further _____ on this topic.
2. A software package entitled ”NN” integrates data that have been compiled by independent_____ .
3. They have been _____ the effects of the drug on mice.
4. This book by itself does not provide all the tools to become a creative _____ in mathematics.
5. The subject has not been fully _____ before.
6. A few _____ challenge this assessment, offering intriguing alternative models.
7. She teaches a lot of classes and doesn't have much time for her own _____ .
8. This book is of special interest to those working, _____ and teaching computing.

2. a) system; b) systematic; c) systematically; d) systematize; e) systematization; f) unsystematically.

1. Rhetoric provides a framework in which these matters may be _____ investigated.

2. They are introducing a very sophisticated _____ for delivering information.
3. The positive side of _____ methodologies is that they can heighten a researcher's appreciation of the complexities of the world.
4. We can _____ this concept by classifying it into a small number of distinct categories.
5. Formalization is an outgrowth of the broader goals of scientific _____ .
6. Satellite communication _____ can potentially alter the industrial paradigm in developing countries.
7. The collection has been _____ updated.

Task 7. Complete the sentences:

1. The final stages of the University programme include _____ .
2. The graduation paper reflects _____ .
3. Research can be led out under the guidance of _____ .
4. The University professional staff numbers _____ .
5. Research teams collaborate with _____ .
6. The postgraduate course lasts _____ .
7. The postgraduate research may be _____ .
8. When the postgraduate completes his or her thesis, he/she _____ .

Task 8. Put questions to underlined words.

1. The graduation paper reflects the knowledge and the practical skills in the particular field of science.
2. The University staff is engaged in multiple research projects in different branches of science.
3. Many of the scientists are known internationally for their contributions.
4. The young scientists and researchers carry out their investigations and prepare a thesis on it.
5. The scientific adviser assists his postgraduate students in many ways.
6. The supervisor reviews the major sections of the thesis and makes critical comments on each draft.
7. The Academic Council takes the decision to award the postgraduate the higher academic degree.

Task 9. Answer the questions.

1. What do the final stages of the University programme include?
2. What do the students carry out their research for?
3. Who is the research led by?
4. How many staff members are there in the University?
5. What activities are the staff members engaged in?
6. What do the postgraduates do during the course of their study?
7. How long do the postgraduate course last?

8. What exams do the postgraduates take?

9. Who helps them with their research?

10. How does the supervisor help his postgraduates?

11. What does a postgraduate do when he/she completes his or her thesis?

12. When do the Academic Council take the decision to award the postgraduate the higher academic degree?

Task 10. Translate the following sentences.

1. Наш університет успішно поєднує навчальну і дослідницьку роботу. 2. Випускна робота, як правило, відображає знання та практичні навички у певній галузі науки. 3. Студенти й аспіранти проводять свої дослідження під керівництвом наукового керівника. 4. Працівники університету залучені до роботи над різноманітними дослідницькими проєктами у різних галузях науки. 5. Багатьох наших науковців знають не лише в Україні, а й за кордоном. 6. Навчання в аспірантурі триває чотири роки. 7. Протягом цього часу аспіранти відвідують лекції, семінари, колоквіуми, та здають кандидатські іспити. 8. Наукове дослідження , зазвичай, складається з теоретичної та практичної (прикладної) частин. 8. Науковий керівник допомагає аспіранту у вирішенні поточних проблем. 9. Завершене дисертаційне дослідження подається на розгляд до спеціалізованої вченої ради. 10. Якщо дисертація відповідає всім вимогам, то аспірантові присуджують науковий ступінь.

Task 11. Make a list of the most important points for you in the text

Speaking task

Task 12. Speak on the following problems and discuss them with your colleagues:

a) the plan of your actions during the first year of study;

b) the reason for your postgraduate studies.

c) Define briefly the subject of the investigation you carry out. Say whether you will describe the study or restrict yourself to some part of it. Tell the group when the investigation was conducted or started, if it is still underway. Provide further information on the investigation: who made it, and which research center it was first conducted in. Define the aim of the investigation. Outline the general plan or design of the investigation.

Writing Task: The Roadmap of Postgraduate Research

Task Type: Formal Academic Essay / Descriptive Report Word Count: 250–300 words

Prompt: Based on your understanding of the University's research structure, write a report describing the journey of a postgraduate student from the beginning of their studies to the awarding of a higher academic degree. In your response, address the following aspects:

1. The Integration of Research: How does the university combine education with practical research skills, and what role do graduation papers play in this process?

2. Postgraduate Requirements: What are the core components of the three-year postgraduate programme, including examinations and scientific standards?

3. The Role of the Scientific Adviser: How does the supervisor assist the researcher during the investigation and the drafting of the thesis?

4. The Final Defense: Describe the procedure for submitting and defending a thesis before the Academic Council.

Checklist for Students (Guidelines):

• Scientific Standards: Mention that research must be conducted at a high scientific and technical level and that results should be practically applicable.

• Adviser's Contribution: Highlight that the adviser not only discusses progress but also provides critical comments on each draft and helps in preparing research publications.

• Academic Milestones: Include the necessity of taking qualifying exams in core subjects, philosophy, and English.

• Organizational Context: Note that the university maintains close links with many research institutes and collaborates with colleagues abroad, which enhances the quality of research projects.

• The Outcome: Conclude with the role of the Academic Council, which evaluates if the thesis meets all requirements before deciding to award the higher academic degree.

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video "5 Steps To Write A Research Paper In A Weekend" and do video comprehension tasks.

Exercise 1. Ordering the Steps

Number the steps (1–5) in the sequence recommended by the professor in the sources:

• Write the Conclusion (recapitulate findings, state limitations, and implications),.

• Get everything in place: ensure your findings, figures, and tables are ready before you start writing.

• Polish and edit the "skeleton" of your paper; don't aim for perfection in the first pass,.

• Start with the Methods and then move to the Results (the "inside out" approach).

• Write the Introduction by setting up the topic, identifying the gap, and stating your study's value,.

Exercise 2. True or False?

1. Writing is the last 10% of your project; you shouldn't start it without your final findings and tables.
2. The most efficient way to write is linearly, starting from the Introduction and ending with the Conclusion.
3. The Methods section is often the easiest part to write and can help build your confidence.
4. You should hide the limitations of your study so that reviewers don't criticize your work.
5. The first draft does not have to be perfect; it is better to "dump facts" and clean them up later.
6. The introduction should be the first section you write because it sets the foundation for your research goals.
7. According to the "formulaic" structure, the conclusion should end with the implications for future research or policy interventions.
8. A "skeleton" of the paper is formed by dumping facts and information during the first pass, which can be polished later.

Exercise 3. Sentence Completion: The Formulaic Structure

Complete the following sentences based on the sectional structure described by the professor.

The Conclusion:

1. The first paragraph should _____ very succinctly.
2. The second paragraph should always address the _____ of your research to fend off reviewer criticisms.
3. The final parts should discuss the _____ and policy interventions.

The Introduction:

1. Part 1: Explain why the _____ and why people should care.
2. Part 2: Identify the _____ in existing literature.
3. Part 3: Articulate the _____ of your paper and how it plugs those gaps.

Grammar Focus: Modal Verbs

In academic writing and research management, **modal verbs** are indispensable tools used to express possibility, necessity, obligation, and scientific "hedging" (making claims less categorical). Based on the sources,

modal verbs function in several distinct ways:

1. Expressing Possibility and Degrees of Certainty

Scientists use modals like **may**, **might**, and **can** to describe potential situations or various paths a research project can take.

• **May:** This is frequently used to describe the nature of research or potential obstacles. For instance, postgraduate research **may** be theoretical, applied, or both. In the writing process, there are barriers that students **may** have when trying to write quickly. Furthermore, certain advice **may** not apply to everyone, though it likely applies to most.

• **Might:** This is often used for gentle suggestions or hypothetical scenarios. A researcher **might** want to perform a quick literature review to back up their points. Additionally, during the first draft, it **might** be that you simply "dump" facts onto the page before polishing them.

• **Can:** This indicates general possibility or the capacity of a system. University research **can** be led out under the guidance of a supervisor. However, a lack of preparation **can** lead to confusion, and the introduction section **can** be a difficult stumbling block.

2. Establishing Requirements and Expectations

Modals such as **should**, **need to**, and **have to** are used to outline university standards and the logical necessities of the scientific method.

• **Should:** This modal establishes the high standards required for a degree. Research work **should** be conducted on a high scientific and technical level, and the results **should** be practically applicable.

• **Need to:** This expresses a logical requirement for success. For example, to write efficiently, you **need to** have your findings and tables ready to go before you begin.

• **Don't have to / Need not:** These are used to lower the psychological barriers to writing. Professor Stuckler emphasizes that the first pass of a paper **doesn't have to** be perfect. Similarly, the introduction **doesn't need to** be as difficult as students often make it.

3. Predicting Results and Intentions

The use of **will** and **be going to** in the sources highlights the expected outcome of following a specific research methodology.

• **Be going to:** Following the "inside out" method **is going to** help researchers avoid getting stuck. It is also used to describe the "value added" that a study **is going to** bring to the scientific field.

• **Will:** If you use the suggested formula, the implications for future research **will** likely apply to your specific work.

Expert Insight for Researchers

In the sources, these modals often appear in the passive voice (e.g., "research can be led out" or "work should be conducted"). This combination is a hallmark of formal academic style because it shifts the focus from the individual researcher to the objective process and institutional standards. Using

modals like may or might also aligns with the "scientific attitude" mentioned in our conversation history—it shows that the researcher is aware of limitations and is not making over-generalized claims.

Exercise 1: Choose the correct modal verb

Choose the most suitable modal verb (may, should, can, doesn't have to, need to, might), drawing on the rules of scientific writing and university requirements.

1. According to the university guidelines, postgraduate research _____ be theoretical, applied, or both.
2. Professor Stuckler emphasizes that your first draft _____ be perfect because you can polish it later.
3. To avoid confusion during the writing process, you _____ have your findings, figures, and tables ready before you start.
4. Scientific research _____ be conducted on a high scientific and technical level to be accepted by the Academic Council.
5. The introduction _____ be a difficult stumbling block, but it is easier if you follow a three-part structure.
6. You _____ want to perform a quick literature review to identify the gaps in existing studies.

Exercise 2: Matching Modal Functions

Sentence	Function
1. "Research can be led out under the guidance of a supervisor"	A) Advice / Suggestion
2. "The results of the investigation should be practically applicable"	B) Possibility / Capability
3. "You might want to go and do a quick literature review to back up those points"	C) High Obligation / Standard
4. "The introduction doesn't need to be as difficult as we sometimes make it"	D) Absence of Necessity
5. "These limitations may have even given you nightmares before"	E) Probability / Hedging

Reflection

Reflection: Integrating Research Strategies and Academic Standards

Instructions: Reflect on your current research and writing process by answering the following three questions. Use the insights from the sources to support your thoughts.

1. Breaking the Linear Barrier

Professor Stuckler argues that writing a paper from start to finish is a mistake that leads students to "stare blankly at the computer for hours". Instead, he suggests writing from the "inside out," starting with the Methods because it

is often the easiest section and helps build confidence.

• **Question:** Looking at your own research project, why might starting with the Methods and Results sections be more effective for you than starting with the Introduction? How does this approach align with the university's requirement to reflect "practical skills" in your graduation paper or thesis?

2. Practical Applicability and the "Value Added."

The sources state that postgraduate work should be conducted on a "high scientific and technical level" and the results must be "practically applicable". At the same time, the "formulaic" structure of a paper requires you to articulate the "value added" of your study to plug existing gaps in the literature.

• **Question:** How can you use the Conclusion section—specifically the part about implications for policy or future research—to prove to the Academic Council that your work meets the university's standard for practical applicability?

3. The Role of Criticism and Supervision

A supervisor is expected to review major sections of your thesis and make "critical comments on each draft". This mirrors the strategy of using the Limitations paragraph in a paper to "fend off reviewer criticisms" by showing that you have already anticipated potential weaknesses.

• **Question:** How does receiving "critical comments" from your scientific adviser prepare you for the final defense before the Academic Council? In what way does being transparent about your research limitations actually strengthen your scientific authority?

Progress Check
MODULE III
The Evolution of Science: From Traditional Methods to the AI Revolution

Task 1. Choose the right option.

Section 1: Writing a Research Paper

1. According to Prof. David Stuckler, what is the most efficient order to write a research paper? A) Introduction, Methods, Results, Conclusion B) Methods, Results, Conclusion, Introduction C) Conclusion, Introduction, Methods, Results D) Results, Methods, Introduction, Conclusion

2. Why does the author suggest starting with the "Methods" section? A) It is the most difficult part. B) It helps build confidence and avoids getting stuck. C) It is the part that reviewers check last. D) It requires the most creative thinking.

3. What should the first paragraph of the "Conclusion" section contain? A) A list of all citations used. B) A succinct recapitulation of the key findings. C) A detailed description of the laboratory equipment. D) The author's personal

biography.

4. What is the purpose of the "Limitations" paragraph in a conclusion? A) To hide the mistakes made during research. B) To fend off reviewer criticisms by showing self-awareness. C) To explain why the researcher needs more funding. D) To list the books that were not found in the library.

5. What three-part structure is suggested for the "Introduction"? A) Abstract, Keywords, References. B) Topic importance, weakness/gaps in existing research, and study value. C) Results, Discussion, Future work. D) Methods, Data, Tables.

6. The phrase "Perfect is the enemy of the good" in the context of writing means: A) You should only submit perfect papers. B) It is better to get a "skeleton" down on the page than to wait for perfection. C) Good papers are never perfect. D) Scientific journals only accept "good" papers.

7. In the introduction, what should you do to back up points about why a conversation is important? A) Do a quick literature review and cite existing studies. B) Write a personal poem. C) Ask AI to invent new data. D) Skip this part to save time.

8. Writing is described as the last _____ percent of a project. A) 50% B) 10% C) 90% D) 5%

9. When writing the "Results" section, what is the primary task? A) To argue with other scientists. B) To describe tables, figures, and key findings in order. C) To invent new theories. D) To criticize the supervisor.

10. What does the "value added" part of the intro clarify? A) The price of the research equipment. B) How the study plugs gaps in previous knowledge. C) The salary of the researchers. D) The number of pages in the dissertation.

Section 2: AI in Academic Research

11. What is the most fundamental rule when using AI in academic writing? A) Never use it under any circumstances. B) Disclosure and transparency. C) Use it only for generating data. D) List the AI as a co-author.

12. Where should information about AI use typically be placed in a manuscript? A) Only on the cover page. B) In the acknowledgement or disclosure statement. C) In a secret footnote. D) It should not be mentioned at all.

13. Publishers distinguish between using AI for "language stuff" and:) "Creative writing." B) "Original research." C) "Social media." D) "Personal emails."

14. Which of the following is an UNACCEPTABLE use of AI according to the sources? A) Improving readability. B) Fabricating or misrepresenting primary research data. C) Cleaning up grammar. D) Structuring conclusions.

15. Why can't AI be listed as an author of a scientific paper? A) It doesn't have a bank account. B) It cannot be held accountable for the ideas or justify the research. C) It doesn't have a physical address. D) It is too expensive to

include.

16. AI is described as a "plausibility machine," which means: A) It always tells the truth. B) It can produce information that sounds correct but is actually fabricated. C) It is impossible for it to make a mistake. D) It only works if you use GPT-4.

17. What are "standard tools" that generally do *not* require strict disclosure? A) Generative LLMs like Claude. B) Spell-checkers and basic grammar tools like Grammarly. C) AI data simulators. D) Image generators.

18. What is the policy regarding AI in the peer-review process for journals like *Science*? A) Reviewers are encouraged to use AI. B) It is strictly forbidden as it can breach confidentiality. C) Reviewers must use AI to check for plagiarism. D) Only editors are allowed to use it.

19. In academic research, you should think of AI as an advanced _____ or _____. A) Co-author / Lab assistant. B) Dictionary / Editor. C) Data generator / Fact-checker. D) Decision-maker / Boss.

20. Who is ultimately responsible for every word and reference in a research paper? A) The AI developer. B) The human researcher. C) The university library. D) The software provider.

Section 3: Pure and Applied Science

21. Pure science (basic research) is primarily concerned with: A) Making immediate profits. B) Establishing relationships between the phenomena of the universe and developing theories. C) Building new types of tractors. D) Organizing political campaigns.

22. When hypotheses or models in pure science are sufficiently validated, they become: A) Personal opinions. B) Working laws or principles of science. C) Outdated documents. D) Commercial products.

23. What is the immediate goal of basic science according to Source 28? A) To find a cure for a specific disease. B) Knowledge for knowledge's sake. C) To improve crop yields. D) To save animals from natural disasters.

24. Applied science is directly concerned with: A) Ignoring the laws of nature. B) The application of scientific laws to practical affairs and human control over the environment. C) Only studying history. D) Writing poems about nature.

25. Which of these is an example of applied science? A) Equations describing fundamental particles. B) Developing the potentialities of atomic energy. C) Studying the life cycle of a polar insect for pure knowledge. D) Pure mathematics without practical use.

26. How do pure and applied science interact? A) They never talk to each other. B) Applied science is a practical extension of theoretical work. C) Pure science is a waste of time for applied scientists. D) They are totally different activities with no interconnection.

27. What can happen when a technologist applies a pure science concept

to a practical problem? A) They might reveal a gap or limitation in the theoretical model. B) They get fired. C) The laws of physics change. D) They stop using the scientific method.

28. Why might a pure scientist be unable to undertake further research? A) They are too lazy. B) They lack the more highly developed instruments provided by technologists. C) There are no more theories to discover. D) They ran out of books.

29. The division between pure and applied scientists is described as: A) Permanent and necessary. B) More apparent than real. C) A legal requirement. D) Only existing in Ukraine.

30. Basic science seeks to expand knowledge regardless of: A) The truth. B) Short-term application. C) The laws of nature. D) The supervisor's opinion.

Section 4: Research at the University

31. At LNTU, the final stages of the university program include: A) Learning how to cook. B) Acquiring skills in research. C) Professional sports training. D) Only theoretical lectures.

32. What is the main purpose of a student's graduation paper? A) To show off their handwriting. B) To reflect knowledge and practical skills in their particular field. C) To summarize all the movies they watched. D) To get a job as a translator.

33. How many employees at the University are engaged in multiple research projects? A) Ten. B) Some thousand. C) Only five professors. D) All the students.

34. What percentage of the University's professional staff hold academic degrees? A) 10%. B) Two thirds. C) 100%. D) 50%.

35. How long does the postgraduate (PhD) course at LNTU typically last? A) One year. B) Three years. C) Five years. D) Ten years.

36. What is a requirement for the results of a postgraduate's investigation? A) They must be kept secret. B) They should be practically applicable. C) they must be written in pencil. D) They should only be theoretical.

37. The postgraduate course program includes taking qualifying exams in core subjects, philosophy, and: A) German. B) English. C) Sports. D) Mathematics.

38. What is the role of a "scientific adviser" (supervisor)? A) To write the thesis for the student. B) To assist in solving current problems and review major sections of the thesis. C) To attend all the student's lectures. D) To decide the student's salary.

39. Before whom does a postgraduate defend their completed thesis? A) The local government. B) The Academic Council of the University. C) Only their supervisor. D) A group of international journalists.

40. If a thesis meets all requirements, the Academic Council awards the

postgraduate: A) A cash prize. B) A higher academic degree. C) A free vacation. D) A new laboratory.

Section 5: AI Revolution and History

41. The modern origins of AI can be traced back to which mathematician? A) Isaac Newton. B) Alan Turing. C) Albert Einstein. D) Stephen Hawking.

42. What was the "Turing Test" designed to measure? A) The speed of a computer processor. B) Whether a machine can converse indistinguishably from a human. C) How much electricity a computer uses. D) The weight of a computer brain.

43. In what year was the term "Artificial Intelligence" coined at Dartmouth College? A) 1999. B) 1956. C) 2022. D) 1945.

44. IBM’s "Deep Blue" became famous for defeating a world champion in: A) Go. B) Chess. C) Poker. D) Scrabble.

45. Deep Blue was "effective but brittle" because it: A) Was made of glass. B) Didn't strategize like a human but followed rules and analyzed board positions. C) Was too small. D) Didn't have any data.

46. How does a neural network "learn"? A) By reading a textbook once. B) By adjusting the strength of connections (synapses) between nodes based on data. C) By following a list of 10 rules. D) By waiting for a human to type in the answer.

47. "AlphaGo" was trained using two methods: supervised learning and _____ learning. A) Emotional. B) Reinforcement. C) Speed. D) Classroom.

48. Why is a "liquid neural network" different from traditional ones? A) It is made of water. B) It is smaller, more efficient (e.g., 19 neurons), and inspired by nature (the C. elegans worm). C) It only works on ships. D) It can only speak 187 languages.

49. Generative AI models like ChatGPT work by recognizing patterns and: A) Reading the minds of users. B) Making guesses at the next word in a sentence. C) Copying and pasting from Wikipedia only. D) Accessing secret government files.

50. What is a "GAN" (Generative Adversarial Network)? A) A network for professional gamblers. B) Two algorithms (generator and discriminator) in a back-and-forth loop to improve results. C) A system for filtering air in laboratories. D) A social media platform for scientists.

Task 2. Complete the sentences by filling in the gaps with the appropriate academic terms from the box provided below.

substantiating data | sequence of procedures | abandonment | disclosure | practically applicable | pure science | experimental evidence | rank of a theory

1. The scientific method is defined as a special _____ applied to establish the working principles of science.

2. If the results of test experiments do not support the initial idea, it often leads to the _____ of the hypothesis.

3. As the amount of _____ becomes larger, a hypothesis gradually advances to the _____.

4. Modern ethical guidelines in academic research require the _____ of any AI tools used in the development of a manuscript.

5. The University requires that postgraduate research be conducted on a high level and its results must be _____.

6. In coming to a conclusion, true scientists are not influenced by reputations or emotions, but are swayed only by _____.

7. While _____ is primarily concerned with the development of theoretical models, applied science focuses on practical affairs and technology.

substantiating data | rank of a theory | disclosure | applied science | recognition of the problem | Academic Council | critical comments

1. The very first step in the procedure known as the Scientific Method is the _____ followed by the collection of relevant facts,.
2. Major publishers now state that the most fundamental rule when using AI tools in research is _____, which ensures transparency and academic integrity,.
3. While pure science focuses on theoretical models, _____ is directly concerned with the application of working laws to the practical affairs of life,.
4. A hypothesis does not become a truth immediately; it only advances to the _____ as the amount of _____ becomes larger and larger.
5. During the writing of a thesis, the scientific adviser is expected to review major sections and provide _____ on each draft to improve its quality.
6. Once the postgraduate student completes and submits their work, they must defend it before the _____, which then decides whether to award the higher academic degree

Unit 10
The Research Process

Warming-up activities

Discuss the following questions:

1. In your opinion, is the research process usually a straightforward, step-by-step path, or is it a more complex and repetitive cycle?
2. When choosing a research area, which do you think should play a bigger role: your personal professional interests or the urgency and novelty of the problem for society?
3. How would you define a hypothesis in your own words, and why is it essential for a scientific study to have one that can be tested?

Task 1. Read and learn the Vocabulary Notes.

Vocabulary Notes

I. The Nature of the Research Process

Multi-stage process — багатоетапний процес.
To undertake — здійснювати, розпочинати (проєкт).
Critically reviewing the literature — критичний огляд літератури.
Rational and straightforward — раціональний та прямолінійний.
Considerably messier — значно заплутаніший (хаотичніший).
To revisit each stage — повертатися до кожного етапу.
To refine ideas — вдосконалювати (уточнювати) ідеї.

II. Steps and Components of Research

Hourglass model — модель пісочного годинника.
Research agenda — план / порядок денний дослідження.
Stating a problem — формулювання (постановка) проблеми.
Resolving a research puzzle — вирішення дослідницької загадки (головоломки).
Determining application areas — визначення сфер застосування.

III. Factors and Definitions

Objective and subjective factors — об’єктивні та суб’єктивні чинники.
Topicality, novelty, and urgency — актуальність, новизна та нагальність.
Aptitudes and frame of mind — здібності та склад розуму.
Amenable to direct investigation — піддатливий для безпосереднього дослідження.

IV. Identifying the Research Problem

Vague — неясний, нечіткий.
Loss for the community — втрата для громади (через брак знань).
Considerable attention — значна увага.
Needs elaboration — потребує (детального) опрацювання.

V. Goals and Tasks

Major goal — головна (основна) мета.

To clarify the nature and structure — з'ясувати природу та структуру.

To identify ways to improve efficiency — визначити шляхи підвищення ефективності.

VI. Hypothesis Characteristics and Types

Tentative assumption — попереднє (пробне) припущення.

Forceful hypothesis — сильна (переконлива) гіпотеза.

From the outset — від самого початку.

Well-supported — добре обґрунтований.

Testability and fruitfulness — перевірюваність та плідність.

Scope — охоплення (сфера застосування).

Conservatism (degree of "fit") — консерватизм (ступінь відповідності існуючим знанням).

Plausible explanation — правдоподібне пояснення.

Inconsistent with the hypothesis — такий, що не узгоджується з гіпотезою.

VII. Formalizing and Evaluating Research

Tentative word — слово, що виражає невпевненість або припущення (наприклад, "may").

To formalize the hypothesis — формалізувати гіпотезу (використовуючи "If... then...").

Independent variable — незалежна змінна (та, яку контролює вчений).

Dependent variable — залежна змінна (та, яку спостерігають / вимірюють).

To fulfill research tasks — виконати дослідницькі завдання.

Further prospects — подальші перспективи.

Convincing interpretation — переконлива інтерпретація.

Well-grounded novel conclusions — глибоко обґрунтовані нові висновки.

Task 2. Make up sentences with the words given in task 1.

Task 3. Read the text and discuss it. Write a synopsis of the text in five sentences.

THE RESEARCH PROCESS

Most research textbooks represent research as a multi-stage process that you must follow in order to undertake and complete your research project. The precise number of stages varies, but they usually include formulating and clarifying a topic, critically reviewing the literature, choosing a strategy, collecting data, analyzing data, and writing up. You may suggest that the research process is rational and straightforward. Unfortunately, this is very rarely true, and the reality is considerably messier. While research is often depicted as moving through the stages outlined below in sequence, this is

unlikely to be the case. In reality, you will probably revisit each stage more than once. Each time you revisit a stage, you will need to reflect on the issues it raises and refine your ideas.

Research is sometimes described using the hourglass model. The hourglass model starts with a broad research agenda, focusing on the required information through the project's methodology (like the neck of the hourglass), then expands the research through discussion and results.

The whole process of research can be divided into the following steps:

setting general area of research; defining the object of research; analyzing problem situation and stating a problem; specifying the subject of research; formulating a research goal; setting objectives; moving a hypothesis; developing research methods; collecting, describing, processing, interpreting research data; drawing conclusions, proving a hypothesis and resolving a research puzzle; determining application areas; writing research project.

Any research starts with setting a research area, which is determined by a number of objective and subjective factors. The objective determinants include topicality, novelty, and the research's urgency. Subjective factors include a researcher's scientific and professional interests, expertise, aptitudes, and frame of mind.

The object of the research is always broader than the chosen subject. It is a system of relations and properties of the phenomenon that exists objectively, both in theory and in practice, and serves as a source of relevant information. The subject of the research is more concrete and includes only those relations and properties amenable to direct investigation. It denotes what the author plans to create in the process of studying.

A research problem is a puzzle that can't be explained with available knowledge and needs a solution.

In the introduction to the research paper, it is necessary to prove that the chosen problem is topical. A problem is topical if it meets at least three requirements:

- the problem has not been fully studied.
- much or something in the problem remains vague;
- lack of knowledge on the problem leads to a loss for the community.

To demonstrate that the chosen research problem is topical, the author provides a review of previously published papers on the topic and a list of authors who were active in studies of the problem. Then he/she notes that, though the problem has received considerable attention, some aspects remain unclear and clarifies what is still unclear about the topic. One also mentions what is still vague and needs elaboration. The author then describes difficulties that arise because the problem under study has not been fully examined.

There is usually one major goal of research with objectives. The author's wish to study a problem is usually expressed in a single sentence stating the

research goal: to study the defined topic. Concrete objectives are further specified. The tasks of the research are usually the following:

to clarify the nature and structure of the phenomenon being researched;

to analyze the approaches to the research topic in the literature;

to describe aspects of the research topic by observation;

to generate a model;

to carry out an experiment;

to analyze experimental results;

to identify ways to improve the efficiency of the phenomenon under research.

The tasks (objectives) of research are set in order to plan the steps of the research. They may correspond to the order of the units and chapters of the research paper as a whole.

A hypothesis is a tentative assumption that proposes a possible explanation for a phenomenon or event. A hypothesis is said to be forceful if the assumption is not obvious from the outset of the research and must be well-supported. Researchers weighing up alternative hypotheses should take into consideration:

testability;

simplicity;

scope - the apparent application of the hypothesis to multiple cases of phenomena;

fruitfulness - the prospect that a hypothesis may explain further phenomena in the future;

conservatism - the degree of "fit" with existing recognized knowledge systems.

Hypotheses can be logical (arising from literature review), descriptive (predicting certain features in a phenomenon), and explanatory (anticipating a plausible explanation of a puzzle).

Generally, a hypothesis is used to make predictions that can be tested by observing the outcome of an experiment. If the outcome is inconsistent with the hypothesis, then the hypothesis is rejected. However, if the outcome is consistent with the hypothesis, the experiment is said to support the hypothesis.

How are hypotheses formulated?

Bacterial growth may be affected by temperature.

Ultraviolet light may cause skin cancer.

Temperature may cause leaves to change color.

All of these are examples of hypotheses because they use the tentative word "may". However, their form is not quite correct. Using the word "may" does not suggest how you would go about proving it. If these statements had not been written carefully, they may not have even been hypotheses at all. For example, if we say "Trees will change color when it gets cold," we are making a prediction. Or if we write "Ultraviolet light causes skin cancer", we make a

conclusion. One way to avoid such easy mistakes is to formalize the hypothesis.

Formalized hypothesis examples:

If *leaf color change is related to* <u>*temperature*</u>*,* ***then*** *exposing plants to low temperatures will result in changes in leaf color.*

If *skin cancer is related to* <u>*ultraviolet light*</u>*,* ***then*** *people with high exposure to UV light will have a higher frequency of skin cancer.*

Notice that these statements contain the words, **if** and **then**. They are necessary in a formalized hypothesis. Formalized hypotheses contain two variables. One is "independent," and the other is "dependent." The independent variable is the one the scientist controls, and the dependent variable is the one the scientist observes and/or measures. In the statements above, the dependent variable is printed in italics, and the independent variable is underlined. The ultimate value of a formalized hypothesis is that it forces us to think about what results we should look for in an experiment.

<u>The conclusions</u> are based on the research findings. Usually, the conclusions follow the order:

- conclusion on whether the research goal has been achieved;
- conclusion on whether the hypothesis has been proved or not;
- conclusion on whether each research task has been fulfilled;
- conclusions on what has been found in fulfilling every research task;
- conclusion on additional findings during the research;
- conclusion on further prospects to continue the research.

Evaluation of the research paper is based on 100%. Each item is assessed out of 10%. In all there are 10 items of evaluation:

- innovative subject;
- forceful hypothesis;
- concrete research goal;
- clear research tasks;
- adequate methods of research;
- detailed presentation of data;
- convincing interpretation;
- well-grounded novel conclusions;
- complete bibliography list;
- perfect format.

If your research paper scores less than 65%, it is “non-pass” and will need improvement. A satisfactory result is 80% or more. Between 80% and 95% is a good grade. An excellent result is 95% or higher.

Task 4. Restore the logical order of the stages of research:

1. studying known facts about the object of research;
2. formulating and clarifying a topic;
3. defining the object of research;

4. choosing adequate methods;
5. moving a hypothesis;
6. setting objectives;
7. collecting experimental data;
8. stating a problem;
9. explaining the results obtained;
10. determining application areas;
11. quantitative and qualitative processing of data.

Task 5. Complete the sentences according to the text above.

1. Although textbooks often show research as a rational and straightforward multi-stage process, the reality is usually _____.
2. According to the _____, research starts with a broad agenda and narrows down through the project's methodology before expanding again through results and discussion.
3. Setting a research area is determined by _____ (such as topicality and novelty) and _____ like a researcher's professional interests and expertise.
4. The _____ serves as a source of relevant information and is always broader than the chosen subject.
5. The _____ is more concrete than the object and includes only those relations that are _____.
6. A research problem is essentially a _____ with available knowledge and requires a solution.
7. For a problem to be considered topical, it must meet at least three requirements, one of which is that a lack of knowledge on the issue leads to a _____.
8. To demonstrate topicality, an author must clarify _____ about the topic despite previous considerable attention from other researchers.
9. The _____ are set to plan the research steps and often correspond to the order of the units and chapters in the final paper.
10. A hypothesis is defined as a _____ that proposes a possible explanation for an event or phenomenon.
11. In the context of evaluating a hypothesis, _____ refers to the prospect that the hypothesis may explain further phenomena in the future.
12. If the outcome of an experiment is _____, the experiment is said to support it; otherwise, the hypothesis is rejected.
13. One way to avoid making simple mistakes in scientific writing is to _____ by using the words "___" and "_____".
14. In a formalized hypothesis, the _____ is the one controlled by the scientist, while the _____ is the one being measured.
15. A research paper is considered to have an _____ if it scores _____

based on the ten items of evaluation.

Task 6. The logic of all experimental researches is basically the same, regardless of the field of study in which the scientist is working. The information presented in the table below is from the field of teaching foreign languages. Match the formulations in column A with basic stages of research in column B.

A	**B**
1) the model of teaching students to write expository essays	a) general area of study
2) to elaborate on the methodology of teaching writing expository essays and verify its effectiveness experimentally	b) object of research
3) literature review, observation, teaching experiment	c) research problem
A	**B**
4) teaching English as a foreign language	d) subject of research
5) contradiction between students' need for mastering academic writing and the lack of model teaching of it	e) research purpose
6) to define the properties and rhetorical organization of expository essays; to study productive, reproductive, and socio-cultural aspects of academic writing; to consider existing approaches to teaching writing	f) research objectives
7) the process of teaching students academic writing	g) hypothesis

8) teaching students to write expository essays will be more effective if it is organized by modelling basic characteristics of academic discourse, thought of as an activity and as a product	h) methods

Task 7. Find Ukrainian equivalents of the English words used in the text about research process.

1) precise a.	a) нагальна потреба
2) clarify v.	b) безладний, брудний
3) review v.	c) очищати, рафінувати, вдосконалювати
4) straightforward a.	d) досвід, кваліфікація, майстерність
5) messy a.	e) пов’язаний, супутній
6) depict v.	f) пролити світло на, з’ясувати
7) outline v.	g) окреслити, зобразити в загальних рисах
8) reflect on v.	h) неясний, невизначений, нечіткий
9) associated a.	i) описувати, зображувати, малювати
10) tentative a.	j) прямий, простий
11) refine v.	k) рецензувати, переглядати
12) specify v.	1) правдоподібний, прийнятний
13) anticipate v.	m) точно визначати, встановлювати, уточнювати
14) hourglass n.	n) здатність, схильність до чого-н.
15) urgency n.	o) розробляти, обмірковувати
16) expertise n.	p) що підлягає
17) aptitude n.	q) передбачати
18) vague a.	r) роздумувати, розмірковувати
19) elaborate v.	s) попередній
20) subject to a.	u) точний
21) plausible a.	v) пісочний годинник

Task 8. Look through paragraph 1 of the text again and find the words that mean the same.

1. to explain something in an exact and detailed way
2. an idea that attempts to explain something but has not yet been tested or proved to be correct
3. not complicated or difficult to understand
4. a subject that people discuss or argue about, especially relating to society, politics, etc.
5. complicated, difficult, and unpleasant to deal with
6. based on sensible, practical reasons rather than emotions
7. to think about something carefully and seriously
8. to consider or discuss something again
9. to be connected with something in some way
10. a glass container that uses sand to measure one hour

Task 9. Complete the sentences with the words above.

1. Darwin offered a working ____ for the mechanism of evolution.
2. There didn't seem to be any ____ explanation for his actions.
3. To make a claim, you must ____ the date when the article was lost.
4. Josie ____ how easily she could have been killed.
5. It's a fairly ____ operation.
6. His social problems were ____ with heavy drinking.
7. I think that's a subject which will have to be ____ .
8. It's a website devoted to environmental ____ .
9. A symbol of ____ is used in computer programs to show that the program is busy and you should wait.
10. Politics has always been a ____ business.

Task 10. Translate the following sentences into Ukrainian paying attention to the use of the words in bold type.

1. It would take too long to present here even a small number of the arguments which have been propounded both ***in favor of and against the hypothesis***.

2. Our experiments were conducted as part of the Joint Global Ocean Study, which had ***the objective of examining*** phytoplankton in the North Atlantic Ocean.

3. Our analysis will be rather informal, but it will ***be elaborated in more detail*** than has been practicable so far.

4. The new data may not ***clarify*** variations in the anatomical evolution of different groups of prehistoric populations.

5. The use of biological molecules in such reactions constitutes ***a promising approach to*** nanophase engineering.

6. Inadequate information allows two types of errors: ***accepting a***

hypothesis as true when it is false, and rejecting ***a hypothesis as false*** when it is in fact true.

7. Many of our observations can be objectively ***confirmed by*** informant tests.

8. The purpose of this book is to ***argue in favor*** of a fresh paradigm.

9. The book's approach is ***consistent with*** both its ***point of departure*** and its aims.

10. Having ***laid out*** the basic scheme, I should now ideally ***specify in grater detail*** what goes into each of components which make up my ***parsing model***.

Task 11. Answer the questions.

1. Why is the research process often described as a "messy" reality rather than a straightforward, rational sequence of stages?
2. How does the hourglass model help visualize the flow of research from a broad agenda to a specific methodology and back to a broad discussion?
3. What are the key differences between the object of research, which is a broad system of relations, and the subject of research, which is more concrete?
4. What objective and subjective factors should a researcher take into account when determining their research area?
5. What three specific requirements must a research problem meet to be considered topical?
6. How does a research goal (the major aim) differ from research tasks (the specific steps or objectives)?,
7. What qualities, such as testability, simplicity, and fruitfulness, make a hypothesis forceful?,
8. Why is it better to use a formalized hypothesis with "if... then..." statements rather than tentative words like "may"?
9. How can you identify the independent and dependent variables within a formalized hypothesis?
10. What are the ten items of evaluation used to assess a research paper, and what score is needed for an excellent result?

Speaking Task

Task 12. Speak on the following problems and discuss them with your colleagues:

a) the stages you will need to complete as part of your research process;

b) the correlation between the object and the subject, the goal and the objectives of research;

c) analyse the concept of a research hypothesis;

d) formulate basic stages of your research;

e) prove that your problem is topical.

Writing Task: Designing Your Research Framework

Writing Task: Designing Your Research Framework
Instructions: Based on the principles of the scientific method and the "hourglass model" described in the sources, complete the following writing stages for your current or planned research project. Ensure your academic tone is professional and your structure follows the "formulaic" requirements.

Part 1: Defining the Scope

- Topic: State the title of your research.
- Object vs. Subject: Clearly distinguish between the object (the broad system of relations) and the subject (the specific properties you will investigate).
    - *Example:* Object — "Higher Education System"; Subject — "Digital Literacy of PhD Students."

Part 2: Proving Topicality (The "Puzzle")

Write a short paragraph (100-150 words) to prove that your problem is **topical**. You must address at least two of the following requirements from the sources:

1. Explain what remains vague or unknown despite previous studies.
2. Describe the loss for the community that occurs because this problem hasn't been fully examined.
3. Clarify the "puzzle" that cannot be explained with existing knowledge.

Part 3: Goals and Tasks

- Research Goal: Formulate a single sentence stating your major aim (e.g., "To study/analyze/develop...").
- Objectives (Tasks): List at least three specific tasks that will serve as the "steps" for your research. Ensure they follow a logical order, such as clarifying the nature of the phenomenon, analyzing literature, and identifying ways to improve efficiency.

Part 4: The Formalized Hypothesis

Develop a forceful hypothesis for your study.

1. First, write it in a tentative form using the word "may".
2. Then, formalize it using the "If... then..." structure to make it testable.
3. Identify the variables: Underline the independent variable (what you control) and italicize the dependent variable (what you measure).
    - *Template:* If [independent variable] is related to [context], then [change in dependent variable] will occur.

Part 5: Self-Evaluation

Look at the 10 items of evaluation (innovative subject, forceful hypothesis, convincing interpretation, etc.). Which of these items do you find the most challenging to fulfill at this stage of your research, and why? Write 2-3 sentences of reflection.

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video "Research Process" and complete the video comprehension tasks.

Exercise 1: Sequencing the Steps

The speaker describes the research process as a "journey from a starting point till the finishing point". **Put the following 11 steps in the correct chronological order** as explained in the video:

- ( ) Sample selection
- ( ) Data collection
- ( ) Review of literature
- ( ) Communication and utilization
- ( ) Formulation of the problem
- ( ) Ethical consideration
- ( ) Formulating hypothesis
- ( ) Data analysis and interpretation
- ( ) Specifying the population
- ( ) Pilot study
- ( ) Selecting research design

Exercise 2: Matching Definitions. Match the research terms (1-6) with their specific explanations or analogies provided in the video.

Term	Explanation / Analogy from Video
1. Research Design	A. A "rehearsal" or screening program to identify mistakes
3. Ethical Consideration	C. An "overall plan," similar to making a plan for a home.
4. Hypothesis	D. Arranging the final results in an orderly or specific manner.
5. Sampling	E. An "assumption" or "imagination" of what the result will be.
6. Interpretation	F. Taking legal permission and safeguarding the rights and faith of patients.
3. Ethical Consideration	C. An "overall plan," similar to making a plan for a home.

Exercise 3: Multiple Choice & Short Answer. Answer the following questions based on the video content:

1. **Etymologically, what does the word "research" mean according to the speaker?**
   A) Searching for a new problem
   B) Looking for something again and again
   C) Writing a dissertation
   D) Collecting library books

2. **In Step 2 (Review of Literature), what is the primary goal of the researcher?**
   The goal is to _____ from sources like books, libraries, magazines, articles, and the internet regarding the chosen topic.

3. **According to the speaker, what determines if research is "legal" or "illegal"?**
   Research becomes legal through _____, which involves getting permission from authorities (hospitals, government) and the participants themselves while protecting their rights.

4. **What are the three methods of data collection mentioned in the video?**

1. _____ (e.g., for psychiatric patients)
2. _____ (e.g., conducting a meeting with participants)
3. _____ (e.g., providing a question paper)

5. **What is the final goal of "Communication and Utilization"?**

The research must be _____ (via books, magazines, or conferences) and then _____, such as a hospital, to be truly useful.

Exercise 4: Critical Thinking (Connecting to Previous Units)

- The speaker in the video describes the research process as a "journey" with 11 steps. How does this compare to the "messy reality" discussed in our previous session?
- Does the video's explanation of "Formulating a Hypothesis" as an "imagination" align with our previous definition of a "forceful hypothesis" that must be testable and use "if... then..." logic?

Grammar Focus: Conditionals and Formalized Hypotheses

A central grammatical feature of scientific writing is the use of Conditional Sentences to move from tentative guesses to testable statements.

- The "If... then..." Structure: This is required to formalize a hypothesis. For example, "If leaf color change is related to temperature, then exposing plants to low temperatures will result in changes in leaf color".
- Predictive Future: In the "then" clause, the Future Simple (will) is used to state the expected observation or measurement.
- First Conditional in Logic: The sources state that if the outcome of an experiment is inconsistent with the hypothesis, then the hypothesis is rejected.

In scientific writing, moving from a tentative guess to a formalized hypothesis is essential because it forces the researcher to define exactly what they are testing. A formalized hypothesis must use the "If... then..." structure and include an independent variable (the one the scientist controls) and a dependent variable (the one the scientist observes or measures).

Exercise 1: Formalizing Tentative Hypotheses.

Instructions: Rewrite the following "tentative" hypotheses (which use the word "may") into formalized hypotheses using the "If... then..." structure.

Example:

- *Tentative:* Bacterial growth may be affected by temperature.
- *Formalized:* If bacterial growth is related to temperature, then increasing the temperature of the environment will result in *faster bacterial growth*.

Tasks:

1. Tentative: Ultraviolet light may cause skin cancer.
    - Formalized:

      _____
2. Tentative: Temperature may cause leaves to change color.
    - Formalized:

      _____
3. Tentative: New medicine may cure HIV and AIDS.
    - Formalized:

      _____

Exercise 2: Identifying Variables and Testing Logic

Instructions: For each formalized hypothesis below, identify the Independent Variable and the Dependent Variable. Then, read the "Experimental Outcome" and decide if the hypothesis should be supported or rejected based on whether the result is consistent with the hypothesis.

1. Hypothesis: If leaf color change is related to temperature, then exposing plants to low temperatures will result in *changes in leaf color*.

- Independent Variable: _____
- Dependent Variable: _____
- Experimental Outcome: Plants placed in a freezing chamber for 48 hours

remained green, showing no color change.

- Logic (Supported/Rejected?): _____

2. Hypothesis: If skin cancer is related to ultraviolet light, then people with high exposure to UV light will have a *higher frequency of skin cancer*.

- Independent Variable: _____
- Dependent Variable: _____
- Experimental Outcome: A study of 1,000 participants found that those who used tanning beds (high UV) had a 50% higher rate of skin cancer than those who did not.
- Logic (Supported/Rejected?): _____

3. Hypothesis: If a new medicine is effective against HIV, then patients taking the medicine will show a *decrease in viral load*.

- Independent Variable: _____
- Dependent Variable: _____
- Experimental Outcome: After a six-month pilot study, data analysis showed that the viral load in patients remained the same as before the treatment.
- Logic (Supported/Rejected?): _____

Reflection

1. How does the "messy" reality of the research process, which often requires you to revisit each stage multiple times to refine your ideas, contrast with the "rational and straightforward" models typically found in many textbooks?
2. To ensure your research is testable and forceful, how can you move beyond a "tentative" assumption (using words like "may") to a formalized hypothesis that clearly defines your independent and dependent variables using an "if... then..." structure?
3. Does your chosen research problem address a genuine "puzzle" that currently results in a "loss for the community", and what steps will you take to ensure your findings are not just discovered but effectively communicated and utilized in a practical setting?

Unit 11
The Research Starting Point: Ideas and Questions

Warming-up activities

Discuss the following questions:

1. How crucial is it to have a well-defined destination or "starting point"

before beginning a complex task, and what happens if you "don't much care where you want to get to"?

2. When you need to generate new ideas, do you find it more helpful to use "rational thinking" (such as searching through literature or discussing with colleagues) or "creative thinking" (such as brainstorming or keeping a notebook of ideas)?
3. To what extent should your personal academic strengths and future career ambitions dictate the projects or topics you choose to undertake?

Task 1. Read and learn the Vocabulary Notes.

I. Starting the Research

research topic — тема дослідження
research project — дослідницький проєкт
starting point — відправна точка, початок
research strategy — стратегія дослідження
data collection and analysis techniques — методи збору та аналізу даних
initial research idea — початкова ідея дослідження
rational thinking — раціональне мислення
creative thinking — креативне мислення

II. Techniques for Generating Ideas

refining research ideas — удосконалення (уточнення) дослідницьких ідей
strengths and interests — сильні сторони та інтереси
searching the literature — пошук літератури
keeping a notebook of ideas — ведення записника ідей
relevance trees — «дерева релевантності» (логічні схеми взаємозв’язків)
brainstorming — мозковий штурм
academic knowledge — академічні знання
past project titles — назви попередніх проєктів
dissertations / Theses — дисертації (випускні роботи / наукові дисертації)
to capture one's imagination — захопити уяву
practitioners — практики
academic and professional journals — академічні та професійні журнали
academic review articles — академічні оглядові статті
pointers to areas where further research is needed — вказівки на сфери, що потребують подальшого дослідження
sparked off one’s thought — дало поштовх думці, наштовхнуло на

думку
personal preferences — особисті вподобання
parameters for evaluating — параметри (критерії) для оцінювання

III. Developing Research Questions and Objectives
broad concept — широка концепція, поняття
branches and sub-branches — гілки та підгілки
research success — успіх дослідження
clarity — чіткість
initial research questions — початкові дослідницькі запитання
straightforward matter — проста справа
descriptive answer — описова відповідь
general focus research question — загальне дослідницьке запитання
research objectives — цілі (завдання) дослідження
research community — наукова спільнота
sense of purpose and direction — відчуття мети та напрямку
rigorous thinking — суворе, ретельне мислення

IV. Analysis and Proposal Writing
to go beyond descriptions — виходити за межі описів
relationships and comparisons — взаємозв'язки та порівняння
predictions and generalizations — прогнозування та узагальнення
explanatory theory — пояснювальна теорія
amendment of a theory — внесення змін (поправок) до теорії
intelligence gathering / Descriptive research — збір інформації / описове дослідження
phenomena — явища
theoretical level — теоретичний рівень
assessed research projects — оцінювані дослідницькі проєкти
research proposal — дослідницька пропозиція (план-проспект дослідження)
research funding — фінансування дослідження
academic research committee — академічний дослідницький комітет
contract — контракт, угода
timescale — часові межі, графік виконання
resources and references — ресурси та список літератури

Task 2. Make up sentences with the words given in task 1.

Task 3. Read the text and discuss it. Write a synopsis of the text in five sentences.

CHOOSING AND SPECIFYING THE RESEARCH TOPIC

1. Before you start your research, you need to have at least some idea of what you want to do. This is probably the most difficult, and yet the most important, part of your research project. Without being clear about what you are going to research, it is difficult to plan how you are going to research it. This reminds us of a favourite quote in *Alice's Adventures in Wonderland.* This is part of Alice's conversation with the Cheshire Cat. In this, Alice asks the Cat (Carrol, 1989: 63-64):

'Would you tell me, please, which way I ought to walk from here?'

'That depends a good deal on where you want to get to,' said the Cat.

'I don't much care where,' said Alice.

'Then it doesn't matter which way you walk,' said the Cat.

Formulating and clarifying the research topic is the starting point of your research project. Once you are clear about this, you will be able to choose the most appropriate research strategy and data collection and analysis techniques.

2. If you have not been given an initial research idea, there is a range of techniques that can be used to find and select a topic that you would like to research. They can be thought of as predominantly *rational thinking,* and those that involve more *creative thinking.* It is usually better to use a variety of techniques. In order to do this, you will need to have some understanding of the techniques and the ways in which they work.

Table 1. **Techniques for generating research ideas**
More frequently used techniques for generating and refining research ideas

Rational thinking	*Creative thinking*
• Examining your own strengths and interests	• Keeping a notebook of ideas
	• Exploring personal preferences using past projects
• Looking at past project titles	
• Discussion	• Relevance trees
• Searching the literature	• Brainstorming

3. *Examining your own strengths and interests.* It is important that you choose a topic in which you are likely to do well and, if possible, have already some academic knowledge. There is the need to think about your future. If you plan to work in financial management it would be sensible to choose a research project in the financial management field.

Looking at past project titles. Many postgraduates consider looking at past projects a useful way of generating research ideas. For undergraduate and taught masters degrees these are often called *dissertations.* For research degrees they are termed *theses.* A common way of doing this is to scan a list of past project titles for anything that captures your imagination. Titles that look interesting or which grab your attention should be noted down, as should any thoughts you have about the title in relation to your own research idea.

Discussion. Colleagues, friends, and university professors are all good sources of possible project ideas. In addition, ideas can be obtained by talking to practitioners and professional groups.

Searching the literature. Types of literature that are of particular use for generating research ideas include:

- articles in academic and professional journals;
- reports;
- books.

Academic review articles are particularly useful. They contain both a considered review of the state of knowledge in that topic area and pointers to areas where further research is needed. In addition, you can browse recent publications, in particular journals, for possible research ideas. *Reports* may also be of use. The most recently published are usually up to date and, again, often contain recommendations that may form the basis of your research idea. *Books*, by contrast, are less up-to-date than other written sources. They do, however, often contain a good overview of research that has been undertaken, which may suggest ideas to you.

4. *Keeping a notebook of ideas.* One of the more creative techniques we all use is keeping a *notebook of ideas.* All this involves is simply noting down any interesting research ideas as you think of them and, of equal importance, what sparked off your thought.

Exploring personal preferences using past projects. Another way to generate possible project ideas is to explore your personal preferences by reviewing past project reports from your university. To do this, you should:

1) select six projects that you like;

2) for each of these six projects, note down your first thoughts in response to three questions:

a. What appeals to you about the project?
b. What is good about the project?
c. Why is the project good?

3) select three projects that you do not like;

4) for each of these three projects note down your first thoughts in response to three questions:

a. What do you dislike about the project?
b. What is bad about the project?
c. Why is the project bad?

You now have a list of what you consider excellent and what you consider poor in projects. By examining this list, you will begin to understand those project characteristics that are important to you and with which you feel comfortable. These can be used as parameters for evaluating possible research ideas.

Relevance trees. Relevance trees may also prove useful in generating research topics. You should start with a broad concept from which you generate further (usually more specific) topics. Each of these topics forms a separate branch from which you can generate further, more detailed sub-branches. As you proceed down the sub-branches, more ideas are generated and recorded.

Brainstorming. Brainstorming can be used to generate and refine research ideas. To brainstorm, you should:

a. define your problem - that is, the sorts of ideas you are interested in - as precisely as possible;

b. ask for suggestions relating to the problem;

c. record all suggestions;

d. review all the suggestions and explore what is meant by each.

e. analyze the list of suggestions and decide which appeal to you most as research ideas and why.

5.One of the key criteria of your research success will be whether you have a set of clear conclusions drawn from the data you have collected. The extent to which you can do that will be determined largely by the clarity with which you have posed your initial research questions.

Defining research questions, rather like generating research ideas, is not a straightforward matter. Beware of research questions that are too easy or too difficult. A question that prompts a descriptive answer, for example, "What is the proportion of graduates entering the civil service who attended the old-established UK universities?" is far easier to answer than: "Why are graduates from old-established UK universities more likely to enter the civil service than graduates from other universities?"

It is often a useful starting point in the writing of research questions to begin with a general focus research question that flows from your research idea. This may lead to several more detailed questions or the definition of research objectives.

Table 2 has some examples of general focus research questions.

Research idea	*General focus research question*
Job recruitment via the Internet	How effective is recruiting for the new staff via the Internet in comparison with traditional methods?
Advertising and share prices	How does the running of a TV

	advertising campaign designed to boost the image of a company affect its share price?
The use of aromas as a marketing device	In what ways does the use of specific aromas in supermarkets affect buyer behaviour?
The future of trade unions	What are the strategies that trade unions should adopt to ensure their future viability?

6. General focus research questions may be used as a base from which you write a set of research objectives. Objectives are more generally acceptable to the research community as evidence of the researcher's clear sense of purpose and direction. Research objectives require more rigorous thinking, which derives from the use of more formal language. *Table 3.* summarizes the objectives of some research conducted by one of our postgraduates

Table 3. Formulating research questions as research objectives

Research question	**Research objective**
1. Why have organizations introduced team briefing?	1. To identify organisations' objectives for team briefing schemes
2. How can the effectiveness of team briefing schemes be measured?	2. To establish suitable effectiveness criteria for team briefing schemes
3. Has team briefing been effective?	3 To describe the extent to which the effectiveness criteria for team briefing have been met
4. How can the effectiveness of team briefing be explained?	4a. To determine the factors associated with the effectiveness criteria fir team briefing being met. 4b. To estimate whether some of those factors are more influential than other factors
5. Can the explanation be generalized?	5. To develop an explanatory theory that associates certain factors with the effectiveness of team briefing schemes

7. Unlike 'what' questions, 'why' questions go beyond descriptions and require analysis. They look for explanations, relationships, comparisons, predictions, generalizations and theories. It is a shot step from the 'why' research question to the testing of an existing theory in a new situation or the

development of your own theory. This may be expressed as a hypothesis that is to be tested or the eventual answer to your research question may be the development or amendment of a theory. Although intelligence gathering (or it is often called descriptive research) will play a part in your research, it is unlikely to be enough. You should be seeking to explain phenomena, analyse relationships, compare what is going on across different research settings, predict outcomes, and generalize; then you will be working at the theoretical level. This is a necessary requirement for most assessed research projects.

8. Writing a research proposal is a crucial part of the research process. If you are applying for research funding or if your proposal is going before an academic research committee, you will know you need to put a great deal of time into preparing it. However, even if the official need for a proposal is not so vital, it is still a process that will repay very careful attention.

Writing a research proposal helps you to organize your ideas, and can be thought of as a contract between you and the reader.

The content of the research proposal should tell the reader what you want to do, why you want to do it, what you are trying to achieve, and how you plan to achieve it. Therefore, the structure of the research proposal includes: title, background, research question(s) and objectives, method, timescale, resources, and references.

Task 4. Skim the text about formulating the research topic. Find an appropriate heading for each paragraph.

a. the importance of theory in writing research projects
b. classification of techniques for generating research ideas
c. rational thinking techniques
d. the starting point of your research project
e. setting research objectives
f. writing a research proposal
g. creative thinking techniques
h. writing research questions

Task 5. Scan the text and write the number of the paragraph where you can find the following information. Do it as quickly as possible.

__ rational thinking
__ theory-dependent research
__ a notebook of ideas
__ personal preferences
__ 'why' and 'what' questions
__ review articles
__ general focus research question

__ the development and amendment of a theory
__ intelligence gathering
__ types of literature
__ branches and sub-branches

Task 6. Match terms in column A with their definitions in column B

A	***B***
1) creative thinking technique	a) a situation in which the results will be of similar value, whatever they are
2) thesis	b) formulation regarding the cause and effect relationships between two or more variables, which may or may not have been tested
3) notebook of ideas	c) if we accept that every purposive decision we take is based on the assumption that certain consequences will flow from the decision, then these decisions are theory-dependent
4) rational thinking technique	d) the usual name for research projects undertaken for Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) degrees, written for an academic audience
5) relevance tree	e) one of a number of key questions that the research process will address. These are often precursors of research objectives
6) research question	f) technique for generating research topics that starts with a broad concept from which further (usually more specific) topics are generated. Each of these topics forms a separate branch, from which further sub-branches that are more detailed can be generated
7) a symmetry of potential outcomes	g) one of a number of techniques for generating and refining research ideas based on a systematic approach such as searching the literature or examining past projects
8) theory	h) one of a number of techniques for generating and refining research ideas based on non-rational criteria

9) theory-dependent	i) technique for noting down any interesting research ideas as you think of them

Task 7. One attribute of a good research topic is the symmetry of potential outcomes. To gain a clear understanding of what it means and how to ensure it, read and analyze the following text as a worked example. Be ready to answer the questions:

a. What was Mark's initial research idea?
b. What made him change the topic?
c. What did he decide to research?
d. Will a refined research topic ensure symmetry of potential outcomes?

Mark was a part-time postgraduate student. His initial research topic was to determine whether there was a relationship between the level of stress experienced by social workers and the number of years they had been employed. If he established a link between these factors, this would be an interesting finding; if, however, he found no relationship, the finding would be less interesting and would have no real practical relevance to his organization.

He therefore decided to amend his topic to exploring and understanding the impact of a forthcoming stress management course on the relative levels of stress experienced by social workers before the course. The results of this research would be interesting and important, whether or not the course had an impact.

Task 8. Find Ukrainian equivalents of the English words and word combinations used in the text.

1) clarifying the research topic	a) оволодіти уявою
2) initial research idea	b) внесення поправок у теорію
3) to undertake a project	c) привернути увагу
4) relevance tree	d) потенційний результат
5) to capture smb’s imagination	e) початкова ідея наукового дослідження
6) to grab smb’s attention	f) переважно
7) fresh insights	g) збір даних
8) predominantly	h) уточнення теми наукового дослідження
9) to browse recent publications	i) ретельне обмірковування
10) to spark off a thought	j) виконувати проект
11) to evaluate research ideas	k) оцінювати дослідницькі ідеї
12) potential outcome	l) причинно-наслідкові відносини
13) rigorous thinking	m) сучасне розуміння
14) intelligence gathering	n) прогноз, передбачення
15) amendment of a theory	o) проглядати останні публікації

16) eventual answer	p) викликати думку
17) cause and effect relationships	q) остаточна відповідь
18) prediction	r) дерево відносної важливості
19) to pursue the idea	s) оглядова стаття
20) review article	t) розглядати ідею

Task 9. Look through the text CHOOSING AND SPECIFYING THE RESEARCH TOPIC again and find the words that mean the same. The paragraph numbers are given in brackets.

1)a sentence or phrase taken from a work of literature or other piece of writing and repeated in order to prove a point or support an argument (1)

2)a student who is doing a university course for a first degree (3)

3)a university degree that students get if they study for one or two years after their first degree (3)

4)to look through or read parts of a book, magazine, etc. without any clear purpose (3)

5)a way of developing new ideas through a discussion in which several people make lots of suggestions and the best ones are chosen (4)

6)standards that are used for judging something or making a decision about something (5)

7)facts or physical signs that help to prove something (6)

a reason you give for something that has happened or something you have done (7)

Task 10. Identify the nouns, adjectives, adverbs, and verbs in the following group of words. Use the appropriate ones in the sentences below. Choose the correct form of the word.

a. prefer, b. preferable, c. preferably, d. preference, e. preferential, f. preferentially

Note the difference between *preferable* and *preferential*.

Preferable means better, esp. because more suitable; that one should or would prefer.

Preferential means giving, receiving, or showing preference.

1. Gradual change is _____ to sudden, large-scale change.
2. Don't expect to be treated _____ .
3. In considering people for jobs, we give____to those with some experience.
4. This is a controversial new law that gives____ treatment to certain minority groups.
5. Would you_____ that we reschedule the meeting for next week.
6. I can meet you at any time tomorrow, but____ not before 11 o'clock.

Task 11. Answer the questions

1. Why is it important to spend time choosing and clarifying your research topic?
2. What are the attributes of a good research topic?
3. What topics should be avoided?
4. What techniques can be used for generating and refining research ideas?
5. What techniques involve rational thinking?
6. What is the usual name for research projects undertaken for Master and Doctor of Philosophy degrees?
7. What techniques involve creative thinking?
8. What are the advantages of brainstorming?
9. Why is it important to define clearly research questions and objectives?
10. What is the difference between research and intelligence gathering?
11. What does the work at the theoretical level imply?
12. What are methods of narrowing a topic to a specific subject?

Speaking Practice

Task 12. Speak on the following problems and discuss them with your colleagues:

- the importance of choosing the right research topic;
- the attributes of a good research topic;
- techniques for generating and refining research ideas;
- turning research ideas into clear research objectives;
- practise in narrowing the topic to a specific subject.

Writing Task: From Research Idea to Formal Proposal

Instructions: Follow the steps below to develop and refine your research topic. Ensure your responses are grounded in the principles of academic rigor and clarity described in the sources.

Step 1: Ideation (Generating the Idea)

Choose one rational and one creative technique from the sources to generate or refine your research idea.

- Rational Task: Briefly describe your strengths and interests. How does your chosen topic align with your future career (e.g., if you plan to work in financial management, why choose a project in this field?).
- Creative Task: Start a "relevance tree". Begin with a broad concept (e.g., "Digital Marketing") and create at least two levels of sub-branches to arrive at a more specific topic.

Step 2: Evaluating Personal Preferences
Using the "Exploring personal preferences" technique, find one past project or thesis title that captures your imagination.

- Analysis: Write down three reasons why this project appeals to you (What is good about it? Why is it good?). This will help you identify the parameters for your own research evaluation.

Step 3: Formulating Research Questions
A key to success is the clarity of your initial questions.

1. General Focus Question: Write one broad question that flows from your research idea (e.g., "How effective is recruiting via the Internet?").
2. Refining to "Why": Convert a simple "What" question (descriptive) into a "Why" question that requires analysis, relationships, and theory testing.
    - *Example:* Move from "What is the proportion of..." to "Why are certain groups more likely to...".

Step 4: Defining Research Objectives
Objectives provide evidence of a researcher's "clear sense of purpose and direction".

- Task: Translate your research questions into at least three formal objectives using rigorous, formal language.
    - *Tip:* Use verbs like "to identify", "to establish", "to determine", or "to develop".

Step 5: Drafting the Proposal Outline
The research proposal acts as a contract between you and the reader.

- Task: Create a skeleton outline for your proposal, including the following mandatory sections:
    1. Title
    2. Background
    3. Research Question(s) and Objectives
    4. Method
    5. Timescale
    6. Resources and References

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video "How to Choose a GOOD Research Topic: Research Papers for Beginners" and do the video comprehension tasks.

Exercise 1: Sequencing the Research Process. Put the following steps in the correct chronological order as described by the speaker in the sources:

- ( ) Refine by asking questions: Narrow the focus by picking apart the "impact" and the specific population.
- ( ) Preliminary research: Check the amount of information available and its alignment with assignment criteria.
- ( ) Identify the general topic: Start at "ground zero" with a broad area like time management.
- ( ) Finalize the topic: Fine-tune the wording to create a strong topic with clear parameters.
- ( ) Play "Matchmaker": Brainstorm specific areas that fall under the umbrella of the general topic to find potential relationships.

Exercise 2: Choose the correct answer:

1. According to the speaker, an effective research topic is defined as:

a) A general broad theme that covers many ideas.

b) A specific area within a general broad topic.

c) Any subject that a student finds personally interesting.

2. What does the "narrowing by expanding" process involve?

a) Starting with a tiny detail and adding more general information.

b) Expanding a general topic to see all options before picking one specific area.

c) Researching aimlessly until a gap in knowledge is found.

3. When "playing matchmaker," why is it important to keep potential topics relevant to your degree?

a) Because broad topics are impossible to research.

b) Because the research must align with the specific course or program requirements.

c) Because independent variables must always be related to mental health.

4. In the example "time management and college students," what is the independent variable?

a) Time management.

b) College students.

c) Graduation rates.

5. What is the "huge mistake" many students make before landing on a topic?

a) They do too much research at the very beginning.

b) They choose a topic they like and get "married" to it without doing preliminary research.

c) They pick a topic that is too broad for their assignment criteria.

6. During preliminary research, what two things should a student check?

a) Their personal interest and the popularity of the topic on social media.

b) The amount of information available and its alignment with assignment criteria.

c) The complexity of the research question and the number of variables.

Exercise 3: Answer the following questions using information from the video transcript:

1. Why is a specific research topic more effective than a broad one?
2. According to the speaker, what is a "huge mistake" many students make when choosing a topic?
3. What two specific things should you look for during preliminary research?
4. How does the speaker suggest measuring "success" for undergraduate students to narrow the topic even further?

Exercise 4: Application & Analysis. Analyze the final research topic provided in the source: *"Impact proper time management skills have on the graduation rate of undergraduate students"*.

- Question: How does this final version provide "parameters" to the research compared to the general topic of "Time Management"?
- Response Strategy: Explain how the topic defines who (undergraduate students), what (proper time management skills), and how it is measured (graduation rate).

Grammar Focus: Interrogative Structures (Descriptive vs. Analytical)

The success of a research project is largely determined by the clarity and depth of the initial research questions. Research questions generally fall into two categories: those that prompt a descriptive answer and those that require an analytical approach.

1. Descriptive Structures (Intelligence Gathering)

Descriptive questions often begin with "What" and are primarily concerned with "intelligence gathering". These questions are often considered "too easy" because they focus on collecting facts or identifying the current state of a situation without exploring deeper causes. While descriptive research plays a part in any project, it is usually insufficient for assessed research projects on its own.

- **Characteristics:** Focuses on proportions, quantities, or simple identification.
- **Example:** "What is the proportion of graduates entering the civil service who attended the old-established UK universities?".

2. Analytical Structures (The Theoretical Level)

Analytical questions, typically beginning with "Why" or "How", go beyond simple descriptions and require a higher level of rigorous thinking. These structures are designed to reach the "theoretical level" of research, which is a necessary requirement for most academic projects. Instead of just gathering data, analytical questions seek to explain phenomena and analyze the mechanics behind observed facts.

- Functions: Analytical structures look for explanations, relationships, comparisons, predictions, and generalizations.
- Example: "Why are graduates from old-established UK universities more likely to enter the civil service than graduates from other universities?".

3. Refining through Questioning

The process of moving from a broad topic to an effective research question involves refining by continuing to ask specific questions. According to the research journey model, a researcher should "pick apart" their initial idea by asking questions about the nature of the impact, the specific population involved, and the metrics for success.

- From Broad to Specific: A general idea like "time management" is refined by asking, "How does it impact a specific group?" and then further narrowed to "How does it impact the graduation rate of a specific group?".
- From Question to Objective: Analytical questions are often used as a base to write research objectives, which use formal language (e.g., *"To determine the factors..."*) to demonstrate a clear sense of purpose and direction.

4. The Transition to Theory and Hypotheses

It is only a "short step" from an analytical "why" question to the testing of an existing theory or the development of a new one. This transition often leads to the formulation of a hypothesis, where the researcher predicts an outcome or relationship that will be tested during the investigation. By focusing on analytical structures, researchers ensure they are not just walking aimlessly but are moving toward a substantive thesis statement

Exercise 1: Descriptive or Analytical?

Goal: To identify the level of research rigor in different interrogative structures.

Instructions: Categorize each research question as either **Descriptive** (intelligence gathering) or **Analytical** (theoretical level)

1. **Question:** What is the average number of hours undergraduate students spend on time management apps per week?
    - **Category:** _____
2. **Question:** Why do students who use digital time management tools show higher graduation rates than those who use paper planners?

- **Category:** _____

3. **Question:** How does the introduction of team briefing schemes affect the communication efficiency within an organization?
    - **Category:** _____
4. **Question:** What is the proportion of business majors who successfully find jobs within six months of graduation?
    - **Category:** _____
5. **Question:** In what ways does the use of specific aromas in supermarkets affect buyer behavior?
    - **Category:** _____

Exercise 2: The "Why" Transformation Challenge

Goal: To practice upgrading research questions from simple descriptions to analytical inquiries.

Instructions: Rewrite the following **descriptive** "What" questions into **analytical** questions that look for relationships, comparisons, or explanations. Use the examples from the sources as a guide.

1. **Descriptive:** What are the most common time management techniques used by online college students?
    - **Analytical (Why/How):**

      _____
2. **Descriptive:** What is the current share price of companies that run TV advertising campaigns?
    - **Analytical (Why/How):**

      _____
3. **Descriptive:** What is the number of organizations that have introduced team briefing?
    - **Analytical (Why/How):**

      _____
4. **Descriptive:** What are the graduation rates of undergraduate students in business programs?

    Analytical (Why/How):

    _____

Reflection

1. Clarity of Direction: Considering the metaphor of Alice and the Cheshire Cat, how does the clarity of your "destination" (your research topic) determine the success of your journey and prevent you from "researching aimlessly" without a clear sense of purpose?
2. Feasibility vs. Interest: When conducting preliminary research, how do you balance your personal academic interests and career ambitions with the practical availability of information and your specific assignment criteria?

3. Analytical Depth: Does your research move beyond "intelligence gathering" (descriptive "what" questions) to reach a "theoretical level" by asking analytical "why" questions that explore complex relationships and explanations?

Unit 12
Critically Reviewing the Literature

Warming-up activities

Discuss the following questions:

1. Why is it essential to understand what other researchers have already discovered before you begin your own scientific investigation?
2. When you hear the word "critical," do you usually think of something negative, or can it also mean a balanced evaluation of both strengths and weaknesses?
3. With the vast amount of information available today, how do you handle "information overload" and decide which sources are truly relevant to your needs?

Task 1. Read and learn the Vocabulary Notes.

I. The Essence of Literature Review

critically reviewing the literature — критичний огляд літератури
to clarify research questions — уточнити дослідницькі запитання
foundation — основа (фундамент)
to refine objectives — вдосконалити (уточнити) цілі
overlooked — упущений, проігнорований
explicit recommendations — чіткі (явні) рекомендації
justification — обґрунтування
to avoid repeating work — уникати повторення роботи
newsworthy — вартий висвітлення у новинах (актуальний)
to draw out key points — виділити ключові моменти
to establish the boundaries — встановити межі
to discredit — спростувати, підірвати довіру

II. Critical Writing and Analysis

up to date — актуальний, сучасний
to assess the strengths and weaknesses — оцінити сильні та слабкі сторони
to cite the original work — цитувати оригінальну працю
merits and faults — переваги та недоліки
recognized experts — визнані експерти
reasoned judgments — аргументовані судження
valid evidence — вагомі (переконливі) докази

to distinguish between fact and opinion — розрізняти факти та думки
funnel structure — структура «лійки»
to compare and contrast — порівнювати та зіставляти
fresh insights — нові погляди (ідеї)
coherent and cohesive argument — послідовний та зв'язний аргумент
empirical work — емпірична робота

III. Types of Literature and Search Strategy

primary literature (grey literature) — первинна література («сіра» література)
conference proceedings — матеріали конференцій
theses — дисертації
manuscripts and memos — рукописи та службові записки
secondary literature — вторинна література
tertiary literature (search tools) — третинна література (інструменти пошуку)
indexes and abstracts — покажчики та реферати
encyclopedias and bibliographies — енциклопедії та бібліографії
information overload — інформаційне перевантаження
parameters of search — параметри пошуку
key words and search terms — ключові слова та терміни пошуку
brainstorming — мозковий штурм
relevance trees — дерева релевантності
biased — упереджений
methodological omissions — методологічні упущення
precision — точність
scientific advisor — науковий керівник

Task 2. Make up sentences with the words given in task 1.

Task 3. Read and translate the text.

CRITICALLY REVIEWING THE LITERATURE

1. Knowledge doesn’t exist in a vacuum, and your work only has value in relation to other people’s. Your work and your findings will be significant only to the extent that they're the same as, or different from, other people's work and findings.

You therefore need to establish what research has been published in your chosen area and try to identify any other research that might currently be in progress. The items you read and write about will enhance your subject knowledge and help you to clarify your research question(s) further. This process is called *critically reviewing the literature.*

2. Your critical literature review will form the foundation on which your research is built. Its main purpose is to help you to develop a good

understanding and insight into relevant previous research and the trends that have emerged. Your review also has a number of other purposes:

- to help you to refine further your research question(s) and objectives;
- to highlight research possibilities that have been overlooked implicitly in research on data;
- to discover explicit recommendations for further research. These can provide you with a superb justification for your own research question(s) and objectives;
- to help you to avoid simply repeating work that has been done already;
- to sample current opinions in newspapers, professional journals, thereby gaining insights into the aspects of your research question(s) and objectives that are considered newsworthy;
- to discover and provide an insight into research approaches, strategies and techniques that may be appropriate to your own research question(s) and objectives.

3. As you begin to find, read, and evaluate the literature, you will need to think about how to combine the academic theories and ideas it contains to form the critical review that will appear in your project report. This will need to discuss critically the work that has already been undertaken in your area of research, and reference that work. It will draw out the key points and trends and present them in a logical way. In doing this, you will provide readers of your project report with the necessary background knowledge to your research question(s) and objectives, and establish the boundaries of your own research. It will also enable readers to see your ideas in the context of previously published research in the area. This does not necessarily mean that your ideas must extend, follow, or approve those set out in the literature. You may be highly critical of the earlier research and seek to discredit it. However, if you wish to do this, you must still review the literature, argue clearly why it is problematic, and then justify your own ideas.

In writing your critical review, you will therefore need:

- to include the key academic theories within your chosen area;
- to demonstrate that your knowledge of your chosen area is up to date;
- to show how your research relates to previous published research;
- to assess the strengths and weaknesses of previous work and take these into account in your arguments;
- to justify your arguments by referencing previous research;
- through clear referencing, to enable those reading your research report to find the original work you cite.

4. Within the context of reviewing the literature, the term 'critical' refers to the judgement you exercise. It therefore describes the process of providing a detailed and justified analysis of and commentary on the merits and faults of the key literature within your chosen area. This means that, for your review to be critical, you should:

- refer to work by recognized experts in your chosen area;
- consider and discuss work that supports and work that opposes your ideas;
- make reasoned judgements regarding the value of others' work to your research;
- support your arguments with valid evidence in a logical manner;
- distinguish clearly between fact and opinion.

5. Although there is no single structure that your critical review should take, it is useful to think of the review as a funnel in which you:

- start at a more general level before narrowing down to your specific research question(s) and objectives;
- provide a brief overview of key ideas;
- summarize, compare, and contrast the work of the key writers;
- narrow down to highlight the work most relevant to your research;
- provide a detailed account of the findings of this work;
- highlight the issues where your research will provide fresh insights;
- lead the reader into subsequent sections of your project report, which explore these issues.

Whichever way you structure your review, you must demonstrate that you have read, understood, and evaluated the items you have located. The key to writing a critical literature review is therefore to link together the different ideas you find in the literature to form a coherent and cohesive argument, which sets the context and justifies your research. Obviously, it should relate to your research question and objectives. It should show a clear link from these, as well as to the empirical work that will follow.

6. The literature sources available to help you develop a good understanding of and insight into previous research can be divided into three categories: primary (published and unpublished), secondary, and tertiary. In reality, these categories often overlap: for example, primary literature sources, including conference proceedings, can appear in journals, and some books contain indexes to primary and secondary literature.

Primary literature sources (also known as *grey literature)* are the first occurrence of a piece of work. They include published sources such as reports, conference proceedings, and theses. They also include unpublished manuscript sources such as letters and memos.

Secondary literature sources, such as books and journals, are the subsequent publications of primary literature. These publications are aimed at a wider audience. They are easier to locate than primary literature as they are better covered by the tertiary literature.

Tertiary literature sources, also called *search tools,* are designed either to help to locate primary and secondary literature or to introduce a topic. They therefore include indexes and abstracts as well as encyclopedias and bibliographies.

Your use of these literature sources will depend on your research questions and objectives. For some research projects, you may use only tertiary and secondary literature; for others, you may need to locate primary literature as well.

7. It is important that you plan the literature search carefully to ensure that you locate relevant and up-to-date literature. This will enable you to identify previously published research in your area and relate your own research to it. Time spent planning will be repaid in time saved when searching the literature. As you start planning your search, beware of information overload! Before commencing your literature search, you should undertake further planning by:

- defining the parameters of your search;
- generating key words and search terms;
- discussing your ideas as widely as possible.

Techniques that can help you include brainstorming and relevance trees.

8. Once obtained, the literature must be evaluated for its relevance to your research questions and objectives. The following questions provide a checklist to help you in this process.

- How recent is the item?

- Have you seen references to this item (or its author) in other items that were useful?

- Does the item support or contradict your arguments? For either it will probably be worth reading!

- Did the item appear to be biased? Even if it is it may still be relevant to your critical review!

- What are the methodological omissions within the work? Even if there are many it still may be of relevance!

- If the precision sufficient? Even if it is imprecise, it may be the only item you can find and still be relevant!

Your assessment of whether you have read a sufficient amount is even more complex. It is impossible to read everything, so you would never start writing your critical review. Yet you need to ensure that your critical review discusses the research that has already been undertaken and that you have positioned your research project in the wider context, citing the main writers in the field. One clue that you have achieved this is when further searching provides mainly references to items you have already read. You also need to check what constitutes an acceptable amount of reading, in terms of both quality and quantity, with your scientific advisor.

Task 4. Skim the text about the critical literature review. Find an appropriate heading for each paragraph.

a. planning the literature search
b. definition of critical literature review
c. evaluating the literature found

d. what is meant by critical
e. the purpose of the critical review
f. the structure of the critical review
g. the content of the critical review
h. literature sources

Task 5. Answer the questions.

1. What is the fundamental reason for critically reviewing the literature before starting a research project?
2. In what ways does a literature review help a researcher to refine their research questions and objectives?
3. How can explicit recommendations for further research found in the literature justify your own study?
4. Why is it important to establish the boundaries of your own research in relation to previously published work?
5. What does the term 'critical' specifically mean in the context of analyzing the merits and faults of academic literature?
6. What specific requirements must be met to demonstrate that your knowledge of the chosen research area is up to date?
7. How is the 'funnel' structure applied when organizing a critical literature review from general ideas to specific objectives?
8. What are the primary differences between primary (grey) literature, secondary literature, and tertiary literature sources?,
9. Which techniques can help a researcher plan their literature search effectively and avoid information overload?
10. What is a key indicator that a researcher has reached a sufficient amount of reading in their field?

Task 6. Match terms in column A with their definitions in column B

A	B
1) critical literature review	a) an alphabetical list of something, such as subjects or names, at the back of a book, that shows on which page they are mentioned
2) key word	b) the first occurrence of a piece of work, including published sources such as government white papers, and unpublished sources such as letters, memos, and committee minutes
3) tertiary literature source	c) detailed and justified analysis and commentary of the merits and faults of the literature within a chosen area, which demonstrates familiarity with what is already known about your research topic
4) grey literature	d) a journal in which the articles have been evaluated by academic peers prior to publication to assess their quality and suitability
5) index	e) journals produced by a professional organization for its members, often containing articles of a practical nature related to professional

	needs
6)professiona journal	f) source designed to help locate primary and secondary literature, such as an index, abstract, or bibliography
7) references	g) an article that contains both a considered review of the state of knowledge in a given topic area and pointers towards areas where further research needs to be undertaken
8)refereed academic journal	h) International Standard Serial Number, a unique eight-digit number used to identify a print or electronic periodical publication
9) review article	i) bibliographic details of all items referred to directly in the text
10) ISBN	j) basic term that describes the research questions and objectives which can be used in combination to search the tertiary literature
11) ISSN	k) International Standard Book Number; a unique 9-digit number given to every book that is published

Task 7. State whether the following statements are true or false.

1. Bibliographic details required to find a journal article normally include the author, year of publication, title of article, title of journal, volume, part/issue, and page numbers.

2. These can be difficult to locate and, when found, difficult to access as there may be only one copy at the awarding institution.

3 Academic journals are never available on the Internet.

4. While reviewing the literature, you do not need to assess the strengths and weaknesses of previous work, including omissions and bias.

5. For your review to be critical, you don't need to make reasoned judgments regarding the value of others' work to your research.

6. By fully acknowledging the work of others, you will avoid charges of plagiarism.

Task 8. Find Ukrainian equivalents of the English words used in the text

1) enhance v.	а) судження, підстава
2) emerge v.	б) відбирати зразки, пробувати
3) implicitly adv	в) збільшувати, підсилвати
4) explicit a.	г) складати(документ)
5) justification n.	д) неявно, приховано
6) sample v	е) проявлятись, виникати (про питання, проблему)
7) draw out v.	є) явний, конкретний, повністю висловлений
8) discredit v.	ж) використовувати, користуватись
9) exercise v	з) логічно послідовний, когерентний

10) distinguish v	и) остерігатися
11) reference v.	і) необ'єктивний, тенденційний
12) coherent a.	ї) дискредитувати
13) cohesive a.	й) забезпечити текст посиланнями
14) beware v.	к) відрізнятись
15) biased a	л) зв'язний
16) relevance n.	м) частково співпадати
17) overlap v.	н) значущість, доречність, важливість

Task 9. Fill in the blanks in the text using the phrases from the box.

a) critically discussing and referencing work
b) develop a thorough understanding of and insight into
c) research question(s) and objectives
d) primary literature
e) brainstorming and relevance trees
f) at a more general level
g) a logically argued way
h) following up references in articles you have already read
i) key words and search terms

A critical review of the literature is necessary to help you to 1) previous research that relates to your research question(s) and objectives. Your review will set your research in context by 2) _____ that has already been undertaken, drawing out key points and presenting them in 3) , and highlighting those areas where you will provide fresh insights. It will lead the reader into subsequent sections of your project report.

There is no one correct structure for a critical review, although it is helpful to think of it as a funnel in which you start 4) _____prior to narrowing down to your specific research question(s) and objectives.

Literature sources can be divided into three categories: primary, secondary and tertiary. In reality, these categories often overlap. Your use of these resources will depend on your research question(s) and objectives. Some may use only tertiary and secondary literature. For others, you may need to locate 5) _____ as well.

When planning your literature search you need:
- to have clearly defined 6) ___ ;
- to define the parameters of your search;
- to generate 7)_____;

- to discuss your ideas as widely as possible.

Techniques to help you in this include 8) .

Your literature search will be undertaken using a variety of approaches in tandem. These will include:

- searching using tertiary sources and the Internet;
- 9) _____ ;
- scanning and browsing secondary literature in your library.

Once obtained, the literature must be evaluated for its relevance to your research question(s) and objectives. This must include a consideration of each item's currency. Each item must be read and noted. Bibliographic details, a brief description of the content, and appropriate supplementary information should also be recorded.

Task 10. Answer the questions.

1. What does the process of critically reviewing the literature involve?
2. What is the main purpose of a critical literature review?
3. What other purposes does the review state?
4. What do you need to include in your critical review?
5. Does the review imply that your ideas should extend, follow or approve those set out in the literature?
6. What is meant by 'critical' in the context of reviewing the literature?
7. What is the accepted structure of a critical review?
8. What three categories can literature sources be divided into?
9. What do primary literature sources include?
10. Why are secondary literature sources easier to locate?
11. What are tertiary literature sources designed for?
12. What does planning the literature search include?
13. What parameters of the literature obtained should be assessed?

Task 11. Critically reviewing the literature. Perform the following:

- Consider your research questions and objectives. Use your lecture notes, course textbooks, and relevant review articles to define both narrow and broader parameters of your literature search, considering language, subject area, geographical area, publication period, and literature type.
- Generate key words and search terms using one or a variety of techniques such as reading, brainstorming, and relevance trees. Discuss your ideas widely, including with your project tutor and colleagues.
- Start your search using both the database and printed tertiary sources to identify relevant secondary literature. Begin with those tertiary sources that abstract and index academic journal articles and books. At the same time, obtain relevant literature that has been referenced in articles you have already read.
- Expand your search via other sources, such as the Internet and by browsing and scanning.

- Obtain copies of relevant items, read them, and make notes. Remember also to record bibliographic details, a brief description of the content, and supplementary information on an index card or in your reference database.
- Start drafting your critical review as early as possible, keeping in mind its purpose.

Speaking Practice

Task 12. Speak on the following problems and discuss them with your colleagues:

1. The "Vacuum" Concept: The sources state that "knowledge doesn't exist in a vacuum". How does relating your findings to the work of others determine the actual significance and value of your research?
2. Justifying Your Research: How can discovering "explicit recommendations for further research" in existing literature serve as a "superb justification" for your own research questions and objectives?
3. Avoiding Redundancy: Beyond gaining subject knowledge, how does a critical review help a researcher avoid "simply repeating work that has been done already"?

Writing Task: Constructing a Critical Literature Review

Instructions: Follow the steps below to demonstrate your ability to find, evaluate, and synthesize academic sources into a coherent argument. Your responses must reflect the principles of critical analysis and logical structure described in the sources.

Step 1: Planning the Search Strategy

Before diving into reading, you must plan to avoid **information overload**.

- **Task:** Choose a potential research topic.
    1. Define the parameters of your search (e.g., date range, language, or geographical sector).
    2. Generate a list of at least five key words or search terms.
    3. Create a brief "relevance tree" or a brainstorming map to visualize how your topic branches into sub-themes.

Step 2: Evaluating Sources (The Checklist)

Select two potential sources for your topic (one primary/grey literature source and one secondary literature source).

- **Task:** Use the checklist from the sources to evaluate one of these items. Write a brief paragraph (100-150 words) answering:
    - How recent is the item?
    - Does it contain any methodological omissions or signs of bias?

(Explain why it might still be relevant despite these).
    - Does it support or contradict your current arguments?

Step 3: Drafting the "Funnel" Structure

The sources suggest organizing your review like a funnel, moving from general ideas to specific objectives.

- **Task:** Outline the structure of your review using the following sections:
    1. General Level: Briefly describe the key academic theories in your area.
    2. Comparison: Mention two "recognized experts" and how you would compare and contrast their work.
    3. The "Gap": Identify a research possibility that has been overlooked or an explicit recommendation for further research from the literature.
    4. Justification: Explain how your proposed research will provide fresh insights in the context of what you have read.

Step 4: Critical Synthesis (The Argument)

- **Task:** Write a short concluding statement (5-7 sentences) for your review.
    - Focus: Ensure you link different ideas to form a coherent and cohesive argument.
    - Goal: Establish the boundaries of your research and justify why your study is necessary based on the previous work you cited.

Video Insights: Postgraduate Research in Motion

Task 13. Watch the video "Literature review critical analysis – 4 steps to do it well" and do the video comprehension tasks.

Exercise 1: Identification of the Four Stages

According to Dr. Elizabeth Yardley, critical analysis is not a «great big secret» but a straightforward four-step process. Identify and list the four stages in the correct order as presented in the video:

1. _____

Exercise 2: Deep Dive into «Describe» and «Interpret»

Answer the following questions based on the first two stages of the process:

1. When describing an item, the speaker emphasizes that you should keep it «short and concise». What two specific things should you focus on in this description?
2. How does the interpret stage go beyond mere description?
3. In the example provided, the researcher compares a journal article about Twitter to a dissertation about TikTok. Why is it important to ask

questions about the differences in platforms and participants (e.g., Chief Marketing Officers vs. Social Media Managers) during the interpretation phase?

Exercise 3: Evaluating Value and Evidence

In the «Evaluate» stage, you make a judgment about the value of the item for your research. Check all the elements the speaker suggests you should consider during this phase:

- [ ] The strengths and weaknesses of the article.
- [ ] How many words are in the article.
- [ ] The quality of the arguments and the strength of the evidence.
- [ ] Whether the findings are generalizable or applicable to your own study.
- [ ] If the author is a fan of the series «Emily in Paris».

Exercise 4: The Art of Synthesis

The final stage is «Synthesis.» Explain the following concepts mentioned in the source:

1. What does it mean to «zoom out» during the synthesis stage?
2. The speaker uses a «jigsaw puzzle» metaphor. What is the difference between an «important piece in the middle» and a «piece around the edge» in terms of your literature review?
3. How does synthesis help you understand how a specific item is positioned in relation to other items you have read?

Exercise 5: Reflective Application

Using the prompts mentioned in the video, how would you rank a piece of literature that «highlights something that others have skipped over or not mentioned»? Which of the four stages does this realization belong to?

- Rank: (e.g., high importance/low importance)
- Stage: _____

Grammar Focus: Infinitives of Purpose for Formulating Literature

In academic writing, infinitives of purpose (the structure «to + verb») are used to express the specific goals or intentions of a research project. According to the sources, a critical literature review is not just a summary but a «foundation» that requires a clear sense of direction. Using infinitives allows a researcher to move from general reading to active inquiry, helping to refine research questions, highlight new possibilities, and justify the necessity of the study.

Exercise 1: Matching Objectives

Match the infinitive of purpose on the left with its intended research outcome on the right, based on the purposes of a literature review

Infinitive Phrase	Research Outcome
1. **To refine**…	**A.** …your arguments by referencing previous research.
2. **To avoid**…	**B.** …research possibilities that have been overlooked.
3. **To highlight**…	**C.** …further your research question(s) and objectives.
4. **To justify**…	**D.** …simply repeating work that has been done already.
5. **To demonstrate**…	**E.** …that your knowledge of your chosen area is up to date.

Exercise 2: Sentence Completion

Complete the following sentences by choosing the correct infinitive verb from the list below. Use the information provided in the sources.

List: ***To establish / To discover / To assess / To enable / To summarize***

1. One purpose of the review is _____ explicit recommendations for further research.
2. You need _____ the boundaries of your own research in relation to existing work.
3. It is necessary _____ the strengths and weaknesses of previous work.
4. The goal of the «funnel» structure is _____ and contrast the work of key writers.
5. Accurate citations are used _____ those reading your report to find the original work.

Exercise 3: Formalizing Objectives

Rewrite the following informal researcher thoughts into formal research objectives using an infinitive of purpose. Follow the academic style found in the sources.

Example: «I want to show how my work fits with what others have written.» *Formal:* **To show how your research relates to previous published research**.

1. «I need to make sure I'm using the right research methods for my project.» **Formal:**

   _____
   _____.
2. «I want to find out what people are saying in the news and journals right now.» **Formal:**

   _____
   _____.

3. «I have to explain why my research is actually needed.»

Formal: _____

Reflection

1. From Description to Judgment: Reflecting on the four stages of critical analysis—describe, interpret, evaluate, and synthesize—how will you ensure your review moves beyond a «short and concise» summary to provide a detailed and justified analysis of the merits and faults of the literature?
2. The «Big Picture» and the «Gap»: Using the «funnel» structure and the «jigsaw puzzle» metaphor, how does zooming out to see where a piece of literature fits in the wider context help you identify research possibilities that have been overlooked and justify the fresh insights your own study will provide?
3. Managing Information and Quality: Given the danger of information overload, how will you apply the evaluation checklist (recency, bias, and methodology) to ensure your review is built on a foundation of high-quality primary and secondary sources rather than just a collection of summaries?

UNIT 13
Scientific Communication

Warming-up activities

Discuss the following questions:

1. How does the idea that science is «public knowledge» determine the way researchers contribute to the progress of ideas?
2. In what ways do citations help a scientist establish the place of their specific investigation within the «whole scientific structure»?
3. Why is the «personal exchange of views» and the opportunity for «thorough criticism» during seminars and workshops considered essential for scientific progress?

Task 1. Read and learn the words from the Vocabulary Notes.

Scientific Communication and Publications

Scientific communication — наукова комунікація.
Public knowledge — суспільне надбання (публічне знання).
To contribute to the progress of ideas — сприяти прогресу ідей.

Scientific publications — наукові публікації.
Research worker — науковий співробітник (дослідник).
Discoveries, deductions, speculations — відкриття, висновки (дедукція), припущення.
Common interest — спільний інтерес.
Derivative — похідний (такий, що базується на попередніх роботах).
Citations — цитування.
Scientific structure — наукова структура (система).

Conferences and Symposia

national and international conferences — національні та міжнародні конференції.
Symposia — симпозіуми.
Coordinating scientific research — координація наукових досліджень.
Organizational committee — організаційний комітет.
Abstracts of papers — тези доповідей.
Latest developments — останні розробки.
State of the art — сучасний стан (рівень досягнень у певній галузі).
Plenary sessions — пленарні засідання.
Chairmanship of distinguished scientists — головування видатних вчених.
Scientific opponents — наукові опоненти.
To keep abreast of the achievements — бути в курсі (не відставати від) досягнень.

Academic Meetings and Seminars

laboratory or work-group seminar — лабораторний або груповий семінар.
Colloquium and workshop — колоквіум та воркшоп (майстер-клас/семінар-практикум).
Guest-speakers — запрошені доповідачі.
Thorough discussion and criticism — ретельне обговорення та критика.
Personal exchange of views — особистий обмін думками.

Task 2. Make up sentences with the words given in task 1.

Task 3. Try to guess the meaning of the following phrases

1. ***conference*** — meeting for discussion, exchange of views.

2. ***symposium*** — a conference at which a particular topic is discussed by speakers.

3. ***event*** — an item in a program of a scientific gathering, a program includes such events as plenary sessions, section meetings, seminars, workshops, round-table talks, etc.; a social program includes such events as dinners, receptions, excursions, tours, etc.

4. ***the state of the art*** — the level or position at a given time, especially at present, of generally accepted and available knowledge, technical achievement in a particular field.

5. ***seminar*** — a discussion group on any particular subject.

6. ***colloquium*** — a meeting for discussion.

7. ***workshop*** — a seminar emphasizing exchange of ideas and practical methods.

8. ***criticism*** —judgment or opinion on something, a remark that finds fault.

9. ***to keep abreast of (with)*** — to keep up to date.

Task 4. Read the text and discuss it. Write a synopsis of the text in five sentences.

SCIENTIFIC COMMUNICATION

Communication is essential for scientific research. Science is public knowledge, and the aim of a scientist is to create, criticize, and thus contribute to the progress of ideas. This aim is generally achieved through scientific publications and conferences.

Articles in regular scientific journals carry, from one research worker to another, various discoveries, deductions, speculations, and observations of common interest. Generally, scientific papers are derivative and depend on previous research. References to other research are reflected in citations. A scientist relies on citations to show the place of his investigation in the whole scientific structure.

Another opportunity to share and exchange opinions and information is national and international conferences and symposia. They play an important role in coordinating scientific research. Usually, scientific gatherings are sponsored by the central scientific organizations. An organizational committee is established to decide where and when a conference should be held. Invitations are sent to organizations interested in the topics discussed, along with requests to submit applications and abstracts of papers.

After receiving all necessary materials, the committee publishes a program of the events. At the conference, participants present their papers and listen to others read reports on the latest developments and the state of the art in their field. Papers on general topics are read before all participants; those dealing with specific problems are presented at group meetings and at plenary sessions held in subject areas under the chairmanship of distinguished scientists. After the hearings, the discussions follow. Scientists can discuss a given problem with other experts in their field, argue with their scientific opponents, and learn the details of experimental procedures. The proceedings of conferences and symposia are usually published to allow others to keep abreast of advances in science.

Another type of scientific meeting is a laboratory or work-group seminar, colloquium, or workshop. The staff and guest speakers review developments in their fields and report on the progress of their research. The speakers expect thorough discussion and criticism, advice, and help from their colleagues. Such

personal exchange of views is essential for any scientist.

Task 5. Translate the following words and word combinations:

Сприяти прогресу ідей, суспільне надбання (публічне знання), наукові публікації та конференції, спільний інтерес, базуватися (залежати) на попередніх дослідженнях, відображатися у цитуваннях, місце дослідження в усій науковій структурі, обмінюватися думками та інформацією, координувати наукові дослідження, організаційний комітет, подавати заявки та тези доповідей, сучасний стан (рівень досягнень) у певній галузі, останні розробки.

Task 6. Read the following statements and comment on them:

1. Articles play an important role in coordinating scientific research.
2. Each paper must have an abstract of not more than ten lines to be translated into the other three languages.
3. The list of references should include only those publications that are mentioned in the text.
4. Those who want to attend a scientific conference or symposium are requested by the Organizing Committee to register, usually by filling in an official application form.

Task 7. Put questions to the underlined words.

1. The aim of a scientist is <u>to contribute to the progress of ideas</u>.
2. Generally, scientific papers depend <u>on previous research</u>.
3. Usually, scientific gatherings are sponsored <u>by the central scientific organizations</u>.
4. <u>After receiving all necessary materials</u>, the committee publishes a program of the events.
5. After the hearings, <u>the discussions</u> follow.
6. <u>Personal exchange of views</u> is essential for any scientist.

Task 8. Translate the following sentences.

14. Науковці обмінюються думками та ідеями через наукові публікації та конференції. 2. Наукові статті публікуються у спеціальних виданнях. 3. У статті вчений посилається на цитати інших науковців, щоб показати місце свого дослідження у загальній структурі. 4. Організаційний комітет відповідає за організацію та проведення конференції. 5. Учасники конференції мають нагоду представити свою статтю та послухати доповіді щодо останніх досягнень у своїй галузі. 6. Зазвичай після слухання доповіді відбувається її обговорення. 7. Опубліковані матеріали конференції дозволяють науковцям бути в курсі останніх досягнень науки.

Task 9. Imagine that you are the conference chairman. What would you say if

- the speaker is wandering about the point;
- speaking time has been exceeded;
- you want the speaker to speak louder into the microphone (from the seat);
- you want the speaker to restrict their contributions to three minutes;
  the speaker's voice is not heard;
- the speaker does not stick to the point;
- the speaker is unknown to you and to other participants;
- one of the conference participants is used to interrupting the speaker.

Task 10. You are at a conference. Your colleague who is asking questions has a bad command of English. He wants you to repeat and translate the answer given to his question.

1. Yes, I must simply agree with you.

2.1 Share your opinion, but I want to comment on the results of your research work.

3.1 certainly agree with many researchers as to the problem discussed.

4. My observations of the problem agree with the observations of the previous speaker.

5.1 Share your opinion concerning this problem

6.1 agree with what's been said today, but I want to comment on one aspect of the problem.

7.1 must accept your point of view.

8. Unfortunately, you are right.

9. Unfortunately, the problem has not been investigated yet.

Task 11. Your colleague from Britain asks you to translate some Ukrainian sentences from the recorded discussion he didn't catch.

1. Я цілком згоден із цим твердженням.
2. Мої спостереження збігаються з вашими.
3. Я вітаю вас із позитивними результатами.
4. Я цілком згоден із попереднім доповідачем.
5. Ви маєте рацію. Результати дуже добрі.
6. Я цілком згоден з попереднім доповідачем.
7. Я мушу прийняти це без жодного сумніву.
8. На жаль, це справді так. Проблема потребує подальшого дослідження.
9. Я погоджуюся з тим, що щойно сказав професор Браун.
10. Я вітаю професора Козловського з результатами його наукових досліджень.
11. Мої спостереження збігаються зі спостереженнями англійських

учених.

12. Я, безперечно, згоден з тим, що було сказано професором Рональдом, але я хочу прокоментувати результати дослідження.

13. Я, безперечно, згоден з багатьма зауваженнями, але хочу зазначити, що ця робота є перспективною.

14. Я згоден, що над цією проблемою треба ще багато працювати.

Speaking Practice

Task 12. Speak on the following problems and discuss them with your colleagues:

Prepare a short presentation or lead a group discussion focusing on the following aspects of scientific communication:

- **The Concept of «Public Knowledge»**: Discuss why communication is considered essential for research and how the primary aim of a scientist — to create, criticize, and contribute to ideas — is achieved through public platforms like journals and conferences.
- **The Map of Science through Citations**: Explain the statement that scientific papers are «derivative» and depend on previous research. How does a scientist use citations to define the exact place of their investigation within the «whole scientific structure»?.
- **The Role of Scientific Gatherings in Coordination**: Evaluate how national and international conferences or symposia help in coordinating scientific research. Discuss the importance of the organizational process, from submitting abstracts to presenting the «state of the art» in a specific field.
- **Formal vs. Informal Scientific Meetings**: Compare the functions of large-scale conferences with smaller meetings like laboratory seminars, colloquia, or workshops. Why is the «personal exchange of views» in these smaller groups often considered more essential for reporting the progress of research?.
- **The Value of Scientific Criticism**: Analyze why researchers actually expect and welcome «thorough discussion and criticism» from their colleagues. How can arguing with scientific opponents or consulting with experts during sessions help a scientist refine their experimental procedures?

Writing Task: The Essentials of Scientific Communication

Instructions: Complete the following three-part assignment. Your writing should demonstrate an understanding of how scientific ideas are created, shared, and criticized within the academic community.

Part 1: The Philosophy of Science (Short Essay)

Write a short argumentative paragraph (100–150 words) explaining the statement: «Science is public knowledge.» In your response, address the following:

- Why is communication considered essential for research?
- How do citations help a scientist define the «place of his investigation in the whole scientific structure»?
- Explain why most scientific papers are considered «derivative.»

Part 2: Preparing for a Scientific Gathering (Abstract & Proposal)

Imagine you have been invited by an organizational committee to participate in an international symposium.

- Task: Draft a formal abstract (50–100 words) of a hypothetical research paper.
- Requirements: Your abstract must mention the «state of the art» in your specific field and promise to discuss the «latest developments.»
- Context: State whether your paper should be read at a plenary session (general topic) or a group meeting (specific problem).

Part 3: Responding to Scientific Criticism (Reflective Writing)

It is stated that in meetings such as workshops or colloquia, speakers expect «thorough discussion and criticism.»

- Task: Write a short reflective piece (80–120 words) on the value of «scientific opponents» and «personal exchange of views.»,
- Prompt: How can arguing with an opponent or receiving «advice and help of colleagues» lead to a better understanding of experimental procedures?

Video Insights: Postgraduate Work in Motion

Task 13. Watch the video "What Is Scientific Communication?" and do the video comprehension tasks.

Exercise 1: Conceptual Definitions. Based on the introductory part of the video, provide concise answers to the following questions:

1. How does the video define scientific communication?
2. Who are the two primary target audiences identified for this process?
3. According to the source, what is the ultimate goal of conveying complex scientific concepts to the public?
4. Why is this process considered essential in a modern societal context?

Exercise 2: Historical Timeline and Evolution. Trace the development of scientific communication by matching the historical period with the correct milestone or method:

Period / Event	Significant Development
1. The 1660s	A. Growth of the «Public Understanding of Science» movement and the Bodmer Report.
2. Philosophical Transactions	B. The founding of the Royal Society.
3. 18th & 19th Centuries	C. Established the concepts of scientific priority and peer review.
4. Post-World War II	D. High popularity of public lectures to bridge the gap between scientists and society.

Exercise 3: The Pillars of Academic Publishing. The video mentions two principles established by the world's oldest scientific journal that remain «fundamental» to science today. Define these terms in your own words based on your academic experience:

1. Scientific Priority:
2. Peer Review:

Exercise 4: Comparing Media and Methods. The source discusses the shift from traditional to digital platforms. Complete the following table and answer the follow-up question:

Category	Examples Mentioned in the Video
Traditional Media	
Modern Digital Platforms	

Follow-up Question: According to the video, what is the specific advantage of modern digital tools for scientists compared to traditional lectures or newspapers?

Exercise 5: Institutional Impact (Case Study: The Royal Society). Analyze the role of scientific societies using the Royal Society as an example:

1. What has been the «central mission» of the Royal Society regarding scientific knowledge?
2. Name two specific activities the Royal Society uses to make science more understandable to the public.

Exercise 6: Critical Discussion for PhD Students. Discuss the following prompts with your colleagues, drawing on the video and your own research area:

- The video mentions that scientific communication «influences policy decisions.» Can you provide an example from your field where clear communication (or a lack thereof) significantly impacted public policy?
- The Bodmer Report highlighted the need for scientists to «connect more

actively with society.» As a researcher, do you believe it is your responsibility to communicate your findings to the general public, or should you focus exclusively on «experts in the field»?

- How do you think the «passion» mentioned in the context of 19th-century lectures can be translated into modern digital formats like podcasts or social media?

Grammar Review

Exercise 1: Identifying Passive Structures. Identify the passive verb forms in the following sentences derived from the sources. Write the tense of each passive construction (e.g., Present Simple Passive, Past Simple Passive).

1. Invitations are sent out to organizations interested in the topics discussed.
   - *Verb:* _____ *Tense:* _____
2. The world's oldest scientific journal was launched by the Royal Society in the 1660s.
   - *Verb:* _____ *Tense:* _____
3. The materials of conferences and symposia are usually published to allow others to keep abreast of achievements.
   - *Verb:* _____ *Tense:* _____
4. How science is communicated today has been shaped by the legacy of the Royal Society.
   - *Verb:* _____ *Tense:* _____

Exercise 2: Sentence Transformation. Rewrite the following active sentences into the passive voice to make them sound more formal and academic, as seen in the sources.

1. The organizational committee decides the location and date of the conference. **Passive:**

   _____
   __

2. Scientists generally achieve the aim of progressing ideas through publications. **Passive:**

   _____
   __

3. Research workers present specific problems at group meetings. **Passive:**

   _____
   __

4. Modern digital platforms allow scientists to reach a global audience. **Passive:**

   _____
   __

Exercise 3: Formal Procedural Description. Complete the following paragraph describing the process of a scientific symposium using the correct passive form of the verbs in brackets.

Once a theme is chosen, an organizational committee (1) _____ (set up) to manage the event. Invitations (2) _____ (send) to various research institutions, and abstracts (3) _____ (request) from potential speakers. After the materials arrive, a formal programme (4) _____ (publish). During the event, papers dealing with general topics (5) _____ (read) before all participants in plenary sessions. Finally, the conference proceedings (6) _____ (usually/publish) so that the latest developments (7) _____ (can/share) with the wider scientific community.

Exercise 4: Choosing the Correct Form. Complete the sentences using the correct form of the verb in brackets (Gerund or Infinitive).

1. The Royal Society was responsible for (launch) _____ the world's oldest scientific journal.
2. Scientists use citations (show) _____ the place of their investigation in the whole scientific structure.
3. (Attend) _____ a public lecture was a popular way for the public to engage with science in the 19th century.
4. The organizational committee invites researchers (submit) _____ abstracts of their latest findings.

Exercise 5: Preposition + Gerund. Fill in the missing prepositions and put the verbs in the correct gerund form. Choose from: *of / in / on / for*.

1. The process _____ (convey) complex concepts is essential for public awareness.
2. The Royal Society significantly contributed _____ (make) science more understandable.
3. Plenary sessions focus _____ (discuss) general topics under the chairmanship of distinguished scientists.
4. There was a growing need _____ (connect) scientists more actively with society after WWII.

Exercise 6: Sentence Transformation. Rewrite the following sentences using the word in brackets, ensuring you use a Gerund or an Infinitive correctly.

1. Scientists share information because they want to influence policy decisions. (IN ORDER TO)
2. One method of communicating science is to publish in regular journals. (CONSISTS OF)

3. The committee’s job is to organize the programme of events. (RESPONSIBLE FOR)

Reflection

1. The Nature of Scientific Knowledge: Considering that science is defined as «public knowledge,» how do citations and the «derivative» nature of scientific papers help a researcher define the exact place of their investigation within the global scientific structure?,
2. The Evolution of Public Engagement: How has the method of «bridging the gap» between scientists and the general public evolved from the passionate public lectures of the 18th and 19th centuries to the modern digital platforms and podcasts used today?
3. Formal vs. Informal Collaboration: What are the distinct roles of large-scale international conferences versus smaller laboratory seminars or workshops in facilitating the «personal exchange of views» and providing the «thorough criticism» necessary for scientific progress?,,
4. Quality Control and Standards: How did historical milestones, such as the founding of the Royal Society and the establishment of peer review, create the fundamental principles that ensure scientific information remains credible and organized in the modern era?

Progress Check
Module IV

The Peculiarities of the Research Process

Section 1: The Research Process & Methodology

1. The word "research" is derived from two words, "re" and "search," which literally means: A. Searching for the first time. B. Looking for something again and again. C. Finding a secret. D. Organizing books in a library.

2. Which model describes the research process as starting broad, narrowing through methodology, and expanding in discussion? A. The Pyramid model. B. The Funnel model. C. The Hourglass model. D. The Circular model.

3. What is the first step in the research process according to Unit 10? A. Collecting data. B. Formulating and clarifying a topic. C. Proving a hypothesis. D. Writing the final report.

4. A "problem" in research is defined as a situation where: A. There is too much information. B. At present there is no solution or answer. C. The researcher disagrees with their supervisor. D. The library is closed.

5. What is a "pilot study"? A. A study conducted by an airplane pilot. B. A rough, small-scale rehearsal to identify mistakes. C. The final presentation of results. D. A study of bird migration.

6. Ethical consideration in research involves: A. Choosing the most interesting topic. B. Protecting the rights and beliefs of participants and getting

permission. C. Writing the paper as fast as possible. D. Using AI to generate all text.

7. "Sampling" refers to the process of: A. Testing every single person in a country. B. Taking a small portion from the entire population to study. C. Interviewing only your friends.) Printing the final dissertation.

8. Which variable is the one the scientist controls in an experiment? A. Dependent variable. B. Independent variable. C. Extraneous variable. D. Qualitative variable.

9. The process of evaluating and arranging collected data in an orderly manner is called: A. Literature review. B. Data analysis and interpretation. C. Hypothesis formulation.) Brainstorming.

10. What percentage is usually considered a "satisfactory" grade for a research paper evaluation? A. 50% or more. B. 65% or more. C. 80% or more. D. Only 95% and above.

Section 2: Choosing and Specifying the Research Topic

11. An effective research topic is described as: A. A general broad topic. B. A specific area within a general topic. C. A topic that has never been studied by anyone. D. A topic chosen randomly from a textbook.

12. "Narrowing by expanding" means: A. Making the paper longer to reach the word count. B. Taking a general topic and expanding it to find a specific study area. C. Deleting most of your research. D. Reading only one book on the subject.

13. Which technique for generating ideas involves starting with a broad concept and generating detailed sub-branches? A. Brainstorming. B. Relevance trees. C. Searching the literature. D. Examining past titles.

14. Preliminary research is conducted to scope out topics and check for: A. Grammatical errors in your notes. B. The amount of information available and alignment with criteria. C. The shortest books in the library. D. What your friends are researching.

15. Why should a researcher use words like "impact" or "effect" in a working topic? A. To make the title sound more professional. B. To keep the relationship mutual before doing deep research. C. Because they are the only words allowed in titles. D. To avoid using a hypothesis.

16. Which of these is a "creative thinking" technique for generating research ideas? A. Examining own strengths. B. Searching the literature. C. Keeping a notebook of ideas. D. Looking at past project titles.

17. "Why" research questions are considered superior to "What" questions because they: A. Are shorter to write. B. Go beyond description and require analysis or explanation. C. Always have a "Yes" or "No" answer. D. Are easier for undergraduates.

18. A research proposal is often thought of as a _____ between the researcher and the reader. A. Secret. B. Contract. C. Suggestion. D. Final

report.

19. When choosing a topic, you should keep it "relevant," meaning it should align with: A. Your personal hobbies only. B. Your degree and the specific course criteria. C. The most popular news of the day. D. Your supervisor’s hobbies.

20. What is the main danger to beware of when beginning a literature search? A. Lack of coffee. B. Information overload. C. Finding too many old books. D. Writing too many notes.

Section 3: Hypotheses and Research Goals

21. A hypothesis is best described as: A. A proven fact. B. An assumption or expectation of the result. C. A list of references. D. The title of the paper.

22. A formalized hypothesis must contain which two words? A. Because and So. B. If and Then. C. Research and Result. D. Maybe and Likely.

23. A hypothesis is said to be "forceful" if: A. It is written in bold. B. The assumption is not obvious from the start. C. It is very long. D. It is copied from a famous scientist.

24. If the outcome of an experiment is consistent with the hypothesis, the experiment: A. Proves the hypothesis is a law. B. Supports the hypothesis. C. Rejects the hypothesis. D. Discards the methodology.

25. "Fruitfulness" as a criterion for a hypothesis refers to: A. The number of pages it takes to explain. B. The prospect of explaining further phenomena in the future. C. How many people agree with it. D. The amount of data collected.

26. In the formalized hypothesis "If skin cancer is related to UV light, then people with high exposure will have higher frequency," the "skin cancer frequency" is the: A. Independent variable. B. Dependent variable. C. Constant. D. Control group.

27. Why is the word "may" (e.g., "Bacterial growth *may* be affected by temperature") problematic in a formal hypothesis? A. It is too scientific. B. It does not suggest how you would go about proving it. C. It is a very long word. D. It sounds too certain.

28. Research tasks (objectives) are set in order to: A. Confuse the reader. B. Plan the specific steps of the research. C. Increase the word count. D. Replace the hypothesis.

Section 4: The Critical Literature Review

29. The main purpose of a critical literature review is to: A. Summarize every book in the library. B. Develop understanding of previous research and justify your own. C. Find spelling mistakes in other people's work. D. Show how much you have read.

30. What are the four steps of critical analysis in a literature review? A. Read, Write, Edit, Publish. B. Describe, Interpret, Evaluate, Synthesize. C.

Find, Copy, Paste, Cite. D. Ask, Listen, Record, Analyze.

31. The "Describe" stage of critical analysis should be: A. At least five pages long. B. Short, concise, and focused on relevance to your topic. C. A summary of the author's biography. D. A list of all chapters in the book.

32. "Evaluation" in a literature review involves making a judgment about: A. The author's writing style. B. The value, strengths, and weaknesses of the item for your research. C. How much the book costs. D. The quality of the paper used.

33. "Synthesis" occurs when you think about an item in relation to: A. Your own personal opinions. B. Other items you have read to see the "bigger picture". C. The library's filing system. D. The dictionary definition.

34. Primary literature sources, also known as "grey literature," include: A. Textbooks and encyclopedias. B. Reports, conference proceedings, and theses. C. Newspapers and magazines. D. Dictionaries.

35. Tertiary literature sources are designed to: A. Be the first occurrence of a piece of work. B. Help locate primary and secondary literature (e.g., indexes, abstracts). C. Be read for entertainment. D. Summarize all existing knowledge.

36. A review should be structured like a "funnel," meaning it starts: A. With specific data and gets broader. B. With general ideas and narrows down to specific questions. C. At the end and works backwards. D. With your own conclusions.

37. You know you have read a "sufficient" amount of literature when: A. You have read 100 books. B. Further searching provides mainly references to items you have already read. C. Your eyes are tired. D. You have reached the word count.

38. In critical analysis, "Interpretation" focuses on: A. Translating the text into another language. B. Application and implications of the research for your own study. C. The font size used in the article. D. Summarizing the methodology.

Section 5: Scientific Communication & History

39. Scientific communication is the process of sharing information with: A. Only your supervisor. B. Various audiences, including experts and the general public. C. Only people who work in laboratories. D. Students at LNTU only.

40. Which organization launched the world’s oldest scientific journal in the 1660s? A. NASA. B. The Royal Society. C. Oxford University. D. The United Nations.

41. What is the name of the oldest scientific journal? A. Science Today. B. Philosophical Transactions. C. The Research Journal. D. Nature and Mankind.

42. The historical journal *Philosophical Transactions* established the

fundamental principles of: A. Scientific priority and peer review. B. Copyright and royalties. C. Social media marketing. D. University tuition fees.

43. Why are scientific papers described as "derivative"? A. Because they are original and unique. B. Because they depend on and refer to previous research. C. Because they are very difficult to read. D. Because they are written by students.

44. A scientist relies on _____ to show the place of their investigation in the scientific structure. A. Photographs. B. Citations. C. Their memory. D. Word counts.

45. What historical method was used in the 18th and 19th centuries to "bridge the gap" between scientists and the public? A. YouTube videos. B. Public lectures. C. Private letters. D. Radio broadcasts.

46. Which report in the UK highlighted the importance of "public understanding of science"? A. The Newton Report. B. The Bodmer Report. C. The Alice Report. D. The Royal Report.

47. In a conference, "specific problems" are usually presented at: A. Plenary sessions read to everyone. B. Group meetings held in subject areas. C. The coffee break. D. The opening ceremony.

48. A laboratory seminar or workshop differs from a conference because speakers expect: A. To get paid more. B. Thorough discussion, criticism, and help from colleagues. C. To talk for five hours. D. No one to ask questions.

49. Modern scientific communication uses "digital platforms," which include: A. Only printed newspapers. B. Social media and podcasts. C. Handwritten letters. D. Only academic libraries.

50. Communication is essential for science because science is defined as: A. A private secret. B. Public knowledge. C. A set of unchangeable laws. D. A way to make money.

Glossary:

A

Achievement Test

An achievement test evaluates learners' understanding of a specific course or study programme and measures how much they have learned in a specific time. It is often used to measure the skills and knowledge learned in a given grade level, usually through planned instruction, such as training or classroom instruction.

Admission Test

The English admission test is an examination that educational institutions conduct to select

prospective students for admission. For admission purposes, Tracktest offers the Verified exam with a verified identity taken in a proctored environment online.

AERA (American Educational Research Association)

AERA is a national research society that strives to advance knowledge about education, to encourage scholarly inquiry related to education, and to promote the use of research to improve education and serve the public good. Tracktest is an international affiliate of AERA since 2019.

ALTE (Association of Language Testers in Europe)

ALTE is an association of language exam providers in Europe. It was founded in 1989 by the University of Cambridge (UK) and the Universidad de Salamanca (Spain). TrackTest has been an institutional affiliate of ALTE since 2016.

B

The BAC (Baccalauréat)

The Baccalauréat is a French state diploma that evaluates the student's skills after 3 years of high school study. The English proficiency exam is part of each BAC exam. TrackTest helps students to practice their English skills before their final BAC exams. They also get an international English certificate as proof of their English proficiency, which can be used in a business environment or for further studies.

BEC (Business English Certificate)

Business English Certificate, now known as B2 Business Vantage, is an English exam provided by Cambridge Assessment English.

BULATS (Business Language Testing Service)

The Business Language Testing Service (BULATS) was an English language test provided by Cambridge English Language Assessment, discontinued at the end of 2019.

C

CAE (Cambridge Advanced English)

Cambridge Advanced English, now known as C1 Advanced, is an English exam provided by Cambridge Assessment English.

CAEL (Canadian Academic English Language)

The Canadian Academic English Language (CAEL) Test is a test designed to measure the English language proficiency of students planning to study in Canadian post-secondary institutions.

CAT (Computerized Adaptive Testing or Computer Aided Testing)

CAT is a form of computer-based test that adapts to the examinee's ability level.

CBT (Computer-Based Testing)

See CAT.

CECR (Cadre Européen Commun de Référence)

CECR (Cadre Européen Commun de Référence) is the French acronym for CEFR.

CEFR/CEF (Common European Framework of Reference/Common European Framework)

CEFR (Common European Framework of Reference) is composed of six reference English levels (A1-C2), which are widely accepted as the global standard for grading an individual's language proficiency.

CELTA (Certificate in English Language Teaching to Adults)

CELTA is an initial teacher training qualification for teaching English as a second or foreign language (ESL and EFL). It is provided by Cambridge English Language Assessment.

CELTYL (Certificate in English Language Teaching to Young Learners)

CELTYL stands for Certificate in English Language Teaching to Young Learners.

CLB/CELPIP (Canadian Language Benchmarks/Canadian English Language Proficiency Index Program)

The Canadian Language Benchmarks (CLB) includes a 12-point scale of task-based language proficiency descriptors used to guide the teaching and assessment of ESL learners in Canada

CPE (Cambridge Proficiency English)

Cambridge Proficiency English, now known as C2 Proficiency, is an English exam provided by Cambridge Assessment English.

Curriculum (in EFL)

The school curriculum is the path of a student within an educational project.

CV (Curriculum Vitae)

Curriculum Vitae (CV) is a short written description of a job candidate's education, qualifications, previous jobs, and sometimes also personal interests, that they send to an employer when they are trying to get a job. The version of the CV defined by the European Union is called Europass CV.

D

DELTA (Diploma in English Language Teaching to Adults)

DELTA is an English language teaching (ELT) qualification for experienced Teachers of English as a Foreign Language (TEFL) and Teachers of English to Speakers of Other Languages (TESOL). It is provided by Cambridge English Language Assessment.

Diagnostic test

A Diagnostic Test is an examination used for the identification of an individual's specific

areas of weakness and strength. Tracktest provides a deficit analysis/weaknesses feedback in each English test report.

DOS (Director Of Studies)

The DOS is a member of staff at an educational institution (school, university, etc) who is responsible for overseeing the ESL curriculum.

E

EAL (English as an additional language)

EAL refers to any students who speak languages other than English. The learner may already be fluent in several other languages or dialects, which is why we don't use the term English as a second language (ESL or E2L).

EALTA (European Association for Language Testing and Assessment)

EALTA is a professional association for language testers in Europe. TrackTest researchers are members of the EALTA-CEFR Special Interest Group.

EAP (English for Academic Purposes)

EAP is a branch of ESP. EAP is concerned with those communication skills in English which are required for study purposes in the formal education systems, usually used in a higher education setting than ESP.

Eaquals (Evaluation and Accreditation of Quality Language Services)

Eaquals is a not-for-profit organisation founded in 1991 with the mission to foster excellence in language education across the world by providing guidance and support to teaching institutions and individuals. Their associate members include British Council, Cambridge English Language Assessment, Trinity College, ETS, and others. TrackTest has been an associate member of EAQUALS since 2019.

EF (Education First)

EF is an international education company specialising in language training, academic degree programs, cultural exchange and educational travel. EF is a provider of the EFSET English test.

EFL (English as a Foreign Language)

The acronym "EFL" is a synonym of English as a Second Language (ESL) used more in non-English-speaking countries. For more details, refer to ESL.

ELA (English Language Arts)

ELA is a subject taught in North American schools that typically consists of a combination of English reading, writing (composition), speaking, and listening.

ELL (English Language Learner)

They are students who are unable to communicate fluently or learn effectively in English. They come from non-English-speaking countries.

ELT (English Language Teaching)

English Language Teaching (ELT) is the teaching of English to people whose first language is not English.

EP (English Profile)

EP describes what aspects of English are typically learned at each CEFR level.

ESL/E2L (English as a Second Language/Languages)

These acronyms are mostly used in English-speaking countries. The study program for non-native speakers.

ESOL (English to Speakers of Other Languages)

Synonym of ESL.

ESP (English for special purposes)

ESP usually refers to teaching the English language to university students or people already in employment, with reference to the particular vocabulary and skills they need. It is centred on the language (grammar, lexis), skills, and discourse appropriate to these activities.

ETS (Educational Testing Service)

ETS is the US-based provider of TOEIC and TOEFL English tests.

F

FCE (First Certificate in English)

The First Certificate in English, now known as B2 First, is an English exam provided by Cambridge Assessment English.

Four Language Skills

There are four different skills in language: Listening, Reading, Speaking and Writing. Tracktest offers a 4-skills English exam under the name the Complete test.

G

GER (Gemeinsamer Europäischer Referenzrahmen)

GER (Gemeinsamer Europäischer Referenzrahmen) is the German acronym for CEFR.

H

HR (Human Resources)

HR is the department of a business or organization that deals with the hiring, administration, and training of staff.

TrackTest provides special features for the English assessment of employees and job candidates via the English for Companies platform.

I

IATEFL (International Association for Teachers of English as a Foreign Language)

IATEFL is an organisation in the field of English language learning and teaching. It was founded in 1967. Tracktest researchers are members of the IATEFL's Testing, Evaluation and Assessment SIG.

ICAEA (International Civil Aviation English Association)

The International Civil Aviation English Association (ICAEA) is a non-profit association created in 1984. It helps develop expertise in the use, training and testing of English in all aviation professions. TrackTest provides a general-purpose online English assessment for aviation and hospitality attendants. TrackTest researchers are members of the ICAEA.

IELTS (International English Language Testing System)

The International English Language Testing System (IELTS) is a test that measures the language proficiency of people who want to study or work in environments where English is used as a language of communication.

K

K-12 (Kindergarten to 12th grade)

K-12 is a term used in education and educational technology in the United States and Canada. K-12 is publicly-supported school grades prior to college. These grades are kindergarten (K) and the 1st through 12th grade.

L

LMS (Learning Management System)

LMS is a software application used to plan, implement, and assess a specific learning process. It provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. TrackTest provides a possible integration with various LMS systems, such as Moodle, Canvas, Blackboard and others.

L&D (Learning and Development)

L&D involves improving the effectiveness of organizations and the individuals and teams within them. Training may be viewed as related to immediate changes in organizational effectiveness via organized instruction, while development is related to the progress of longer-term organizational and employee goals. Tracktest provides special features for the English assessment of employees and job candidates via the English for Companies platform.

L2 Learners

A person's second language, or L2, is a language that is not the native language of the speaker but is learned later.

M

MCER (El Marco Común Europeo de Referencia para los Idiomas)

MCER (El Marco Común Europeo de Referencia para los Idiomas) is the Spanish acronym for CEFR.

P

PET (Cambridge Preliminary Test)

Cambridge Preliminary Test, now known as B1 Preliminary, is an English exam provided by Cambridge Assessment English.

Placement test

A placement test is a test given by a school to determine the academic or skill level of a student in order to place them in the right group level. TrackTest provides a short English placement test free of charge for individuals and organisations.

Proficiency test

Proficiency tests measure how learners can use the knowledge or skills they have learned in real-world situations.

Q

QCER (Quadro comune europeo di riferimento)

QCER (Quadro comune europeo di riferimento) is an Italian acronym for CEFR.

R

RSA (Royal Society of Arts)

Until 1988 CELTA and DELTA were provided by RSA, then transferred to Cambridge English Language Assessment.

S

Syllabus (in EFL)

The syllabus is an academic document that communicates information about a specific course and defines expectations and responsibilities.

T

TEFL (Teaching English as a Foreign Language)

TEFL refers to teaching the English language to students with different first languages.

TESOL (Teaching English to Speakers of Other Languages)

TESOL is the largest professional organization for teachers of English as a second or foreign language.

TEYL (Teaching English to Young Learners)

Programs for teaching children from 4 to 15 years old.

TOEFL (Test of English as a Foreign Language)

TOEFL is a standardised test to measure the English language ability of non-native speakers

wishing to enrol in English-speaking universities, provided by ETS.

TOEIC (Test of English for International Communication)

The TOEIC test is an English language test designed specifically to measure the everyday English skills of people working in an international environment. It is provided by ETS.

TSE (Test of Spoken English)

The Test of Spoken English (TSE) was an oral test developed by the Educational Testing Service. In 2010, the TSE was replaced by the speaking portion of the TOEFL.

TWE (Test of Written English)

The Test of Written English (TWE) is a written test developed by the Educational Testing Service (ETS).

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Мартинюк А. П., Киселюк Н.П. English for Academic Purposes: *навчальний посібник*. Луцьк: ЛНТУ, 2026. 168 с.

Комп’ютерний набір Н.П.Киселюк
Редактор А.П.Мартинюк

Підп. до друку 2026р.
Формат 60х84/16. Папір офс. Гарнітура Таймс.
Ум. друк. арк. ___. Обл.-вид. арк.
Тираж ____ прим.

Відділ іміджу та промоції
Луцького національного технічного університету
43018 м. Луцьк, вул. Львівська, 75