МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
МИКОЛАЇВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ІМЕНІ В.О. СУХОМЛИНСЬКОГО
КАФЕДРА ІНОЗЕМНИХ МОВ

МЕТОДИЧНІ РЕКОМЕНДАЦІЇ
ДЛЯ САМОСТІЙНОЇ РОБОТИ З ДИСЦИПЛІНИ
«ІНОЗЕМНА МОВА (ЗА ПРОФЕСІЙНИМ СПРЯМУВАННЯМ)»
ДЛЯ СТУДЕНТІВ СПЕЦІАЛЬНОСТІ
«СЕРЕДНЯ ОСВІТА (БІОЛОГІЯ), СЕРЕДНЯ ОСВІТА (ХІМІЯ)»

МИКОЛАЇВ – 2019

Методичні рекомендації для самостійної роботи з дисципліни «Іноземна мова (за професійним спрямуванням)» для студентів спеціальності «Середня освіта (Біологія), Середня освіта (Хімія)» / Л.В. Айзікова. – Миколаїв, МНУ ім. В.О. Сухомлинського, 2019. – 204 с.

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Методичні рекомендації призначені студентам ступеню «бакалавр» за спеціальністю 014 "Середня освіта", спеціалізацією 014.05 Середня освіта (Біологія), 014.06 Середня освіта (Хімія), які вивчають іноземну мову (англійську) за професійним спрямуванням протягом I-III семестрів, та розраховані на виконання самостійної роботи в межах 9 кредитів.

Навчальний матеріал методичних рекомендацій ґрунтується на англомовних аутентичних ресурсах, що відображають сучасний розвиток науки в галузі біології та хімії. Тексти розділів дібрані з урахуванням змісту спеціальних дисциплін, які вивчаються студентами.

ЗМІСТ

INTRODUCTION

READING STRATEGIES

Understanding of academic texts is considered to be “one of the skills that university students must learn. However, to become a good academic translator, it is foundational and significant to read academically. Reading academically allows you to learn new words, master new phrases, and comprehend new ideas critically.

To be a good academic reader, there are three skills that one needs to improve:

- **The ability to read actively:** to understand, learn and retain what you read.
- **The ability to read critically:** to evaluate and interpret what you read.
- **The ability to read fluently:** to get used to most of the words in your readings and learn the definitions of words that you do not know.”

THE ABILITY TO READ ACTIVELY

“There are some strategies to read actively that we can provide you with this journey.

Pre-reading

Writing freely on a topic that you read enables you to know what you already know and how you think about it. Pre-reading is an important step to first come up with some of your own ideas.

Annotating

When you annotate a text, you underline, highlight and make notes as you read. Annotating is a summary per page. You annotate so that you do not need to read the text all over again later. To annotate, you do not have to be very specific, but you should jot down some key points that the authors talk about. Annotating is good for reviewing and recalling what you have read and useful when you write essays and exams.

Note-taking

When you take notes, you keep records or memos from what you read in order to have a better understanding. Note-taking can be a study guide in your writing, particularly when you do research. We recommended you take notes on key points from your articles, the writer's name, and the publication information in a journal. The notes that you take are useful when you try to understand the main points of the reading and the articles you read."

Identifying important information

Thesis

A thesis is the main argument or the point that the author tells the readers. A thesis is usually a clear and specific statement. This is the most significant part of all. It is not just a random statement, but is an insightful argument which leads the whole article.

Significant claims

Significant claims are as important as the thesis, which is usually stated in topic sentences. Annotating or underlining these arguments in the notes as you read helps you understand why the author makes the points.

Important words and unfamiliar words

It is usually important when the author uses important and unfamiliar words. Making marks on these words helps you to follow the main arguments of the article. You may need to look up the unfamiliar words to understand the article better and avoid confusion.

Important ideas

Marking important ideas within a text helps you solve and comprehend its meaning. Paraphrasing the important ideas are also helpful in order to organize the main ideas in your own words and recall them.

Memorable passages or images

Passages or images in an article are sometimes vital to understand the context. Try to think that why the author puts photos or passages allows you to have a broader understanding.

Questions and comments

Jotting down your questions and comments is essential when you think and read critically. As you finish reading, you should start to think whether you can answer these questions based on the materials you acquired previously. The answers can be a great start to form your own topics.

READ CRITICALLY TO TRANSLATE SKILLFULLY

Becoming a good critical reader

Read thoroughly

It is good to spend time on reading thoroughly and with focus. Reading too quickly may be a reason to miss some key information. It is important that you understand what the writer talks about before you start writing your words. This helps you to defend your points with connected information.

Dig deeper

If the topic of your reading interests you, keep reading articles about relevant themes. Sometimes this can help you to think of some other possibilities that are creative and meaningful.

Question what you read

Having questions is always crucial when it comes to academic writing or reading. If you feel uncertain about some points in your reading, do some research on it. This can help you to think from different perspectives and to develop some new questions.

Keep following the writer's arguments

Take your time and pay attention to figure out what the author tries to tell readers. You probably should reread and evaluate what the writer tells readers so that you can make sure that nothing is neglected.

Develop new questions

Developing questions that you already have is important. List these questions and find the argument in them to help yourself develop some new ideas from them.

Keep following what you read

When you have your assignments with you, you do some research on different sources such as journals, peer-reviewed articles, e-books, and newspapers. It is easy for you to get confused with the information you get from all these sources. In order to avoid the situation, you can pay attention to the following points.

Keep following sources

Keeping a memo when you read the articles. Also, adding the titles of your reading and the names of the authors to your memos help you write your citations. Moreover, a record of publications dates should be in your memos too.

Keeping notes

It is not so difficult to keep your notes. You need to make sure your notes are organized whether by the date you write them, the contents, the category of the source, the information you look for, or by the author's name.

Make a use of bookmarks

If you use the Internet to find sources, bookmarking is a great tool for you. You can save the website you find. You may want to create folders to organize your sources.

THE ABILITY TO READ FLUENTLY = EXPANDING YOUR ACADEMIC VOCABULARY

Building up your vocabulary is the key to success in improving your reading speed. Knowing more words allows you to have a better understanding of the articles you read.

Read widely

Reading is an effective way to build your vocabulary. Reading also allows you to become familiar with synonyms and antonyms of the new terms. Reading constantly helps: you can read websites, books, newspapers that are of your interest. You can read books by your favorite authors. You also need to spend some time on the kinds of articles you are not very fond of. This can also help you

with your vocabulary. The more you read, the larger your range of vocabulary will be.

Look for context clues

When you see words that are unfamiliar to you, it is better to try to guess what it means before you look them up in dictionaries. In order to take a guess, you can read the sentences before and after the unfamiliar words. Sometimes the author gives you the definitions of them indirectly.

Learn the roots of words

To learn the roots of words is helpful in any language. English words are from Latin And Greek roots. One way to know the roots is to look up the roots of the words you want to know in the dictionaries.

Use a dictionary / dictionaries

Use a dictionary if you want to know what the words mean quickly and specifically. Looking up in a dictionary is the best way to know the meanings.

Strengthen your understanding

To strengthen your understanding, making a list of new terms helps you to remember the meanings. In particular, students who learn English as an additional language may need to keep a list on your new terms. In your list, you can include the original sentences, the definitions from a dictionary and the synonyms and antonyms.

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Edited by: Yang Yang

https://onlineacademiccommunity.uvic.ca/arwmethodology/2017/11/16/academic-reading-strategies/

PRACTICAL READING STRATEGIES

Strategies differ from reader to reader. The same reader may use different strategies for different contexts because their purpose for reading changes. Ask yourself “why am I reading?” and “what am I reading?” when deciding which strategies to try.

Before reading

- Establish your purpose for reading
- Speculate about the author's purpose for writing
- Review what you already know and want to learn about the topic
- Preview the text to get an overview of its structure, looking at headings, figures, tables, glossary, etc.
- Predict the contents of the text and pose questions about it. Note any discussion questions.

During reading

- Annotate and mark sections of the text to easily recall important or interesting ideas
- Check your predictions and find answers to questions
- Use headings and transition words to identify relationships in the text
- Create a vocabulary list of other unfamiliar words to define later
- Try to infer unfamiliar words' meanings by identifying their relationship to the main idea
- Connect the text to what you already know about the topic
- Take breaks (split the text into segments if necessary)

After reading

- Summarize the text in your own words (note what you learned, impressions, and reactions) in an outline, concept map, or matrix (for several texts)
- Talk to someone about the author's ideas to check your comprehension
- Identify and reread difficult parts of the text
- Define words on your vocabulary list and practice using them

Works consulted: Grabe, W., & Stoller, F. L. (2002). Harlow: Longman.

The University of North Carolina,

https://writingcenter.unc.edu/esl/resources/academic-reading-strategies/

Unit 1.

STUDYING AT THE UNIVERSITY

1. Learn the active vocabulary to the text.

name [ˊneim], n - ім'я

come (came, come) [ˊk m], v - приходити

come from - бути родом з

study [ˊstʌ dı], n – навчання, вивчення

study [ˊstʌ dı],v - вивчати, вчитися, займатися

course [ko:s], n – курс (навчання)

year [jə:], n - рік (навчальний), курс навчання

psychology [saıˊkolod3ı], n - психологія

department [dıˊpa:tmənt], n – відділення, факультет, кафедра

full time department, n – денне відділення

part time department, n - заочне відділення

like [laık], v – подобатися, любити

deal [di:l]**,** v **(with) –** мати справу, розглядати питання, вирішувати завдання

enjoy [ınˊd3oı], v – любити, отримувати задоволення від

hard [ha:d], adj – важкий, тяжкий

work [wə:k], n – робота

work [wə:k], v - працювати

foreign [ˊforın], adj - іноземний

language [ˊlæŋgwıd3], n - мова

speak (spoke, spoken) [spi:k] ([spouk], [ˊspouken]), v – розмовляти

job [d3ob],n – робота

married [ˊmærıd], adj - одружений, жонатий, заміжня

get married, v - одружуватися

wife [waıf], n - дружина

wives [waıvz], pl - дружини

child [tʃaıld], n - дитина

children [tʃıldrən], pl - діти

young [jʌ ŋ], adj - молодий

dream [dri:m], n – мрія, сон

dream [dri:m], v – мріяти, бачити сон

2. Learn the pronunciation of the proper names:

Peter Parker [ˊpi: təˊpa:kə]

Susan [`sju:zn]

London [`lʌ ndən]

Oxford [ˊoksfəd]

England [íŋgləndˊ]

Scotland [ˊskotlənd]

3. Match the names of the countries with the names of the languages spoken in them.

England [íŋgləndˊ]	Italian [ɪˊtæljən]
Scotland [ˊskotlənd]	Scottish [ˊskotiʃ]
Spain [ˊspein]	French [ˊfrentʃ]
France [ˊfra:ns]	English [ˊɪnglɪʃ]
Germany [ˊd3ə:mənɪ]	Spanish [ˊspænɪʃ]
Italy [ˊɪtəlɪ]	German [ˊd3ə:mən]

4. Guess the meaning of the words. Use a *dictionary* to *check your* guesses.

University, course, practical, psychology, problem, student, group, cottage, philosophy, department, subject, botany, zoology, chemistry, microbiology, physiology, genetics, conservation, nature, anatomy, microbiology, biophysics, biochemistry, genetics, bionics, laboratory

5. Look through the text and choose the best title for it.

“Oxford University”, “Students’ life”, “About myself”.

6. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Hello! My **name** is Peter Parker. I **come from** London, England. I'm twenty. I **study at** Oxford University. The **course** started two years ago and now I'm in my third **year**. I study at the practical **psychology department**, as I **like** psychology very much. It's interesting for me because psychology **deals with** the problems of relationship, and ways of improving inner life of a person. There are twenty other students in our group. All of us **enjoy** the course a lot, but studying here is very **hard work**. We study a lot of general and special subjects, such as: Philosophy, Sociology, History, General Psychology, Educational and Applied Psychology. Also we study **foreign languages** here. I can **speak** four languages quite well: English, German, French and Spanish. Now I'm a **full time** student but next year I'm going to enter a **part time department**, because I have a family, that's why I'm going to find a **job** to support it. I **got married** last year and Susan, my wife, is expecting a **child** now. My **wife** is two years **younger** than I. Now we rent a flat, but we **dream about** a little cottage of our own somewhere on the east coast of Scotland.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

7. Choose the best variant to translate the sentences from the text.

1) I come from London.

a) Я їду до Лондону.

b) Я родом з Лондону.

c) Я приїхав з Лондону.

d) Я приїхав до Лондону.

2) I'm in my third year.

a) Мені три роки.

b) Я в третьому році.

c) Я на третьому курсі.

d) Я мешкаю тут три роки.

3) We dream about a little cottage of our own.

a) Ми самі мріємо про невеликий котедж.

b) Ми мріємо про невеликий власний котедж.

c) Нам сниться невеликий котедж.

d) Ми живемо в невеликому власному котеджі.

8. Decide if these *statements* about the text are *true* or *false*.

1) Peter comes from Scotland.
2) He is 20.
3) He studies at Oxford University.
4) He is in his 4th year.
5) There are 26 students in his group.
6) They like their studies a lot.
7) Peter can speak 5 languages.
8) He is married.
9) His wife is 18.
10) They have a child.

9. Complete these sentences using the words on this list:

name, years, year, family, come from, part time, study, group, hard, foreign

1) My _____ is Nick Carter.
2) I ____ ____ New York.
3) I am 25 _____ old.
4) I have a _____: a wife and a child.
5) I _____ at Mykolaiv University.
6) I am in my first _____.
7) There are twenty other students in our ____.
8) We study _____ languages.
9) I'm a student of a_____ department.
10) The course is a very _____ work.

10. Replace the words in italics by the synonyms from the text.

1) I *was born in* Mykolaiv
2) My *studies* started two years ago.
3) I *like* the course a lot.
4) It is *difficult* work.
5) I *know* four languages.
6) She is *waiting for* a *baby*.
7) We *want to have* a cottage

11. Replace the words in italics by the antonyms from the text.

1) I don't have a wife. I am *single*, but my brother is _____.
2) He is *old*, but his wife is _____.
3) I *hate* rock music but my sisters _____ it a lot.
4) Studying Psychology is *easy* for me, but studying foreign languages is _____ work.
5) I know English *badly*, but I can speak French quite _____.
6) My friend is a student of the *full time* department, but I study at the _____ department.
7) Ukrainian is my *native* language, and English is a _____ language for me.

11. Select the most appropriate definition for the given words.

1. apply

A. to increase the quality or condition of; make better.

B. to wait for something

C. to hope for or look forward to with some reason to believe in fulfillment.

D. to make use of or put to use.

2. department

A. in, from, characteristic of, or involving a country that is not one's own.

B. the study of the nature and principles of knowledge, truth, existence, and moral and aesthetic values.

C. a subdivision of a larger organization or system, such as a government or business.

D. tending to inform, instruct, or educate.

3. educational

A. the topic of what is said, written, studied, or the like.

B. a chronological narrative of past events.

C. the study or science of mental, emotional, and behavioral states and processes.

D. tending to inform, instruct, or educate.

4. expect

A. to hope for or look forward to with some reason to believe in fulfillment.

B. an educational institution devoted to learning and research and authorized to award degrees on both the graduate and undergraduate levels.

C. to increase the quality or condition of; make better.

D. to make use of or put to use.

5. foreign

A. a chronological narrative of past events.

B. a subdivision of a larger organization or system, such as a government or business.

C. the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.

D. in, from, characteristic of, or involving a country that is not one's own.

6. history

A. to increase the quality or condition of; make better.

B. to make use of or put to use.

C. an educational institution devoted to learning and research and authorized to award degrees on both the graduate and undergraduate levels.

D. a chronological narrative of past events.

7. improve

A. to make use of or put to use.

B. to hope for or look forward to with some reason to believe in fulfillment.

C. to increase the quality or condition of; make better.

D. a subdivision of a larger organization or system, such as a government or business.

8. interest

A. the topic of what is said, written, studied, or the like.

B. curiosity about, involvement in, or concern about something.

C. the study or science of mental, emotional, and behavioral states and processes.

D. an educational institution devoted to learning and research and authorized to award degrees on both the graduate and undergraduate levels.

9. language

A. the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.

B. curiosity about, involvement in, or concern about something.

C. of or relating to practice and experience as opposed to theory or abstraction.

D. in, from, characteristic of, or involving a country that is not one's own.

10. philosophy

A. in, from, characteristic of, or involving a country that is not one's own.

B. the study of the nature and principles of knowledge, truth, existence, and moral and aesthetic values.

C. the topic of what is said, written, studied, or the like.

D. to make use of or put to use.

11. practical

A. in, from, characteristic of, or involving a country that is not one's own.

B. of or relating to practice and experience as opposed to theory or abstraction.

C. to increase the quality or condition of; make better.

D. the study of the nature and principles of knowledge, truth, existence, and moral and aesthetic values.

12. psychology

A. the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.

B. of or relating to practice and experience as opposed to theory or abstraction.

C. the study or science of mental, emotional, and behavioral states and processes.

D. a subdivision of a larger organization or system, such as a government or business.

13. subject

A. the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.

B. the study of the nature and principles of knowledge, truth, existence, and moral and aesthetic values.

C. to make use of or put to use.

D. the topic of what is said, written, studied, or the like.

14. support

A. to bear (a weight or load).

B. the topic of what is said, written, studied, or the like.

C. curiosity about, involvement in, or concern about something.

D. the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.

15. university

A. to make use of or put to use.

B. the study or science of mental, emotional, and behavioral states and processes.

C. an educational institution devoted to learning and research and authorized to award degrees on both the graduate and undergraduate levels.

D. a subdivision of a larger organization or system, such as a government or business.

12. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. practical		a chronological narrative of past events.

2. philosophy		an educational institution devoted to learning and research and authorized to award degrees on both the graduate and undergraduate levels.
3. history		to bear (a weight or load).
4. expect		tending to inform, instruct, or educate.
5. psychology		of or relating to practice and experience as opposed to theory or abstraction.
6. university		the organized system of written symbols and vocal sounds with which humans communicate thoughts, ideas, or emotions.
7. support		the study or science of mental, emotional, and behavioral states and processes.
8. educational		the study of the nature and principles of knowledge, truth, existence, and moral and aesthetic values.
9. department		to hope for or look forward to with some reason
10. interest		in, from, characteristic of, or involving a country that is not one's own.
11. foreign		to increase the quality or condition of; make better.
12. apply		a subdivision of a larger organization or system, such as a government or business.
13. subject		to make use of or put to use.
14. language		the topic of what is said, written, studied, or the like.
15. improve		curiosity about, involvement in, or concern about something.

13. Complete these sentences using the words on this list:

apply, department, expect, foreign, improve, language, philosophy, psychology, subject, history, interest, practical, support

1) A great deal of research has been done on that _____.
2) They _____ the design of their new cars.

3) The field of _____ has provided insights into the processes of learning.
4) It surprises adults that children can learn _____ so quickly.
5) The government wants to establish greater _____ trade.
6) Socrates and Plato made important contributions in the area of _____.
7) She’s excited because she's _____ a package from her sister.
8) I had to _____ every bit of my knowledge of computers to solve the problem.
9) The little chairs are not made to _____ the weight of an adult.
10) He’s _____ a good grade on this paper because he worked very hard on it.
11) He studied _____ and went on to become a crisis counselor.
12) He wrote a _____ of the Vietnam War.
13) Teachers can study educational theory, but learning how to teach requires _____experience in the classroom as well.
14) She has never traveled to a _____ country.
15) The professor took an _____ in his student's work.
16) For most people who live in Brazil, English is a _____ language.
17) Her new novel is about an interesting _____.
18) These picture hangers can _____ thirty pounds.

14. Read the text applying before reading, during reading and after reading strategies described in the introduction.

I am a student of the Faculty of Natural Sciences. Our faculty is one of the largest faculties of the University. We study a lot of different special subjects. Besides them, we study English to be able to read scientific books on biology and chemistry. Students are acquainted with all branches of biology. They are lectured in various subjects of natural science.

There are many departments at our faculty: of botany, zoology, chemistry, microbiology, physiology of plants, physiology of man and animals, genetics, soil science, conservation of nature, anatomy, microbiology, biophysics, biochemistry, soil science, genetics, bionics, etc. There are also research laboratories and museums. Every student has an opportunity to work in modern, well-equipped laboratories, where different problems of biology are under investigation.

During the first two years they attend lectures on mathematics, physics, political subjects and foreign languages. In the third year more narrow specialization begins. They have several specialized courses and additional practical and research work in the subject they chose as their future speciality. Besides attending classes, they may join some scientific circles and choose a problem to work on according to their bents. All of them know that biology is the science of glorious past and great future. They do their best to acquire as much knowledge as possible.

Graduates of the biological faculty are assigned to work at laboratories, schools, research institutes. Those who have a bent for research work may apply for a post-graduate course of study.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

15. Select the most appropriate definition for the given words.

1. accord

A. the branch of biological science that deals with the classification and study of plants.

B. to devote one's attentions to a specific pursuit or field of study.

C. an area or field of study.

D. balanced interrelationship; agreement; harmony.

2. acquaint

A. the structure of an organism or of its parts.

B. (used with a singular verb) the science of heredity, especially of the influence of genes on the appearance, development, and evolution of organisms.

C. to introduce, or to make familiar or accustomed to (usually followed by "with").

D. an area or field of study.

3. additional

A. more; over and above the original amount of.

B. the structure of an organism or of its parts.

C. to introduce, or to make familiar or accustomed to (usually followed by "with").

D. to set apart for a particular use or for use by a particular person.

4. anatomy

A. of or relating to practice and experience as opposed to theory or abstraction.

B. the structure of an organism or of its parts.

C. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

D. to introduce, or to make familiar or accustomed to (usually followed by "with").

5. assign

A. to set apart for a particular use or for use by a particular person.

B. an area or field of study.

C. the structure of an organism or of its parts.

D. of or pertaining to biology.

6. biological

A. balanced interrelationship; agreement; harmony.

B. to devote one's attentions to a specific pursuit or field of study.

C. more; over and above the original amount of.

D. of or pertaining to biology.

7. botany

A. the structure of an organism or of its parts.

B. the branch of biological science that deals with the classification and study of plants.

C. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

D. more; over and above the original amount of.

8. equip

A. to establish or set in operation.

B. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

C. to furnish with necessary tools or means to accomplish a task.

D. to devote one's attentions to a specific pursuit or field of study.

9. genetics

A. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

B. the structure of an organism or of its parts.

C. balanced interrelationship; agreement; harmony.

D. (used with a singular verb) the science of heredity, especially of the influence of genes on the appearance, development, and evolution of organisms.

10. institute

A. of or relating to practice and experience as opposed to theory or abstraction.

B. to introduce, or to make familiar or accustomed to (usually followed by "with").

C. to establish or set in operation.

D. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

11. museum

A. to establish or set in operation.

B. (used with a singular verb) the science of heredity, especially of the influence of genes on the appearance, development, and evolution of organisms.

C. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

D. the structure of an organism or of its parts.

12. political

A. (used with a singular verb) the science of heredity, especially of the influence of genes on the appearance, development, and evolution of organisms.

B. of, relating to, or concerned with the theory or practice of politics.

C. to establish or set in operation.

D. more; over and above the original amount of.

13. practical

A. to introduce, or to make familiar or accustomed to (usually followed by "with").

B. of or pertaining to biology.

C. of or relating to practice and experience as opposed to theory or abstraction.

D. of, relating to, or concerned with the theory or practice of politics.

14. specialize

A. to set apart for a particular use or for use by a particular person.

B. an area or field of study.

C. to devote one's attentions to a specific pursuit or field of study.

D. the branch of biological science that deals with the classification and study of plants.

15. specialty

A. an institution or building where collections of valuable historical or artistic objects are preserved and displayed.

B. an area or field of study.

C. of or relating to practice and experience as opposed to theory or abstraction.

D. to furnish with necessary tools or means to accomplish a task.

16. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. specialize		to establish or set in operation.
2. specialty		of, relating to, or concerned with the theory or practice of politics.
3. political		to devote one's attentions to a specific pursuit or field of study.
4. biological		of or pertaining to biology.
5. institute		an institution or building where collections of valuable

		historical or artistic objects are preserved and displayed.
6. museum		balanced interrelationship; agreement; harmony.
7. accord		an area or field of study.
8. acquaint		more; over and above the original amount of.
9. practical		of or relating to practice and experience as opposed to theory or abstraction.
10. additional		(used with a singular verb) the science of heredity, especially of the influence of genes on the appearance, development, and evolution of organisms.
11. equip		to introduce, or to make familiar or accustomed to (usually followed by "with").
12. genetics		the branch of biological science that deals with the classification and study of plants.
13. botany		to furnish with necessary tools or means to accomplish a task.
14. anatomy		to set apart for a particular use or for use by a particular person.
15. assign		the structure of an organism or of its parts.

17. Complete these sentences using the words on this list:

acquaint, additional, anatomy, botany, equip, political, specialize, specialty, accord, assign, biological, institute, practical

1. It’s an excellent Indian restaurant that _____ in tandoori cooking.
2. Her _____ was French.
3. They went next door and _____ themselves with their new neighbors.
4. She chose to study _____ because she’d always been fascinated with the structure of plants.
5. She’s decided to _____ in large animal veterinary care.

6. Elections are a part of many _____ systems.

7. Intensive training _____ him well for the challenges of the new job.

8. The army _____ each soldier with a rifle.

9. We will need _____ chairs for the seminar; ten will not be enough.

10. They're studying the _____ of the spleen.

11. In _____ with tradition, the bride wore white.

12. Teachers can study educational theory, but learning how to teach requires _____ experience in the classroom as well.

13. The two brothers disagree on _____ issues.

14. The company is _____ new procedures for hiring.

15. She was eager to _____ herself with the customs of her new country.

16. The government has _____ a policy that will restrict imports.

17. Many studies have explored the _____ differences between males and females.

18. The goal of the radicals was to _____ a revolutionary government.

19. The gym teacher _____ us each a locker.

20. I'm _____ this closet for winter clothes only.

18. Tell about your studies at the university.

Unit 2.

LIVING AND NONLIVING MATTER AND THE CHEMICALS OF LIFE

1. Learn the active vocabulary to the text.

abundant	[adjective]	(adv.) large in amount or number; plentiful. The office has an abundant supply of copy paper. He had abundant reasons for not getting started on the project.
accord	[noun]	(adv.) balanced interrelationship; agreement; harmony. In accord with tradition, the bride wore white.
acquire	[transitive verb]	(adv.) to come to possess, especially gradually over time. He is acquiring some bad habits from his friends. You've acquired an American accent since you've been living in the States. We acquired some furniture for our apartment from some relatives. I never liked asparagus before, but I seem to have acquired a taste for it.
arrange	[transitive verb]	(adv.) to put in a desired order or configuration. We arranged the books according to their size. They arranged the furniture so that it would be convenient for both talking and watching television. She arranged the papers on her desk.
bond	[transitive verb]	(adv.) to bind together. The heat bonded the two pieces of metal.
complex	[adjective]	(adv.) difficult to analyze or understand because of being complicated. His first spy novel was so complex that I found it hard

		to figure out what was happening when I read it.
component	[noun]	(adv.) a part or element of a whole; constituent. One of the engine's components is damaged. Vegetables are an important component of a healthy diet. Oxygen and hydrogen are the chemical components that make up the water molecule.
compose	[transitive verb]	(adv.) to make up the parts or elements of. These twenty people compose the class. Coal is composed of organic materials.
composition	[noun]	(adv.) the relation among the parts of something; order or structure.
dependent	[adjective]	(adv.) relying on another for help or support. The family has two dependent children. Previously, the country had been a dependent colony. The baby birds are still dependent on their parents for food.
element	[noun]	(adv.) a part of any whole. Fresh garlic is a key element of this dish. The first element of her speech concerned the need for reforms. Selfishness is an element of human nature.
exchange	[noun]	(adv.) the act or result of giving or receiving one thing for another. The exchange of rings is a part of some wedding ceremonies.
exclusively	[adverb]	(adv.) with all others left out or not included; only; solely.

		A diet that consists exclusively of bread and doughnuts is not very healthy. It was difficult for a Hispanic family to move to an exclusively white neighborhood.
facilitate	[transitive verb]	(adv.) to make less difficult; help in progress. Her guidance counselor's advice facilitated her college application process. His business connections facilitated his finding a new job. The ramp facilitates entry for people who use wheelchairs.
function	[intransitive verb]	(adv.) to run or operate, especially in a manner that is desired or considered normal. The heart functions by pumping blood. He really can’t function since his wife died. The city cannot function without electricity. I don’t function well if I don't get enough sleep.
inanimate	[adjective]	(adv.) not having or showing the characteristics associated with life; lifeless. She claims she has no skill at painting people or animals and prefers to paint inanimate objects.
locate	[transitive verb]	(adv.) to find the position or place of. Can you locate the town on the map?
molecule	[noun]	(adv.) a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.
negative	[adjective]	(adv.) critical; cynical; pessimistic. If she had any negative feelings toward her daughter-

		in-law, she hid them well. The film received negative reviews from the critics, but it was hugely successful with audiences. He tried to be optimistic, but he had a generally negative view of his future life.
organ	[noun]	(adv.) in a plant or animal, a specialized structure that performs a particular function, such as the heart.
organism	[noun]	(adv.) any single living being, such as an animal, plant, fungus, or bacterium. The water sample contains numerous kinds of tiny organisms.
region	[noun]	(adv.) a large continuous space or area. Each region of the country has its own accent or dialect. A snowstorm hit the region very hard over the weekend.
soluble	[adjective]	(adv.) able to be dissolved. Sugar is more quickly soluble in warm water than in cold.
somewhat	[adverb]	(adv.) in some measure, degree, or proportion; rather. The movie was good, but I was somewhat disappointed after hearing so many rave reviews. The exam was somewhat more difficult than I expected, but I think I did all right.
specialize	[intransitive verb]	(adv.) to devote one's attentions to a specific pursuit or field of study. She’s decided to specialize in large animal veterinary care. It’s an excellent Indian restaurant that specializes in

		tandoori cooking.
structural	[adjective]	(adv.) of or pertaining to construction, to things that are constructed, or to the basic parts that are assembled. The storm blew off many shingles from the roof, but there was no structural damage to the house. They are studying the structural aspects of the language and are given little practice in speaking.
structure	[noun]	(adv.) a thing consisting of a number of elements joined together in a certain way. A human cell is a complicated structure.
substance	[noun]	(adv.) a specific kind of matter. a liquid substance.
transfer	[noun]	(adv.) the act or process of transferring. The transfer of power after the election went relatively smoothly. He was looking forward to his transfer back to the States.
unique	[adjective]	(adv.) being the only one of its type; sole; single. Everyone's fingerprints are unique. The figurines are handmade, and each one is unique.
accord	[noun]	(int.) agreement; harmony. In accord with tradition, the bride wore white.
animate	[verb]	(int.) to bring to life. A magic hat animated Frosty the snowman.
biological	[adjective]	(int.) having to do with living things and their life processes. Digestion of food is a biological process.

characteristic [noun] (int.) something that makes a person or thing different from others.
Tails that can grasp things are a characteristic of monkeys.

component [noun] (int.) a part of something.
One of the components of the engine is missing.
Vegetables are a component of a healthy diet.

composition [noun] (int.) the way the parts of something are put together; order or structure.
The team sent a submarine to study the composition of the sea bottom.

consist [verb] (int.) to be made up or formed (usually followed by "of").
The United States consists of fifty states.

contrast [verb] (int.) to compare in order to make differences clear.
The book contrasted women's lives a hundred years ago with the lives of women today.

contribute [verb] (int.) to give for a purpose.
She contributed time and money to the rescue work.

dependent [adjective] (int.) relying on another for help or to provide what one needs.
Children are dependent on their parents for food and shelter.

dynamic [adjective] (int.) full of energy and strength; lively; active.
He is a dynamic actor.

equilibrium [noun] (int.) a state of balance between two or more forces.
When two people are sitting on a seesaw and the seesaw is level, their weights are in equilibrium.

evolution	[noun]	(int.) the process of changing and adapting to an environment over time. Due to evolution, desert plants do not need much water to survive in dry climates.
facilitate	[verb]	(int.) to make less difficult; help in the doing of. The ramp facilitates entry for people who use wheelchairs.
hormone	[noun]	(int.) a substance made by certain cells in the body. Hormones move around the body in the blood and have effects on certain organs and cells. Hormones help control body processes such as growth. Hormones produced by this gland control the body's growth.
interact	[verb]	(int.) to respond to one another in a social situation. We were pleased to see how our parents were interacting.
membrane	[noun]	(int.) a thin layer of tissue found in living things. Some kinds of membranes cover the outside or inside of organs. Other membranes separate or connect different parts of the body. Membranes connect the toes of frogs.
negative	[adjective]	(int.) not helpful or constructive. She made negative comments about my singing.
principle	[noun]	(int.) a basic law or truth on which action or behavior is based. Our country's laws are based on the principles of liberty and justice.
reactive	[adjective]	(adv.) characterized by reaction or response to a

		stimulus; tending to react. She was so gravely ill that she was no longer reactive to those around her.
region	[noun]	(int.) a large space or area. This region is famous for its apples.
soluble	[adjective]	(adv.) able to be dissolved. Sugar is more quickly soluble in warm water than in cold.
somewhat	[adverb]	(int.) in some measure, degree, or proportion; rather. She is somewhat lazy.
specialize	[intransitive verb]	(int.) to devote one's attentions to a specific pursuit or field of study. The restaurant specializes in Vietnamese food.
sustain	[transitive verb]	(int.) to provide with the basic necessities of life. They don’t earn enough money from these jobs to sustain themselves and their families.
transmit	[verb]	(int.) to send or carry from one person, place, or thing to another. Please transmit this message to the commander.
undergo	[verb]	(int.) to have the experience of; receive; endure. She’ll undergo surgery on her foot next week. Our family underwent major changes last year.
underlie	[transitive verb]	(adv.) to be the foundation or basis of. That siblings should stay together is one of the principles that underlies our adoption policy. What were the motivating factors that underlay this act of aggression? Let’s look at the evidence that underlies the author's

argument.

unique [adjective] (int.) being the only one of its type; sole; single. Everyone's fingerprints are unique.

vital [adjective] (int.) having to do with life. The nurse checked the patient's heartbeat and other vital signs.

calcium [noun] (adv.) a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

carbon [noun] (adv.) a chemical element that has six protons in each nucleus and that occurs in pure forms as diamond and graphite, or in a large variety of compounds such as carbon dioxide, carbohydrates, and petroleum hydrocarbons. (symbol: C) Carbon is found in all living things.
This molecule contains two atoms of carbon.

chlorine [noun] (adv.) a chemical element of the halogen group that has seventeen protons in each nucleus, occurs naturally only in compounds such as sodium chloride and chloroform, and can be isolated in pure form as a toxic yellow-green gas. (symbol: Cl)

complex [adjective] (adv.) difficult to analyze or understand because of being complicated.
His first spy novel was so complex that I found it hard to figure out what was happening when I read it.

hydrogen [noun] (adv.) a chemical element that contains one proton in each nucleus and that occurs naturally in many

compounds such as water, acids, petroleum hydrocarbons, and carbohydrates, and in pure form as a highly flammable, lighter-than-air gas used in many industrial applications, such as the hydrogenation of fats and oils. (symbol: H) (Cf. deuterium, protium, tritium.)

iodine [noun] (adv.) a highly reactive chemical element of the halogen group that has fifty-three protons in each nucleus and occurs naturally in compounds such as salts, and in pure form as a poisonous bluish black crystal. (symbol: I)

iron [noun] (adv.) a chemical element that has twenty-six protons in each nucleus and that occurs naturally in a variety of compounds such as minerals important in the earth's crust as well as the biologically essential cytochromes and hemoglobin, and that can be isolated in pure form as a silver-white dense malleable metal that rusts rapidly in air, can be easily magnetized, and is widely used in a variety of alloys. (symbol: Fe)

magnesium [noun] (adv.) a highly reactive chemical element of the alkaline-earth group that has twelve protons in each nucleus and that occurs naturally only in compounds, but that can be isolated as a divalent ion essential in plant and animal nutrition, or as alight, ductile, silver-white solid that bursts into a bright flame when heated above room temperature, used for flares, fireworks, and the like. (symbol: Mg)

molecule [noun] (adv.) a single atom or several atoms bound together electromagnetically, forming the smallest particle that

		possesses all the characteristic physical and chemical properties of an element or compound.
nitrogen	[noun]	(adv.) a chemical element that has seven protons in each nucleus and that occurs as a colorless, odorless gas that comprises about eighty percent of the earth's atmosphere, or in important compounds such as nitrates, proteins, nucleic acids, and ammonia. (symbol: N)
oxygen	[noun]	(adv.) a chemical element that has eight protons in each nucleus and that occurs in pure form, as a colorless, odorless gas essential to the respiration of living things, or in important compounds such as water, carbohydrates, and oxide minerals. (symbol: O)
phosphorous	[adjective]	(adv.) of, like, containing, or pertaining to phosphorus, especially trivalent phosphorus.
potassium	[noun]	(adv.) a chemical element of the alkali metal group that has nineteen protons in each nucleus, that occurs naturally only in compounds such as various salts, and that can be isolated as a soft silver-white solid that oxidizes swiftly in air. (symbol: K)
protein	[noun]	(adv.) any of a group of complex organic compounds containing nitrogen and composed of chains of amino acids, found in all living organisms and considered essential to all animal life processes.
represent	[transitive verb]	(adv.) to denote or serve as a symbol for. A skull and crossbones represents danger. The letter “t” represents the first sound in the word “top.”

sodium [noun] (adv.) a highly reactive chemical element of the alkali metal group that has eleven protons in each nucleus and that occurs naturally only in compounds such as sodium chloride and sodium bicarbonate. (symbol: Na)

sulfur [noun] (adv.) a chemical element that has sixteen protons in each nucleus, that occurs as a pale yellow crystal, or in compounds such as sulfuric acid and the sulfur amino acids, and that has various industrial uses. (symbol: S)

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Living and Nonliving Matter and the Chemicals of Life

Most of us naturally sort objects around us into *living* (animate) beings or *nonliving* (inanimate) objects. However, sometimes it is hard to tell the difference or we may have to stretch our definitions of living versus nonliving. This lesson looks at some of the principles of chemistry underlying living systems.

Atoms and Elements

Living organisms and inanimate objects are all composed of atoms. The way in which atoms are arranged into more complex molecules and how those molecules interact determines whether something is alive or not. Around one hundred elements can be found on Earth and in the rest of the universe. If you divide any element into its smallest part, you will have what we call an *atom*. An *element* is made up of one and only one type of atom (although trillions of these same atoms exist in even a tiny piece of the element).

Elements are arranged according to the number of *protons* they have in their nucleus. Thus, hydrogen, with only one proton, is the first element. The number of *electrons* equals the number of protons. Electrons are exchanged and shared in chemical reactions, but protons remain untouched during such reactions. The

neutrons in the *nucleus* also remain untouched. The number of neutrons varies and, along with the protons, contributes to the mass of the atom. The electrons are so small that their mass is not included in the mass of the whole atom.

Particles of an Atom

An atom is composed of even smaller particles called *protons*, *neutrons*, and *electrons*. These particles are common to all atoms. The number of these particles will determine the uniqueness of an atom and thus an element. The neutrons and protons are combined in the center of the atom, a region called the *nucleus*. The electrons are located in cloud-like layers where they spin around the nucleus.

Electron Shells

The electrons in atoms concentrate into layers surrounding the nucleus. These layers are called *shells*. Each atom needs to fill out the number of electrons in each of its shells. Atoms with complete shells are "content" and do not easily participate in chemical reactions. Chemical reactions occur when electrons are shared or transferred between atoms. Atoms that do not have complete electron shells tend to be more reactive and participate in chemical reactions.

Atoms can complete their electron shells in one of two ways. They can acquire them through a transfer, or they can share them with other atoms. When two or more atoms combine, we call the resulting compound a *molecule*.

Ionic Bonds

When electrons are transferred between atoms, each becomes an *ion* with either a positive or negative electric charge. The opposite charges then attract each ion

to the other. Sodium and chlorine form ions that are attracted to each other in a molecule called sodium chloride, otherwise known as table salt. Bonds between

ions are called *ionic bonds*.

Covalent Bonds

When atoms share electrons, they are said to have formed a *covalent bond*. A good example of a molecule with covalent bonding is water. Water consists of one oxygen atom and two hydrogen atoms. The oxygen atom needs two electrons

to complete its outer shell, and each hydrogen atom needs one electron. The oxygen

atom can thus form a covalent bond with each of the two hydrogen atoms.

Chemical Bonds and Energy

Most atoms are joined with others to form molecules. These molecules, in turn, can combine to form larger molecules and new substances. Living organisms take simple molecules and combine them into complex chemical substances. However, life also breaks down complex molecules as a way of acquiring energy. All the bonds in a molecule contain energy, and when large molecules are broken down by living systems, this bond energy is released. It is this bond energy that sustains living systems. Living organisms use this energy to grow and develop. They are in a constant state of change yet remain essentially the same. This is called a *dynamic equilibrium* because change is always occurring, but the organism remains what it is intended to be. This continues until the organism dies, when it will be decomposed into simpler molecules. This process is in contrast to inorganic, nonliving molecules like *minerals.* Minerals may undergo change, but they do not grow and develop.

The Most Common Elements in Living Matter

Oxygen

Carbon

Hydrogen

Nitrogen

Calcium

Phosphorous

Chlorine

Sulfur

Potassium

Sodium

Magnesium

Iodine

Iron

Molecules of Life

The molecules of life are most commonly made from a dozen or so elements. Because they very often contain carbon, they are also referred to as *organic molecules*. The most important biological molecules are lipids, proteins, carbohydrates, and nucleic acids.

Lipids are also called fats and are substances that act as an energy reserve and as a protective cushion for vital organs. Sometimes, lipids will combine with other molecules to form important compounds. The membranes around cells are composed of molecules called *phospholipids*. Hormones like estrogen and testosterone are lipid-type molecules also known as *steroids*. Cholesterol is also a lipid-type molecule.

Proteins are complex molecules and represent about half of the dry weight of an animal's body. Proteins are made from a series of smaller molecules called *amino acids*. Proteins have two very valuable functions in living organisms. They form structures like muscles, bones, and other organs, and they are specialized molecules called *enzymes*. Enzymes are molecules that facilitate chemical reactions to make them more efficient. The enzymes are not used up in the chemical reaction and are not part of the final product.

Carbohydrates are made up of only carbon, hydrogen, and oxygen. Carbohydrate molecules provide energy (though less than lipid molecules) and structural components of organisms (especially plants). The main type of carbohydrates is *sugars*, which provide abundant and quick energy for all cells. Brain cells are exclusively dependent upon a constant source of sugar molecules. Starch-type carbohydrates are more complex than sugars and are not soluble in water; thus, they act as a longer-term storage depot of energy. In animals, this storage carbohydrate is called *glycogen* and is somewhat different in composition than the starch found in plants. *Cellulose* is a special carbohydrate found in plants, and it is primarily responsible for the structural support of plants. Because the

many plants in the world have so much cellulose, it is one of the most abundant organic molecules on Earth.

Nucleic acids are large molecules made up of smaller molecules called *nucleotides*. The most familiar example of nucleic acids is the DNA molecule. DNA is *deoxyribonucleic acid* and is responsible for carrying and transmitting genetic information. Thus, nucleic acids are responsible for two of the hallmark characteristics of life: reproduction and evolution.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. accord

A. to give for a purpose.

B. characterized by reaction or response to a stimulus; tending to react.

C. to have the experience of; receive; endure.

D. agreement; harmony.

2. animate

A. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

B. a large space or area.

C. to send or carry from one person, place, or thing to another.

D. to bring to life.

3. biological

A. being the only one of its type; sole; single.

B. a basic law or truth on which action or behavior is based.

C. having to do with living things and their life processes.

D. relying on another for help or to provide what one needs.

4. characteristic

A. a substance made by certain cells in the body. _____ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.

B. to provide with the basic necessities of life.

C. something that makes a person or thing different from others.

D. characterized by reaction or response to a stimulus; tending to react.

5. component

A. a part of something.

B. to provide with the basic necessities of life.

C. to make less difficult; help in the doing of.

D. full of energy and strength; lively; active.

6. composition

A. the way the parts of something are put together; order or structure.

B. not helpful or constructive.

C. to bring to life.

D. something that makes a person or thing different from others.

7. consist

A. to send or carry from one person, place, or thing to another.

B. to be made up or formed (usually followed by "of").

C. relying on another for help or to provide what one needs.

D. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

8. contrast

A. a large space or area.

B. to compare in order to make differences clear.

C. having to do with living things and their life processes.

D. a substance made by certain cells in the body. _____ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.

9. contribute

A. to compare in order to make differences clear.

B. to be made up or formed (usually followed by "of").

C. to give for a purpose.

D. the process of changing and adapting to an environment over time.

10. dependent

A. something that makes a person or thing different from others.

B. not helpful or constructive.

C. to devote one's attentions to a specific pursuit or field of study.

D. relying on another for help or to provide what one needs.

11. dynamic

A. full of energy and strength; lively; active.

B. to make less difficult; help in the doing of.

C. a state of balance between two or more forces.

D. to provide with the basic necessities of life.

12. equilibrium

A. agreement; harmony.

B. the process of changing and adapting to an environment over time.

C. characterized by reaction or response to a stimulus; tending to react.

D. a state of balance between two or more forces.

13. evolution

A. a basic law or truth on which action or behavior is based.

B. the process of changing and adapting to an environment over time.

C. to send or carry from one person, place, or thing to another.

D. to be the foundation or basis of.

14. facilitate

A. to send or carry from one person, place, or thing to another.

B. to make less difficult; help in the doing of.

C. agreement; harmony.

D. able to be dissolved.

15. hormone

A. to send or carry from one person, place, or thing to another.

B. being the only one of its type; sole; single.

C. a substance made by certain cells in the body. _____ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.

D. to provide with the basic necessities of life.

16. interact

A. to respond to one another in a social situation.

B. to bring to life.

C. the process of changing and adapting to an environment over time.

D. not helpful or constructive.

17. membrane

A. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

B. a state of balance between two or more forces.

C. something that makes a person or thing different from others.

D. full of energy and strength; lively; active.

18. negative

A. having to do with living things and their life processes.

B. not helpful or constructive.

C. to bring to life.

D. a part of something.

19. principle

A. to be the foundation or basis of.

B. to make less difficult; help in the doing of.

C. a basic law or truth on which action or behavior is based.

D. a substance made by certain cells in the body. _____ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.

20. reactive

A. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

B. to respond to one another in a social situation.

C. to give for a purpose.

D. characterized by reaction or response to a stimulus; tending to react.

21. region

A. in some measure, degree, or proportion; rather.

B. to be made up or formed (usually followed by "of").

C. a large space or area.

D. to send or carry from one person, place, or thing to another.

22. soluble

A. able to be dissolved.

B. having to do with life.

C. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

D. to be made up or formed (usually followed by "of").

23. somewhat

A. something that makes a person or thing different from others.

B. characterized by reaction or response to a stimulus; tending to react.

C. able to be dissolved.

D. in some measure, degree, or proportion; rather.

24. specialize

A. the way the parts of something are put together; order or structure.

B. a large space or area.

C. a state of balance between two or more forces.

D. to devote one's attentions to a specific pursuit or field of study.

25. sustain

A. to provide with the basic necessities of life.

B. the way the parts of something are put together; order or structure.

C. a state of balance between two or more forces.

D. characterized by reaction or response to a stimulus; tending to react.

26. transmit

A. to send or carry from one person, place, or thing to another.

B. to respond to one another in a social situation.

C. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

D. full of energy and strength; lively; active.

27. undergo

A. a basic law or truth on which action or behavior is based.

B. in some measure, degree, or proportion; rather.

C. to have the experience of; receive; endure.

D. having to do with life.

28. underlie

A. to be the foundation or basis of.

B. agreement; harmony.

C. to bring to life.

D. a part of something.

29. unique

A. being the only one of its type; sole; single.

B. to bring to life.

C. a thin layer of tissue found in living things. Some kinds of _____ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.

D. a substance made by certain cells in the body. _____ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.

30. vital

A. to be the foundation or basis of.

B. having to do with life.

C. to be made up or formed (usually followed by "of").

D. a basic law or truth on which action or behavior is based.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. membrane		a substance made by certain cells in the body. __ move around the body in the blood and have effects on certain organs and cells. _____ help control body processes such as growth.
2. soluble		to be the foundation or basis of.
.3 region		to have the experience of; receive; endure.
4. undergo		able to be dissolved.
5. hormone		a large space or area.
6. composition		to make less difficult; help in the doing of.
7. underlie		the way the parts of something are put together; order or structure.
8. facilitate		a thin layer of tissue found in living things. Some kinds of __ cover the outside or inside of organs. Other _____ separate or connect different parts of the body.
9. animate		to bring to life.
10. unique		to give for a purpose.
11. sustain		having to do with living things and their life processes.
12. dependent		having to do with life.

13. vital		to provide with the basic necessities of life.
14. interact		being the only one of its type; sole; single.
15. biological		to respond to one another in a social situation.
16. contribute		relying on another for help or to provide what one needs.
17. evolution		agreement; harmony.
18. transmit		full of energy and strength; lively; active.
19. component		the process of changing and adapting to an environment over time.
20. reactive		to compare in order to make differences clear.
21. contrast		in some measure, degree, or proportion; rather.
22. accord		a part of something.
23. somewhat		characterized by reaction or response to a stimulus; tending to react.
24. dynamic		to send or carry from one person, place, or thing to another.
25. principle		to devote one's attentions to a specific pursuit or field of study.
26. specialize		to be made up or formed (usually followed by “of”).
27. equilibrium		not helpful or constructive.
28. negative		a basic law or truth on which action or behavior is based.
29. characteristic		something that makes a person or thing different from others.
30. consist		a state of balance between two or more forces.

5. Complete these sentences using the words on this list:

accord, animate, characteristic, consist, hormone, principle, region, somewhat, undergo, component, dependent, facilitate, membrane, reactive, soluble, sustain,

transmit, underlie, biological, contribute, dynamic, equilibrium, evolution, interact, specialize, unique, vital, composition, contrast, negative

1) The book _____ women's lives a hundred years ago with the lives of women today.
2) The team sent a submarine to study the _____ of the sea bottom.
3) Our family _____ major changes last year.
4) She made _____ comments about my singing.
5) Vegetables are a _____ of a healthy diet.
6) The ramp _____ entry for people who use wheelchairs.
7) Let’s look at the evidence that _____ the author's argument.
8) She was so gravely ill that she was no longer _____ to those around her.
9) Sugar is more quickly _____ in warm water than in cold.
10) One of the _____ of the engine is missing.
11) They don’t earn enough money from these jobs to _____ themselves and their families.
12) Children are _____ on their parents for food and shelter.
13) _____ connect the toes of frogs.
14) Please _____ this message to the commander.
15) In _____ with tradition, the bride wore white.
16) Tails that can grasp things are a _____ of monkeys.
17) She is _____ lazy.
18) A magic hat _____ Frosty the snowman.
19) Our country’s laws are based on the _____ of liberty and justice.
20) _____ produced by this gland control the body's growth.
21) What were the motivating factors that _____ this act of aggression?
22) This _____ is famous for its apples.
23) 9. She’ll _____ surgery on her foot next week.
24) The United States _____ of fifty states.

25) Digestion of food is a _____ process.

26) That siblings should stay together is one of the principles that _____ our adoption policy.

27) We were pleased to see how our parents were _____.

28) He is a _____ actor.

29) The restaurant _____ in Vietnamese food.

30) When two people are sitting on a seesaw and the seesaw is level, their weights are in_____.

31) Everyone's fingerprints are _____.

32) She _____ time and money to the rescue work.

33) Due to _____, desert plants do not need much water to survive in dry climates.

34) The nurse checked the patient's heartbeat and other _____ signs.

6. Test your knowledge on the topic.

1. Molecules consist of

a. only protons and neutrons.

b. only electrons and neutrons.

c. whole atoms.

d. bonds of energy.

2. An ionic bond is formed when two atoms

a. share electrons.

b. transfer electrons.

c. share protons.

d. transfer protons.

3. Water has covalent bonds because the oxygen and hydrogen atoms

a. share electrons.

b. transfer electrons.

c. share protons.

d. transfer protons.

4. Life depends upon

a. the bond energy in molecules.

b. the energy of protons.

c. the energy of electrons.

d. the energy of neutrons.

5. Which of the following elements is NOT found in carbohydrates?

a. carbon

b. hydrogen

c. oxygen

d. sulfur

6. Which of the following are carbohydrate molecules that provide quick energy for cells, especially brain cells?

a. amino acids

b. glycogen

c. sugars

d. lipids

7. Translate the text into Ukrainian.

Living organisms are made up of many molecules, some complex and others relatively simple. Molecules are made of atoms. Atoms are made from protons and neutrons in a centrally located nucleus, surrounded by layers or shells of electrons. The important molecules of life are lipids, proteins, carbohydrates, and nucleic acids.

Unit 3.
WHAT IS LIFE?

1. **Learn the active vocabulary to the text.**

adaptation	[noun]	(adv.) the act or process of changing or adjusting something to fit in a new role or context. The adaptation of the novel for the Broadway stage took a year of hard work.
binary	[adjective]	(adv.) consisting of or characterized by two parts or components.
complex	[adjective]	(adv.) difficult to analyze or understand because of being complicated. His first spy novel was so complex that I found it hard to figure out what was happening when I read it.
develop	[transitive verb]	(adv.) to bring out the potential of; advance to a more complete or more effective condition. The coach is attempting to develop the team this year so that it can contend for the championship. It took time and great effort to develop the land for crops. She has a certain natural talent, but she needs to develop it.
environment	[noun]	(adv.) the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings. With the warm light, the soft curtains, and the comfortable chairs, they tried to make the doctor's waiting room a pleasant environment. The hostile environment of the prison plunged him

		into depression. Every attempt has been made to make the mine a safe environment for workers. He was brought up in an environment in which education was highly valued. In the political environment of the time, it was dangerous to write books criticizing the government.
evolution	[noun]	(adv.) the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.
evolve	[intransitive verb]	(adv.) to develop gradually; come into being. The revolution evolved during years of suffering. The plan evolved over many weeks of discussion.
external	[adjective]	(adv.) of the outside or outer part; being outside. He cleaned only the external surfaces of the oven. Cold-blooded animals need warmth from external sources like the sun.
fission	[noun]	(adv.) the act or process or an instance of breaking apart.
guide	[transitive verb]	(adv.) to direct along an unfamiliar course. The local woman guided the downed pilot to a safe hiding place.
inanimate	[adjective]	(adv.) not having or showing the characteristics associated with life; lifeless. She claims she has no skill at painting people or animals and prefers to paint inanimate objects.
irritability	[noun]	(adv.) the quality or condition of being irritable or easily angered.

movement	[noun]	(adv.) a particular instance or way of changing place or position in space. Each movement of her arm was painful. The movements in ballet are graceful and highly stylized.
natural	[adjective]	(adv.) of, pertaining to, produced by, or existing in nature. The zoo hopes to return the large cat to its natural habitat in the forest. Honey is a natural sweetener.
natural selection	[noun]	(adv.) a natural process of evolution in which the organisms that are best adapted to their environment survive and are able to reproduce, while those that are weak leave fewer or no offspring.
nonliving	[adjective]	(adv.) combined form of living.
object	[noun]	(adv.) anything that exists in tangible form and can be seen or touched. I need my glasses to see objects in the distance. The prisoners are allowed to keep only a few personal objects in their cells. She is good at drawing three-dimensional objects.
offspring	[noun]	(adv.) the child, young, or descendant of a particular parent or ancestor. As his aunts and uncles had no offspring, he had no cousins. The offspring of the famous racehorse also became champions. The bird returned to the nest to feed its offspring, four chicks in all.

organism	[noun]	(adv.) any single living being, such as an animal, plant, fungus, or bacterium. The water sample contains numerous kinds of tiny organisms.
organization	[noun]	(adv.) the quality of being carefully arranged. My calendar shows the organization of my daily schedule.
relatively	[adverb]	(adv.) in comparison to something else. The problem has relatively little importance.
reproduce	[transitive verb]	(adv.) to make a copy or duplicate of. The furniture maker reproduced a chair made hundreds of years ago.
respond	[intransitive verb]	(adv.) to give a reply, in words or otherwise. I asked her a question, but she did not respond. I haven't had time to respond to her letter.
selection	[noun]	(adv.) an act, instance, or process of selecting, or the condition of being selected. His selection of a tie for work was always done with impatience. No one could understand the boss's selection of this person for the job. The selection of class president is done by a vote. She was surprised at her selection for this honor.
self-guided	[adjective]	(adv.) combined form of guided.
stimulus	[noun]	(adv.) something that rouses or accelerates action, feeling, or thought.
successful	[adjective]	(adv.) of a person, having attained that which is desired or intended.

		a successful actress.
tissue	[noun]	(adv.) the mass of like cells in an animal or plant body, especially as they form a specific organ. heart tissue.
variable	[noun]	(adv.) something that tends to change or vary. When determining which medicine to prescribe, a doctor must take into account many variables, such as the age and weight of the patient.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

What Is Life?

We seem to have an intuitive sense of how to answer the question, “what is life?” Most of us can distinguish between something that is living versus something that is not living (or was once living but is now dead). We can sometimes be fooled, but most of the time, we get it right. This lesson will summarize the qualities of life that distinguish it from inanimate objects or those things that were once living.

Life Performs Actions

One general way to view living things is to notice that they carry out functions and undergo changes, often self-directed. A rock may undergo changes during erosion, and it may even move in a stream or during an earthquake.However, none of these changes or movements is self-directed. The rock is passive and things happen

to it. A living organism moves when it needs to and performs a full range of other functions, some at a visible level (such as movement or eating) and others at a smaller, less visible scale (such as the chemical reactions of digestion or the changes in a neuron during nerve signal transmission). So in this sense, the level of

complexity indicates whether something is living or not.

Characteristics of Living Things

In general, living things are different from inanimate objects because they can perform self-directed functions and actions, are structurally and functionally complex, are able to reproduce, are able to respond to the environment, and can evolve.

Life Has Levels of Complexity

A television set or a computer may seem complicated, but each really consists of only a few chemical elements and a few dozen parts. Rocks, for example, are made of one or a few chemical elements. However, simple, onecelled microorganisms such as a bacterium are made of dozens of chemical elements and molecules. These molecules are built up into thousands of more complex molecules and form dozens of structures. Larger, multicelled plants or animals (like ourselves) have a dizzying array of molecules and interrelated parts. Living things are based on cells, the smallest unit of life. These cells are grouped together to form *tissues*, as, for example, millions of liver cells grouped together form liver tissue. Different tissues are grouped together to form an organ, so liver tissue, blood tissue, and connective tissue all combine to form the organ we call the liver. Many organs will be grouped together to form organ systems. Using the liver example, we can group it with the intestines, the pancreas, and the stomach to form what we call the digestive system. This layering of ever-increasing complexity is a hallmark characteristic of life.

Life Reproduces Itself

Inanimate objects can last for a very long time and even appear to be indestructible. Living things don’t last forever; they wear out or die. However, life continues because organisms can reproduce. New organisms (offspring) are produced when the original organisms (parents) reproduce. Though the parents will die, their offspring will produce even more offspring to continue life.

Even if you break a rock in half, you don’t really have more rock, just two pieces instead of one. And the rock doesn’t decide to break itself; the action is not

self-directed as it is in the reproduction of living organisms. Thus, another indicator of life is the ability to reproduce.

Life Reacts to Environmental Stimuli

Living organisms are irritable; they can take notice of a disturbance. When the environment provides a stimulus, an organism can react to it. Environmental stimuli can be changes in temperature, light, moisture, or many other variables. Inanimate matter such as a rock totally lacks the ability to do this. At best, a rock undergoes some simple change of position (when a strong water current moves it), or it undergoes simple changes in chemical composition (when it crumbles during freezing and thawing). Animals continually respond to stimuli by moving, migrating to a different place for a whole season, running, hiding, seeking or building shelter, and in thousands of other ways. Irritability or the ability to react to an environmental stimulus is thus another hallmark characteristic that differentiates life from nonlife.

Life Evolves

An organism's ability to respond to its environment can be very valuable. Organisms that are good at doing this will be more likely to survive and reproduce more offspring. When such successful organisms reproduce, they will pass their characteristics on to their offspring. These offspring will also survive well. Organisms that don't react well to their surroundings will most likely die and not reproduce as often. As this slow process continues for a long time ,we will see changes in whole populations of organisms. This change over time will result in the evolution of new populations. The process of evolution is thus another distinct characteristic of living beings. Inanimate objects do not engage in this survival of the fittest type of evolution.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. adaptation

A. the act or process of changing or adjusting something to fit in a new role or context.

B. to bring out the potential of; advance to a more complete or more effective condition.

C. the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.

D. to make a copy or duplicate of.

2. binary

A. not having or showing the characteristics associated with life; lifeless.

B. something that tends to change or vary.

C. to direct along an unfamiliar course.

D. consisting of or characterized by two parts or components.

3. complex

A. an act, instance, or process of selecting, or the condition of being selected.

B. something that tends to change or vary.

C. to make a copy or duplicate of.

D. difficult to analyze or understand because of being complicated.

4. develop

A. to give a reply, in words or otherwise.

B. something that rouses or accelerates action, feeling, or thought.

C. to bring out the potential of; advance to a more complete or more effective condition.

D. the act or process or an instance of breaking apart.

5. environment

A. the act or process of changing or adjusting something to fit in a new role or context.

B. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

C. any single living being, such as an animal, plant, fungus, or bacterium.

D. of a person, having attained that which is desired or intended.

6. evolution

A. a particular instance or way of changing place or position in space.

B. the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.

C. of a person, having attained that which is desired or intended.

D. to bring out the potential of; advance to a more complete or more effective condition.

7. evolve

A. the act or process or an instance of breaking apart.

B. to develop gradually; come into being.

C. of the outside or outer part; being outside.

D. something that tends to change or vary.

8. external

A. of the outside or outer part; being outside.

B. the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.

C. the act or process of changing or adjusting something to fit in a new role or context.

D. not having or showing the characteristics associated with life; lifeless.

9. fission

A. something that rouses or accelerates action, feeling, or thought.

B. the act or process or an instance of breaking apart.

C. the act or process of changing or adjusting something to fit in a new role or context.

D. an act, instance, or process of selecting, or the condition of being selected.

10. guide

A. to direct along an unfamiliar course.

B. something that tends to change or vary.

C. to give a reply, in words or otherwise.

D. of the outside or outer part; being outside.

11. inanimate

A. the act or process of changing or adjusting something to fit in a new role or context.

B. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

C. not having or showing the characteristics associated with life; lifeless.

D. combined form of living.

12. irritability

A. combined form of guided.

B. anything that exists in tangible form and can be seen or touched.

C. of the outside or outer part; being outside.

D. the quality or condition of being irritable or easily angered.

13. movement

A. the quality of being carefully arranged.

B. a particular instance or way of changing place or position in space.

C. combined form of living.

D. consisting of or characterized by two parts or components.

14. natural

A. of, pertaining to, produced by, or existing in nature.

B. consisting of or characterized by two parts or components.

C. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

D. the quality or condition of being irritable or easily angered.

15. natural selection

A. the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.

B. a natural process of evolution in which the organisms that are best adapted to their environment survive and are able to reproduce, while those that are weak leave fewer or no offspring.

C. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

D. something that tends to change or vary.

16. nonliving

A. the act or process of changing or adjusting something to fit in a new role or context.

B. the quality of being carefully arranged.

C. combined form of guided.

D. combined form of living.

17. object

A. to develop gradually; come into being.

B. the child, young, or descendant of a particular parent or ancestor.

C. anything that exists in tangible form and can be seen or touched.

D. consisting of or characterized by two parts or components.

18. offspring

A. in comparison to something else.

B. anything that exists in tangible form and can be seen or touched.

C. to give a reply, in words or otherwise.

D. the child, young, or descendant of a particular parent or ancestor.

19. organism

A. any single living being, such as an animal, plant, fungus, or bacterium.

B. to make a copy or duplicate of.

C. of a person, having attained that which is desired or intended.

D. the mass of like cells in an animal or plant body, especially as they form a specific organ.

20. organization

A. difficult to analyze or understand because of being complicated.

B. the act or process or an instance of breaking apart.

C. the quality of being carefully arranged.

D. any single living being, such as an animal, plant, fungus, or bacterium.

21. relatively

A. combined form of guided.

B. in comparison to something else.

C. the act or process of changing or adjusting something to fit in a new role or context.

D. the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.

22. reproduce

A. of a person, having attained that which is desired or intended.

B. consisting of or characterized by two parts or components.

C. to make a copy or duplicate of.

D. an act, instance, or process of selecting, or the condition of being selected.

23. respond

A. the quality of being carefully arranged.

B. the act or process of changing or adjusting something to fit in a new role or context.

C. of a person, having attained that which is desired or intended.

D. to give a reply, in words or otherwise.

24. selection

A. an act, instance, or process of selecting, or the condition of being selected.

B. something that tends to change or vary.

C. something that rouses or accelerates action, feeling, or thought.

D. difficult to analyze or understand because of being complicated.

25. self-guided

A. anything that exists in tangible form and can be seen or touched.

B. of a person, having attained that which is desired or intended.

C. combined form of guided.

D. a particular instance or way of changing place or position in space.

26. stimulus

A. the quality of being carefully arranged.

B. in comparison to something else.

C. something that rouses or accelerates action, feeling, or thought.

D. an act, instance, or process of selecting, or the condition of being selected.

27. successful

A. of a person, having attained that which is desired or intended.

B. difficult to analyze or understand because of being complicated.

C. any single living being, such as an animal, plant, fungus, or bacterium.

D. to make a copy or duplicate of.

28. tissue

A. anything that exists in tangible form and can be seen or touched.

B. the act or process or an instance of breaking apart.

C. difficult to analyze or understand because of being complicated.

D. the mass of like cells in an animal or plant body, especially as they form a specific organ.

29. variable

A. the act or process or an instance of breaking apart.

B. something that tends to change or vary.

C. any single living being, such as an animal, plant, fungus, or bacterium.

D. not having or showing the characteristics associated with life; lifeless.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. evolve		the act or process of changing or adjusting something to fit in a new role or context.
2. adaptation		combined form of guided.
3.environment		to develop gradually; come into being.
4. self-guided		any single living being, such as an animal, plant, fungus, or bacterium.
5. reproduce		the sum of things, circumstances, and conditions that

		surround one and may have an effect on one; surroundings.
6. stimulus		something that rouses or accelerates action, feeling, or thought.
7. organism		the mass of like cells in an animal or plant body, especially as they form a specific organ.
8. tissue		to make a copy or duplicate of.
9. binary		of, pertaining to, produced by, or existing in nature.
10. guide		combined form of living.
11. external		to give a reply, in words or otherwise.
12. irritability		of a person, having attained that which is desired or intended.
13. natural		consisting of or characterized by two parts or components.
14. successful		the quality or condition of being irritable or easily angered.
15. nonliving		to direct along an unfamiliar course.
16. respond		of the outside or outer part; being outside.
17. natural selection		not having or showing the characteristics associated with life; lifeless.
18. variable		the child, young, or descendant of a particular parent or ancestor.
19. relatively		in comparison to something else.
20. selection		an act, instance, or process of selecting, or the condition of being selected.
21. inanimate		a natural process of evolution in which the organisms that are best adapted to their environment survive and are able to reproduce, while those that are weak leave fewer or no offspring.

22. offspring		difficult to analyze or understand because of being complicated.
23. complex		anything that exists in tangible form and can be seen or touched.
24. object		something that tends to change or vary.
25. organization		the act or process or an instance of breaking apart.
26. movement		a particular instance or way of changing place or position in space.
27. develop		the quality of being carefully arranged.
28. evolution		the continuous modification and adaptation of organisms to their environments through selection, hybridization, and the like.
29. fission		to bring out the potential of; advance to a more complete or more effective condition.

5. Complete these sentences using the words on this list:

adaptation, environment, external, inanimate, natural, organization, reproduce, respond, selection, complex, develop, evolve, guide, natural, object, organism, movement, relatively, successful, offspring, tissue, variable

1) It took time and great effort to _____ the land for crops.
2) Honey is a _____ sweetener.
3) The prisoners are allowed to keep only a few personal _____ in their cells.
4) The water sample contains numerous kinds of tiny _____.
5) The local woman _____ the downed pilot to a safe hiding place.
6) His first spy novel was so _____ that I found it hard to figure out what was happening when I read it.
7) The revolution _____ during years of suffering.

8) He was brought up in an _____ in which education was highly valued.
9) The hostile _____ of the prison plunged him into depression.
10) She is good at drawing three-dimensional _____.
11) She claims she has no skill at painting people or animals and prefers to paint _____ objects.
12) The furniture maker _____ a chair made hundreds of years ago.
13) The _____ of the novel for the Broadway stage took a year of hard work.
14) With the warm light, the soft curtains, and the comfortable chairs, they tried to make the doctor's waiting room a pleasant _____.
15) Cold-blooded animals need warmth from _____ sources like the sun.
16) The zoo hopes to return the large cat to its _____ habitat in the forest.
17) My calendar shows the _____ of my daily schedule.
18) I haven’t had time to _____ to her letter.
19) The _____ of class president is done by a vote.
20) In the political _____ of the time, it was dangerous to write books criticizing the government.
21) She has become quite a _____ actress.
22) I need my glasses to see _____ in the distance.
23) No one could understand the boss's _____ of this person for the job.
24) Each _____ of her arm was painful.
25) Every attempt has been made to make the mine a safe _____ for workers.
26) She has a certain natural talent, but she needs to _____ it.
27) His _____ of a tie for work was always done with impatience.
28) He cleaned only the _____ surfaces of the oven.

29) The coach is attempting to _____ the team this year so that it can contend for the championship.

30) The problem has _____ little importance.

31) When determining which medicine to prescribe, a doctor must take into account many_____, such as the age and weight of the patient.

32) The _____ of the famous racehorse also became champions.

33) The plan _____ over many weeks of discussion.

34) The bird returned to the nest to feed its _____, four chicks in all.

35) As his aunts and uncles had no _____, he had no cousins.

36) I asked her a question, but she did not _____.

37) The _____ in ballet are graceful and highly stylized.

38) She was surprised at her _____ for this honor.

6. Test your knowledge on the topic.

1. The evolution of organisms depends upon their ability to survive and become _____to their environment, thus being able to produce more offspring.

a. adapted

b. accustomed

c. accommodated

d. accomplished

2. Irritability refers to an organism's ability to

a. reproduce.

b. respond to environmental stimuli.

c. adapt to its environment.

d. grow and develop.

3. A nonliving rock has a relatively simple organization. However, living organisms

a. are even simpler.

b. are able to reproduce more slowly.

c. have a layered and complex organization.

d. move less than rocks.

4. Life continues on because organisms are able to

a. grow and develop.

b. move.

c. react to environmental stimuli.

d. reproduce.

5. Which of the following is an inanimate object able to do?

a. evolve through natural selection

b. warm up by being in the sunlight

c. reproduce through binary fission

d. have self-guided movement

7. Translate the text into Ukrainian.

Several characteristics distinguish living organisms from nonliving objects. Several such characteristics are grouped into the following categories:

- ✓ Life performs actions, often self-directed.
- ✓ Life has layers of complexity and is not simple in its structure or function.
- ✓ Life reproduces itself.
- ✓ Life reacts to environmental stimuli.
- ✓ Life evolves.

CHARACTERISTIC	**LIVING ORGANISM**	**NONLIVING OBJECT**
Can perform actions and functions	Yes, continually	No, or not self-directed
Level of complexity	High, layered	Low
Reproduction	Yes	No
Reaction to stimulus	Yes, actively interacts with environment	No, except simple changes of position or chemical composition
Evolution	Yes	No, except simple chemical changes

Unit 4.

CHARACTERISTICS OF LIVING THINGS

1. Learn the active vocabulary to the text.

abbreviate	[verb]	(int.) to shorten the time or length of. When told he would have only fifteen minutes to speak, John abbreviated his speech.
absorb	[verb]	(int.) to take in or soak up. A paper towel will absorb the spilled milk.
ancestor	[noun]	(int.) a person from whom one is descended and who lived several generations ago. Her ancestors came to America from China in the middle of the 1800s.
assimilate	[intransitive verb]	(adv.) to adapt and conform. Adult immigrants tended to hang on to their language and traditional ways, whereas the children usually assimilated.
characteristic	[noun]	(int.) something that makes a person or thing different from others. Tails that can grasp things are a characteristic of monkeys.
classify	[verb]	(int.) to put or order into groups of similar things. He classified his coin collection according to type and age.
definition	[noun]	(int.) the statement of the meaning of a word or phrase. This dictionary gives two definitions for the word "deed."

descend	[verb]	(int.) to move downward or to a lower position. The airplane is beginning to descend now. An angel descended from the heavens.
describe	[verb]	(int.) to tell or write about; create a picture of in words. He described the costumes worn in the movie to all of his friends.
excess	[adjective]	(int.) more than is needed or usual; extra. There were excess brownies at the picnic because everyone brought some.
introduce	[verb]	(int.) to present to another person. Could you introduce me to that girl you were talking to? Mom says I should just introduce myself to people, but I think it's embarrassing.
involve	[verb]	(int.) to have as a necessary part or result; include. Baseball involves throwing, catching, and batting a ball. Police work involves some danger.
metabolism	[noun]	(int.) the processes in plants and animals by which food is changed into energy or used to make cells and tissues. Mice have a high rate of metabolism.
molecule	[noun]	(int.) the smallest unit of a substance that has all the properties of that substance. A molecule is made up of a single atom or group of atoms. Each molecule of water has one hydrogen and two oxygen atoms.

nutrient	[noun]	(int.) something in food that helps people, animals, and plants live and grow. If you don't get enough nutrients, you may become sick.
organism	[noun]	(int.) an individual living thing, such as a plant, an animal, or a bacteria. The soil is full of organisms, such as earthworms, bacteria, and fungi.
process	[noun]	(int.) a series of actions used to produce something or reach a goal. We are learning the process of milking cows.
product	[noun]	(int.) something made by means of either human work or that of a machine. This store sells all kinds of paper products.
relate	[verb]	(int.) to tell the story of. The traveler related his adventures in Alaska.
reproduce	[verb]	(int.) to make a copy of. The furniture maker reproduced a chair made hundreds of years ago.
reproduction	[noun]	(int.) a copy of something. I have a reproduction of the Mona Lisa in my room.
requirement	[noun]	(int.) something that is needed or necessary. Water is a requirement for all living things.
respiration	[noun]	(int.) the act of breathing. Respiration slows down during sleep.
response	[noun]	(int.) a written or spoken answer; reply. I wrote to my senator and received a response.
sensitivity	[noun]	(adv.) the quality of being acutely responsive

		mentally or emotionally. Her sensitivity makes her an excellent therapist.
singular	[adjective]	(int.) having to do with or designating the form of a word that indicates only one. The word "kitten" is a singular noun.
stimulus	[noun]	(int.) something that causes or increases action, feeling, or thought. Hearing the great pianist perform was a stimulus to practice harder.
structure	[noun]	(int.) a thing made up of a number of parts joined together in a certain way. A human cell is a complicated structure.
tentacle	[noun]	(int.) a long thin body part on the head or around the mouth of some animals. Tentacles are used for feeling or taking hold of things. Octopus and squid have tentacles.
toxic	[adjective]	(int.) having to do with or made of a poison; poisonous. The factory spilled toxic waste into the lake.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

All living things have seven characteristics.

Biology is the study of living things, which are often called organisms. Living organisms have seven features or characteristics which make them different from objects that are not alive.

Classification involves grouping things.

Classification means putting things into groups. There are many possible ways we could group living organisms. For example, we could put all the

organisms with legs into one group, and all those without legs into another, or we could put all red organisms into one group, and all blue ones into another. The first of these ideas would be much more useful to biologists than the second.

The main reason for classifying living things is to make it easier to study them. For example, we put humans and dogs and horses and mice into one group (the mammals) because they share certain features (for example, having hair) that are not found in other groups. We think that all mammals share these features because they have all descended from the same ancestors, long ago. We think that all mammals are related to one another. We would therefore expect all mammals to have bodies that have similar structures and that work in similar ways. If we find a new animal that has hair, then we know that it belongs in the mammal group. We will already know a lot about it, even before we have studied it at all.

Biologists classify living things.

The first person to try to classify living things in a scientific way was a Swedish naturalist called Linnaeus. He introduced his system of classification in 1735. He divided all the different kinds of living things into groups called species. He recognized 12000 species. Linnaeus' species were groups of organisms which had a lot of features in common. We still use this system today.

Species are grouped into genera (singular: genus). Each genus contains several species with similar characteristics. Several genera are then grouped into a family, families into orders, orders into classes, classes into phyla and finally phyla into kingdoms. Some of the more important groups are described in this chapter.

Key definitions:

- **excretion** removal from organisms of toxic materials, the waste products of metabolism (chemical reactions in cells including respiration) and substances in excess of requirements;
- **growth** a permanent increase in size and dry mass by an increase in cell number or cell size or both;
- **movement** an action by an organism or part of an organism causing a change of position or place;

- **nutrition** the taking in of nutrients which are organic substances and mineral ions, containing raw materials or energy for growth and tissue repair, absorbing and assimilating them;
- **reproduction** the processes that make more of the same kind of organism;
- **respiration** the chemical reactions that break down nutrient molecules in living cells to release energy;
- **sensitivity** the ability to detect or sense changes in the in the environment (stimuli) and to make responses.

Each species has a binomial.

Linnaeus gave every living organism two names, written in Latin. The first name is the name of the genus it belongs to, and always has a capital letter. The second is the name of its species, and always has a small letter. This two-word name is called a binomial.

For example, a wolf belongs to the genus Canis and the species lupus. Its binomial is Canis lupus. These names are printed in italics. When you write one, you cannot really write in italics, so you should underline any Latin names. The genus name can be abbreviated like this: C. lupus.

Organisms are divided into five kingdoms.

All living things are placed in one of five kingdoms. Each of these kingdoms has its own set of characteristics.

There is also another group that is of interest to biologists. They are the viruses. Biologists disagree about whether viruses should be classed as living things. Most believe that they should not, because the only characteristic that they share with living organisms is being able to reproduce - and they can’t even do that on their own. A virus has to get into another living cell and hijack it before it can produce new viruses.

The animal kingdom contains many phyla.

You probably think you can recognize an animal when you see one. However, it is not always so easy. For a very long time, people thought that sea anemones were plants, because they tend to stay in one place and their tentacles

look rather like petals. Now we know that they are animals. One of the best ways to tell if an organism is an animal is to look at its cells under the microscope. Animal cells never have cell walls.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. abbreviate

A. a series of actions used to produce something or reach a goal.

B. having to do with or designating the form of a word that indicates only one.

C. to shorten the time or length of.

D. more than is needed or usual; extra.

2. absorb

A. to put or order into groups of similar things.

B. to take in or soak up.

C. something made by means of either human work or that of a machine.

D. a thing made up of a number of parts joined together in a certain way.

3. ancestor

A. to tell the story of.

B. to adapt and conform.

C. more than is needed or usual; extra.

D. a person from whom one is descended and who lived several generations ago.

4. assimilate

A. to adapt and conform.

B. something that makes a person or thing different from others.

C. a copy of something.

D. to make a copy of.

5. characteristic

A. something in food that helps people, animals, and plants live and grow.

B. a copy of something.

C. something that makes a person or thing different from others.

D. the act of breathing.

6. classify

A. something made by means of either human work or that of a machine.

B. to put or order into groups of similar things.

C. a long thin body part on the head or around the mouth of some animals. _____ are used for feeling or taking hold of things.

D. the act of breathing.

7. definition

A. something in food that helps people, animals, and plants live and grow.

B. to present to another person.

C. the statement of the meaning of a word or phrase.

D. the smallest unit of a substance that has all the properties of that substance. A _____ is made up of a single atom or group of atoms.

8. descend

A. having to do with or made of a poison; poisonous.

B. to put or order into groups of similar things.

C. the smallest unit of a substance that has all the properties of that substance. A _____ is made up of a single atom or group of atoms.

D. to move downward or to a lower position.

9. describe

A. to tell or write about; create a picture of in words.

B. the statement of the meaning of a word or phrase.

C. to present to another person.

D. the quality of being acutely responsive mentally or emotionally.

10. excess

A. something that is needed or necessary.

B. something made by means of either human work or that of a machine.

C. to have as a necessary part or result; include.

D. more than is needed or usual; extra.

11. introduce

A. something that makes a person or thing different from others.

B. to present to another person.

C. having to do with or designating the form of a word that indicates only one.

D. the statement of the meaning of a word or phrase.

12. involve

A. to present to another person.

B. to have as a necessary part or result; include.

C. having to do with or made of a poison; poisonous.

D. to move downward or to a lower position.

13. metabolism

A. something that is needed or necessary.

B. to tell or write about; create a picture of in words.

C. the processes in plants and animals by which food is changed into energy or used to make cells and tissues.

D. the statement of the meaning of a word or phrase.

14. molecule

A. the quality of being acutely responsive mentally or emotionally.

B. to tell the story of.

C. the smallest unit of a substance that has all the properties of that substance. A _____ is made up of a single atom or group of atoms.

D. a long thin body part on the head or around the mouth of some animals. _____ are used for feeling or taking hold of things.

15. nutrient

A. to tell or write about; create a picture of in words.

B. a copy of something.

C. something in food that helps people, animals, and plants live and grow.

D. a person from whom one is descended and who lived several generations ago.

16. organism

A. an individual living thing, such as a plant, an animal, or a bacteria.

B. the statement of the meaning of a word or phrase.

C. to have as a necessary part or result; include.

D. something that is needed or necessary.

17. process

A. a series of actions used to produce something or reach a goal.

B. to move downward or to a lower position.

C. to present to another person.

D. the quality of being acutely responsive mentally or emotionally.

18. product

A. the processes in plants and animals by which food is changed into energy or used to make cells and tissues.

B. a copy of something.

C. something made by means of either human work or that of a machine.

D. something in food that helps people, animals, and plants live and grow.

19. relate

A. having to do with or designating the form of a word that indicates only one.

B. something made by means of either human work or that of a machine.

C. to tell the story of.

D. a copy of something.

20. reproduce

A. a series of actions used to produce something or reach a goal.

B. to make a copy of.

C. having to do with or made of a poison; poisonous.

D. the quality of being acutely responsive mentally or emotionally.

21. reproduction

A. a copy of something.

B. a long thin body part on the head or around the mouth of some animals. _____ are used for feeling or taking hold of things.

C. a thing made up of a number of parts joined together in a certain way.

D. to put or order into groups of similar things.

22. requirement

A. something that is needed or necessary.

B. to move downward or to a lower position.

C. to take in or soak up.

D. to adapt and conform.

23. respiration

A. the processes in plants and animals by which food is changed into energy or used to make cells and tissues.

B. having to do with or made of a poison; poisonous.

C. the act of breathing.

D. the smallest unit of a substance that has all the properties of that substance. A _____ is made up of a single atom or group of atoms.

24. response

A. something made by means of either human work or that of a machine.

B. a written or spoken answer; reply.

C. to present to another person.

D. the act of breathing.

25. sensitivity

A. an individual living thing, such as a plant, an animal, or a bacteria.

B. the quality of being acutely responsive mentally or emotionally.

C. to put or order into groups of similar things.

D. a thing made up of a number of parts joined together in a certain way.

26. singular

A. having to do with or made of a poison; poisonous.

B. having to do with or designating the form of a word that indicates only one.

C. a series of actions used to produce something or reach a goal.

D. to tell or write about; create a picture of in words.

27. stimulus

A. something that causes or increases action, feeling, or thought.

B. something made by means of either human work or that of a machine.

C. to tell the story of.

D. a thing made up of a number of parts joined together in a certain way.

28. structure

A. more than is needed or usual; extra.

B. to tell or write about; create a picture of in words.

C. a thing made up of a number of parts joined together in a certain way.

D. a written or spoken answer; reply.

29. tentacle

A. to adapt and conform.

B. the processes in plants and animals by which food is changed into energy or used to make cells and tissues.

C. a series of actions used to produce something or reach a goal.

D. a long thin body part on the head or around the mouth of some animals. _____ are used for feeling or taking hold of things.

30. toxic

A. to shorten the time or length of.

B. the act of breathing.

C. something that is needed or necessary.

D. having to do with or made of a poison; poisonous.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. structure		something that causes or increases action, feeling, or thought.
2. respiration		a thing made up of a number of parts joined together in a certain way.
3. describe		the statement of the meaning of a word or phrase.
4. classify		to put or order into groups of similar things.
5. assimilate		the act of breathing.
6. stimulus		to tell or write about; create a picture of in words.

7. singular		having to do with or designating the form of a word that indicates only one.
8. definition		to adapt and conform.
9. organism		to move downward or to a lower position.
10. introduce		something made by means of either human work or that of a machine.
11. descend		something that makes a person or thing different from others.
12. response		a written or spoken answer; reply.
13. metabolism		something in food that helps people, animals, and plants live and grow.
14.characteristic		an individual living thing, such as a plant, an animal, or a bacteria.
15. product		the processes in plants and animals by which food is changed into energy or used to make cells and tissues.
16. nutrient		to present to another person.
17. involve		having to do with or made of a poison; poisonous.
18. reproduction		the smallest unit of a substance that has all the properties of that substance. A __ is made up of a single atom or group of atoms.
19. toxic		a copy of something.
20. process		a series of actions used to produce something or reach a goal.
21. molecule		more than is needed or usual; extra.
22. sensitivity		the quality of being acutely responsive mentally or emotionally.
23. reproduce		to have as a necessary part or result; include.
24. excess		to make a copy of.
25. tentacle		a long thin body part on the head or around the mouth of

		some animals. __ are used for feeling or taking hold of things.
26. abbreviate		to tell the story of.
27. absorb		to take in or soak up.
28. ancestor		a person from whom one is descended and who lived several generations ago.
29. requirement		to shorten the time or length of.
30. relate		something that is needed or necessary.

5. Complete these sentences using the words on this list:

abbreviate, characteristic, descend, introduce, involve, organism, reproduction, requirement, ancestor, describe, excess, molecule, product, reproduce, response, singular, toxic, sensitivity, structure, absorb, classify, definition, introduce, nutrient, relate, stimulus, tentacle, assimilate, metabolism, process, respiration

1) Water is a _____ for all living things.
2) The soil is full of _____, such as earthworms, bacteria, and fungi.
3) Her _____ makes her an excellent therapist.
4) An angel _____ from the heavens.
5) I have a _____ of the Mona Lisa in my room.
6) Tails that can grasp things are a _____ of monkeys.
7) When told he would have only fifteen minutes to speak, John _____ his speech.
8) Police work _____ some danger.
9) Could you _____ me to that girl you were talking to?
10) A human cell is a complicated _____.
11) The word "kitten" is a _____ noun.
12) This store sells all kinds of paper _____.
13) Each _____ of water has one hydrogen and two oxygen atoms.
14) There were _____ brownies at the picnic because everyone brought some.

15) Her _____ came to America from China in the middle of the 1800s.
16) The factory spilled _____ waste into the lake.
17) The furniture maker _____ a chair made hundreds of years ago.
18) I wrote to my senator and received a _____.
19) The airplane is beginning to _____ now.
20) He _____ the costumes worn in the movie to all of his friends.
21) Mom says I should just _____ myself to people, but I think it's embarrassing.
22) The traveler _____ his adventures in Alaska.
23) A paper towel will _____ the spilled milk.
24) Hearing the great pianist perform was a _____ to practice harder.
25) He _____ his coin collection according to type and age.
26) Baseball _____ throwing, catching, and batting a ball.
27) If you don't get enough _____, you may become sick.
28) This dictionary gives two _____ for the word "deed."
29) Octopus and squid have _____.
30) We are learning the _____ of milking cows.
31) Mice have a high rate of _____.
32) _____ slows down during sleep.
33) Adult immigrants tended to hang on to their language and traditional ways, whereas the children usually _____.

6. Translate the text into Ukrainian.

All living things have seven characteristics: reproduction, nutrition, respiration, growth, excretion, movement and sensitivity.

Living organisms are classified into groups according to how closely related they are. Each species of organism is given a unique two-word Latin name called a

binomial. The first word of the binomial is the genus and the second word is the species.

Vertebrates are classified into five classes: fish, amphibians, reptiles, birds and mammals. They each have their own distinctive set of features. For example, amphibians have a smooth skin, fish and reptiles have scales, birds have feathers and scales, and mammals have hair.

Arthropods are invertebrates with jointed legs and segmented bodies. They can be further classified into arachnids, myriapods, insects and crustaceans.

Annelids are worms with segmented bodies but no legs.

Nematodes are worms with unsegmented bodies.

Molluscs have unsegmented bodies, and often have a shell.

Bacteria are single-celled organisms whose cells do not have nuclei.

Fungi include moulds, mushrooms and toadstools. They have cells with cell walls but do not photosynthesize.

Viruses are not generally considered to be alive at all. They are not made of cells and cannot carry out any of the characteristics of living things on their own.

Flowering plants can be classified into monocotyledonous plants and dicotyledonous plants. Monocots have seeds with one cotyledon, and their leaves often have parallel veins. Dicots have seeds with two cotyledons, and their leaves generally have branching veins.

A dichotomous key is a set of paired contrasting descriptions which lead you through to the identification of an unknown organism.

Unit 5.
THE FIVE KINGDOMS AND CLASSIFYING ORGANISMS

2. Learn the active vocabulary to the text.

animal	[noun]	(adv.) a living creature that is generally distinguished from plants by its cellular structure and by the ability to move voluntarily.
backbone	[noun]	(adv.) the series of bones that run along the center of the back; spinal column; vertebrae.
bacteria	[noun]	(adv.) plural of bacterium. Bacteria are one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that, in some cases, cause disease. Rabies is a deadly disease caused by bacteria. Bacteria that are beneficial to digestion live in the human digestive tract.
bacterium	[noun]	(adv.) any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.
class	[noun]	(adv.) a group of animals or things in which all members share certain characteristics; kind. Cars will race against others of the same class.
contain	[transitive verb]	(adv.) to hold or have within. Cheese contains a good deal of salt. The building contains two sets of staircases. Wine contains more alcohol than beer.
fungi	[plural noun]	(adv.) a plural form of fungus.

genus	[noun]	(adv.) one of the categories used in classifying living organisms, larger than a species but smaller than a family.
inhabit	[transitive verb]	(adv.) to live in; use as a dwelling. Early humans inhabited these caves. Jaguars still inhabit this part of the rainforest. The city is inhabited by over ten million people.
invertebrate	[adjective]	(adv.) without a spinal column or backbone. A slug is an invertebrate animal.
kingdom	[noun]	(adv.) a country that is ruled by a king or queen. The two neighboring kingdoms had been at peace for some time.
membrane	[noun]	(adv.) a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms. Membranes connect the toes of frogs.
molecule	[noun]	(adv.) a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.
multicellular	[adjective]	(adv.) composed of many cells.
order	[noun]	(adv.) a direction or command. Soldiers must the follow orders of their commanding officers.
organic	[adjective]	(adv.) producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like. Some of the smaller farms in the area have taken up

		organic farming. You can get all kinds of organic produce at the farmers market.
phylum	[noun]	(adv.) the principal subdivision of animals, and of some classifications of plants, according to their major shared characteristics, each subdivision containing one or more classes.
plant	[noun]	(adv.) a living organism of the vegetable group. The trees, ferns, and all other plants on the mountainside were destroyed by the fire. Only very hardy plants are able to survive under these desert conditions.
species	[noun]	(adv.) in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other species; subdivision of a genus.
surround	[transitive verb]	(adv.) to encompass by closing off all sides. The wall surrounds the town.
vascular	[adjective] [noun]	(adv.) composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts. the human vascular system.
vertebrate	[adjective]	(adv.) having a backbone.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

The Five Kingdoms and Classifying Organisms

Life began as very simple molecules that were bound by membranes. Eventually, these membrane-bound molecules were assembled into more complex structures we call cells. These cells evolved into many forms and even became multicelled collections, leading to organisms such as ourselves. All these organisms adapted to their environment and have characteristics that distinguish them from each other. Scientists have developed systems to organize and classify all of Earth's organisms.

Kingdoms

Life first appeared on Earth as very simple, very tiny microorganisms. These creatures were mostly groups of organic molecules surrounded by a membrane. However, they could feed themselves in some fashion and were able to grow and reproduce. Gradually, over time and through the process of evolution, organisms assumed new forms. Eventually, life on Earth developed into many diverse forms and formed complex relationships. We have been able to organize life into five large groupings called *Kingdoms*. Each Kingdom contains organisms that share significant characteristics that distinguish them from organisms in the other

Kingdoms. The five Kingdoms are Animals, Plants, Fungi, Protists, and Bacteria.

The Animal Kingdom

The organisms classified into this Kingdom are multicellular and, because they do not have chlorophyll, are unable to photosynthesize. We call them *heterotrophs*, meaning "eater of others," because they must eat preexisting organic matter (either plants or other animals) to sustain themselves. Animals have tissues that are more complexly constructed than plants and one-celled organisms. Animals also possess nervous tissue, which has reached high stages of development into nervous systems and brains. Animals are able to move from place to place (locomote) using their muscular systems. We usually divide the Animal Kingdom into two large groups, the vertebrates (animals with backbones) and the invertebrates (animals without backbones).

The Plant Kingdom

Plants are multicellular organisms that use chlorophyll in specialized cellular structures called *chloroplasts* to capture sunlight energy and convert it into organic matter. We refer to plants as *autotrophs* (self-feeders). Also included in the Plant Kingdom are algae that are not multicellular, but are cells with a nucleus (unlike bacteria). Besides the algae, most plants are divided into one of two groups, the *nonvascular plants* (such as mosses) and the *vascular plants* (such as most crops, trees, and flowering plants). Vascular plants have specialized tissue that allows them to transport water and nutrients from their roots to their leaves and back again, even when the plant is several hundred feet tall. Nonvascular plants cannot do this and remain very small in size. Vascular plants are able to inhabit moist as well as dry environments, whereas nonvascular plants are mostly found in moist, marshy areas because they have no vascular tissue to transport water.

The Fungi Kingdom

Organisms in this Kingdom share some similarities with plants yet maintain other characteristics that make them more animal-like. They lack chlorophyll and cannot perform photosynthesis, so they don't produce their own food and are called *heterotrophs*. However, they reproduce by spores like plants do. They also resemble plants in appearance. The most common representative organisms in this Kingdom are mushrooms, yeasts, and molds. Fungi are very common and are a major benefit to other organisms, including humans. The bodies of fungi are made of filaments called *hyphae*. In large fungi, the hyphae interconnect to form tissue called *mycelium*. The largest organism in the world is believed to be a soil fungus whose mycelium tissue extends for many acres.

The Protist Kingdom

This Kingdom includes single-celled organisms that contain a nucleus as part of their structure. They are a relatively simple cell, but still contain many structures and perform many functions. This Kingdom includes organisms such as paramecium, euglena, amoeba, and slime molds. They often move around using *cilia* or *flagellums*.

The Moneran Kingdom

This Kingdom contains bacteria. All these organisms are single celled and do not contain a nucleus. They have only one chromosome for carrying genetic information, although sometimes they also transmit genetic information using small structures called *plasmids*. They also use flagella to move, like the protists, but their flagella has a different and simpler structure than the protists. They usually reproduce asexually. The bacteria *E. coli (Escherichia coli)* is a member of this Kingdom.

KINGDOM	**SINGLE OR MULTICELLED**	**CONTAINS A NUCLEUS**	**PERFORMS PHOTOSYNTHESIS**
Animal	Multicelled	Yes	No, heterotrophic
Plant	Multicelled	Yes	Yes, autotrophic
Fungi	Single and multicelled	Yes	No, heterotrophic
Protist	Single celled	Yes	Both, auto and heterotrophic
Moneran	Single celled	No	Both, auto and heterotrophic

Levels of Classification

A grouping as large as a Kingdom is not very specific and contains organisms defined by broad characteristics. Other levels of classification become gradually more specific until we define an actual specific organism. To classify organisms, we generally start out by grouping them into the appropriate Kingdom. Within each Kingdom, we further subdivide organisms into other groupings. As an example, let's take the wolf:

Kingdom: Animal

Phylum: Chordates (This means the wolf had a notochord that developed into its backbone.)

Class: Mammals (This means the wolf has hair, bears live young, and nurses them with mammary glands.)

Order: Carnivores (This means the wolf is a meat eater.)

Family: *Canids* (This means the wolf has nonretractable claws, a long muzzle, and separate toes.)

Genus: *Canis* (This means the wolf is a member of the dog family.)

Species: *lupus* (This refers to a particular type of wolf known as the European wolf.)

The previous categories form the most common scheme for classifying organisms, although other groupings and other categories are often used. The reason for developing a classifying system is so that we have consistency in how we refer to an organism. If we didn't have this system, then the European wolf described previously would be called wolf in English, *lobo* in Spanish, and *loup* in French. This leads to confusion and a loss of scientific accuracy.

Binomial Nomenclature

The system illustrated here is based on a system developed by Carlos Linneaus. It is called *binomial nomenclature* because in this system, any organism can be positively identified by two Latin words. The other words used previously illustrate where the named organism fits into the whole scheme, but it is only the last two, the Genus and species words, that specifically name an organism. The Genus name is always capitalized and written in italics, whereas the species name is written lowercase but also in italics. Thus, the European wolf is *Canis lupus*, *Canis familiaris* is the common dog, *Felis tigrina* is a tiger, *Felis domesticus* is a common cat, and humans are *Homo sapiens*.

How to Remember the Classification Scheme

Here is an easy way to remember the terms used in this classification scheme:

Kings **P**lay **C**ards **O**n **F**riday, **G**enerally **S**peaking. If you take the first letter of each word in the sentence and apply it to the proper term in the classification

scheme, you will get the following: **K**ingdom, **P**hylum, **C**lass, **O**rder, **F**amily, **G**enus, **S**pecies

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. animal

A. having a backbone.

B. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

C. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

D. a living creature that is generally distinguished from plants by its cellular structure and by the ability to move voluntarily.

2. backbone

A. the series of bones that run along the center of the back; spinal column; vertebrae.

B. to hold or have within.

C. a living organism of the vegetable group.

D. producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like.

3. bacteria

A. having a backbone.

B. plural of bacterium. _____ are one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that, in some cases, cause disease.

C. a group of animals or things in which all members share certain characteristics; kind.

D. composed of many cells.

4. bacterium

A. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

B. without a spinal column or backbone.

C. the principal subdivision of animals, and of some classifications of plants, according to their major shared characteristics, each subdivision containing one or more classes.

D. a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.

5. class

A. a living organism of the vegetable group.

B. a group of animals or things in which all members share certain characteristics; kind.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. without a spinal column or backbone.

6. contain

A. the series of bones that run along the center of the back; spinal column; vertebrae.

B. to hold or have within.

C. composed of many cells.

D. a direction or command.

7. fungi

A. a plural form of fungus.

B. one of the categories used in classifying living organisms, larger than a species but smaller than a family.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. a country that is ruled by a king or queen.

8. genus

A. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

B. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

C. composed of many cells.

D. one of the categories used in classifying living organisms, larger than a species but smaller than a family.

9. inhabit

A. a living organism of the vegetable group.

B. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

C. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

D. to live in; use as a dwelling.

10. invertebrate

A. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

B. having a backbone.

C. to hold or have within.

D. without a spinal column or backbone.

11. kingdom

A. a plural form of fungus.

B. a direction or command.

C. producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like.

D. a country that is ruled by a king or queen.

12. membrane

A. composed of many cells.

B. a group of animals or things in which all members share certain characteristics; kind.

C. a living creature that is generally distinguished from plants by its cellular structure and by the ability to move voluntarily.

D. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

13. molecule

A. having a backbone.

B. without a spinal column or backbone.

C. a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.

D. one of the categories used in classifying living organisms, larger than a species but smaller than a family.

14. multicellular

A. the principal subdivision of animals, and of some classifications of plants, according to their major shared characteristics, each subdivision containing one or more classes.

B. a plural form of fungus.

C. composed of many cells.

D. a group of animals or things in which all members share certain characteristics; kind.

15. order

A. a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.

B. a direction or command.

C. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

D. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

16. organic

A. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

B. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

C. composed of many cells.

D. producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like.

17. phylum

A. to encompass by closing off all sides.

B. producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like.

C. a plural form of fungus.

D. the principal subdivision of animals, and of some classifications of plants, according to their major shared characteristics, each subdivision containing one or more classes.

18. plant

A. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

B. a living organism of the vegetable group.

C. plural of bacterium. _____ are one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that, in some cases, cause disease.

D. one of the categories used in classifying living organisms, larger than a species but smaller than a family.

19. species

A. without a spinal column or backbone.

B. one of the categories used in classifying living organisms, larger than a species but smaller than a family.

C. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

D. a living creature that is generally distinguished from plants by its cellular structure and by the ability to move voluntarily.

20. surround

A. to live in; use as a dwelling.

B. a direction or command.

C. to encompass by closing off all sides.

D. to hold or have within.

21. vascular

A. a plural form of fungus.

B. a group of animals or things in which all members share certain characteristics; kind.

C. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

D. to encompass by closing off all sides.

22. vertebrate

A. having a backbone.

B. without a spinal column or backbone.

C. a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.

D. a direction or command.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. membrane		a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.
2. animal		one of the categories used in classifying living organisms, larger than a species but smaller than a family.
3. inhabit		any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.
4. bacterium		to live in; use as a dwelling.
5. kingdom		plural of bacterium. __ are one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that, in some cases, cause disease.
6. vertebrate		a country that is ruled by a king or queen.
7. bacteria		a living creature that is generally distinguished from plants by its cellular structure and by the ability to move voluntarily.
8. genus		having a backbone.
9. fungi		to hold or have within.
10. contain		a living organism of the vegetable group.
11. invertebrate		composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.
12. class		without a spinal column or backbone.

13. vascular		a group of animals or things in which all members share certain characteristics; kind.
14. order		a plural form of fungus.
15. surround		a direction or command.
16. plant		to encompass by closing off all sides.
17. species		in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other __; subdivision of a genus.
18. phylum		composed of many cells.
19. backbone		a single atom or several atoms bound together electromagnetically, forming the smallest particle that possesses all the characteristic physical and chemical properties of an element or compound.
20. multicellular		the series of bones that run along the center of the back; spinal column; vertebrae.
21. molecule		the principal subdivision of animals, and of some classifications of plants, according to their major shared characteristics, each subdivision containing one or more classes.
22. organic		producing or produced naturally, as food, without the use of chemical pesticides, growth enhancers, additives, and the like.

5. Complete these sentences using the words on this list:

class, inhabit, invertebrate, membrane, order, organic, plant, surround, vascular, bacteria, contain, kingdom

1) _____ that are beneficial to digestion live in the human digestive tract.

2) Wine _____ more alcohol than beer.

3) Cheese _____ a good deal of salt.

4) Rabies is a deadly disease caused by _____.

5) The two neighboring _____ had been at peace for some time.

6) The city is _____ by over ten million people.

7) The building _____ two sets of staircases.

8) Only very hardy _____ are able to survive under these desert conditions.

9) You can get all kinds of _____ produce at the farmers market.1. Some of the smaller farms in the area have taken up _____ farming.

10) A slug is an _____ animal.

11) Jaguars still _____ this part of the rainforest.

12) Soldiers must the follow _____ of their commanding officers.

13) The trees, ferns, and all other _____ on the mountainside were destroyed by the fire.

14) Cars will race against others of the same _____.

15) Early humans _____ these caves.

16) _____ connect the toes of frogs.

17) The human _____ system is extremely complex.

18) The wall _____ the town.

6. Test your knowledge on the topic.

1. A feature that distinguishes organisms from the Kingdom Monera is that their cells

a. contain specialized organelles.

b. contain a nucleus.

c. contain chloroplasts.

d. lack a nucleus.

2. Which of the following statements is true about the binomial nomenclature system of classification?

a. The genus and species names describe a specific organism.

b. The category of Kingdom is very specific.

c. The category of species is very broad.

d. Three names are needed to correctly specify a particular organism.

3. Which Kingdom contains organisms that have plant-like and animal-like characteristics?

a. Animal Kingdom

b. Plant Kingdom

c. Fungi Kingdom

d. Moneran Kingdom

4. Which of the following answers has the different classification levels in the correct order from most general to most specific?

a. Kingdom, Phylum, Class, Order, Family, *Genus, species*

b. Order, Family, *Genus, species,* Class, Phylum, Kingdom

c. *species, Genus,* Family, Order, Class, Phylum, Kingdom

d. Kingdom, Phylum, Class, *species, Genus,* Family, Order

5. Which of the following Kingdom's members are multicellular AND autotrophic?

a. Fungi

b. Animal

c. Protist

d. Plant

6. Which of the following Kingdom's members have tissue called mycelium?

a. Fungi

b. Animal

c. Protist

d. Plant

7. Translate the text into Ukrainian.

Biologists classify organisms based on shared characteristics among groups. The largest level of groupings is the Kingdoms, which consist of Animal, Plant, Fungi,

Protist, and Moneran. The Kingdoms are further subdivided into Phylum, Class, Order, Family, Genus, and species. The Genus and species designations form a two-name system, called binomial nomenclature, that specifically identifies a particular organism (for example, humans are designated *Homo sapiens*).

Unit 6.
MICROORGANISMS

3. Learn the active vocabulary to the text.

airborne	[adjective]	(adv.) borne or carried in the air. airborne seeds.
atmosphere	[noun]	(adv.) the mass of gases surrounding the earth or any other celestial body. The ozone layer is a part of the Earth's atmosphere.
bacterium	[noun]	(adv.) any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.
chain	[noun]	(adv.) a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation. The prisoners were connected to each other by chains. She put the dog outside on his chain. He wore a gold chain around his neck.
coagulate	[transitive verb]	(adv.) to cause (a liquid) to thicken into a semisolid mass. Enzymes coagulate the milk in the cheese-making process.
consume	[transitive verb]	(adv.) to eat, drink, or ingest. The prisoner hungrily consumed his meal. You consume quite a lot of coffee every day. It’s important to know how many pills the child consumed.
destroy	[transitive	(adv.) to damage beyond repair; ruin.

	verb]	The fire destroyed the entire building. Most of the city was destroyed by the bombings.
eliminate	[transitive verb]	(adv.) to dispose of, remove, or destroy. Many cleaning products claim to eliminate germs. The corrupt and ruthless leader found ways to eliminate his enemies.
enzyme	[noun]	(adv.) any of a large number of proteins that act as catalysts for chemical reactions within living things. Amylase is a digestive enzyme present in saliva.
food chain	[noun]	(adv.) a succession of living organisms in which each serves as food for the next.
fungi	[plural noun]	(adv.) a plural form of fungus.
genetic	[adjective]	(adv.) of, concerning, caused by, or influenced by heredity, especially by genes. genetic engineering.
microbe	[noun]	(adv.) any microscopic life form, especially considered as a cause of infection or disease.
microorganism	[noun]	(adv.) any microscopic life form such as a bacterium, protozoan, or virus.
moisture	[noun]	(adv.) a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.
nucleus	[noun]	(adv.) the central, essential, or highly concentrated part around which other parts are grouped. The harbor became the nucleus of a booming city.
photosynthesis	[noun]	(adv.) the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical

		energy that is used to synthesize inorganic compounds into organic ones, especially sugars.
population	[noun]	(adv.) the collective human inhabitants of an area. He was elected by a large majority of the population. The famine devastated the country's population.
primitive	[adjective]	(adv.) of, pertaining to, or at an early stage or undeveloped condition. Life changed dramatically for primitive humans when they learned how to use fire. I have only a primitive understanding of how computers work.
relationship	[noun]	(adv.) any of various kinds of association between people.
transmission	[noun]	(adv.) the act or process of transmitting, or the fact or condition of being transmitted.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Microorganisms

Microorganisms (microbes) are very small, and most of them cannot be seen with the unaided eye, requiring the use of a microscope or at least a magnifying lens. We can also detect microorganisms by chemical tests. These living beings are everywhere, even in extreme environments such as very hot springs, very cold and dry areas, and even deep in the ocean under tremendous pressure. Some of these organisms cause diseases in animals, plants, and humans; however, most are beneficial to us and the Earth’s ecosystems. In fact, we are utterly dependent upon microbes for our quality of life. This lesson will discuss three types of microorganisms: bacteria, protists, and fungi.

Bacteria

Bacteria are microorganisms that do not have a true nucleus; their genetic material is free floating within the cell. Bacteria are very small one-celled organisms and do not contain very complex cell structures. Generally, bacteria come in three varieties: *bacilli* (rod-shaped), *cocci* (sphere-shaped), and *spirilla* (spiral-shaped). Bacteria are prevalent in all environments and are important members of an ecosystem. They are responsible for the breakdown of dead organic matter into its constituent molecules. For this reason, we call bacteria decomposers. They also can be eaten by other organisms and are thus valuable in food-chain relationships. Since bacteria are small, can divide asexually very rapidly, can live practically anywhere, and have great metabolic versatility, they are the most numerous organisms on Earth. Many bacteria, when placed in good conditions, can reproduce every 20 or 30 minutes, each doubling its population after each reproduction.

Benefits of Bacteria

To illustrate the importance of bacteria, let's look at the cycling of the element nitrogen that is used by organisms to make proteins. We will start with dead plants that are being decomposed by bacteria. The nitrogen from the plant tissue is released into the atmosphere, and nitrifying bacteria converts that nitrogen into ammonia-type compounds. Other bacteria act upon these compounds to form nitrates that plants absorb. When these new plants die, we are back again at the decomposing bacteria that release the plant's nitrogen back into the atmosphere.

Bacteria are even in our intestinal tracts to aid in the digestion of food and the manufacturing of vitamins. We derive many benefits from bacteria, but they can also cause us to suffer with diseases.

Bacterial Diseases

Microorganisms, including bacteria, cause many diseases. These organisms enter our bodies in a variety of ways, including airborne transmission, ingestion by mouth, or through the skin when it is cut or injured. We can eliminate this threat by disinfecting utensils and hands or even by the sterilization of objects (the

application of high-pressure steam heat). All these methods destroy bacteria and other microorganisms that may cause disease.

Protists

This group is composed of single-celled organisms that have their genetic material contained within a nucleus and have some specialized structures within their cells.

These organisms are considered to be more primitive than other organisms with cellular nuclei, but they are more evolved than bacteria (Kingdom Monera). This is a diverse Kingdom consisting of organisms with varied structures and functions, such as amoeba and paramecium. Some of this Kingdom's members are autotrophic and contain chlorophyll, whereas others are heterotrophic and must eat other organisms. It is believed that early protists were both animal- and plant-like because they were able to obtain food in both ways. Today, a protist called Euglena does this. Protists are important parts of food chains and ecosystems, and some protists cause disease.

Fungi

The Kingdom Fungi contains single-celled organisms that are heterotrophic in the sense that they do not contain chlorophyll and cannot photosynthesize. Other fungi are multicellular and not microorganisms but function in much the same way as the microscopic forms. However, it is more accurate to describe the ability of multicellular fungi to obtain food in three ways. Saprophytic fungi consume dead organic matter, parasitic fungi attack living plants and animals, and mycorrhizal-associated fungi form close relationships with trees, shrubs, and other plants, where each partner in the relationship mutually benefits. Fungi produce spores that are very resistant to temperature and moisture extremes. These spores can travel to new areas, thus spreading the fungi organism. The spores can survive for a long time, even in inhospitable environments. When conditions change and become more favorable, the spores germinate and grow. Food is absorbed through structures called *hyphae*. A large mass of interconnected, branching hyphae is called the *mycelium,* which constitutes the main body of the multicellular fungi.

However, the mycelium is usually not seen because it is hidden throughout the food source being consumed. What is most often visible is the fungal fruiting body. A mushroom is a fruiting body that contains the spores. The main body of the mushroom (the mycelium) is under the soil surface. An organism called *lichen* is a mutually beneficial union of a fungus and an alga. Because fungi consume dead organic matter, they play an important decomposition role in an ecosystem. Their actions return nutrients to the soil for eventual uptake by plants.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. airborne

A. borne or carried in the air.

B. the central, essential, or highly concentrated part around which other parts are grouped.

C. of, pertaining to, or at an early stage or undeveloped condition.

D. any microscopic life form, especially considered as a cause of infection or disease.

2. atmosphere

A. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

B. the mass of gases surrounding the earth or any other celestial body.

C. the central, essential, or highly concentrated part around which other parts are grouped.

D. any of a large number of proteins that act as catalysts for chemical reactions within living things.

3. bacterium

A. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

B. any of a large number of proteins that act as catalysts for chemical reactions within living things.

C. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

D. any of various kinds of association between people.

4. chain

A. to dispose of, remove, or destroy.

B. the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical energy that is used to synthesize inorganic compounds into organic ones, especially sugars.

C. the mass of gases surrounding the earth or any other celestial body.

D. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

5. coagulate

A. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

B. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

C. any microscopic life form such as a bacterium, protozoan, or virus.

D. to cause (a liquid) to thicken into a semisolid mass.

6. consume

A. any microscopic life form, especially considered as a cause of infection or disease.

B. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

C. to eat, drink, or ingest.

D. any microscopic life form such as a bacterium, protozoan, or virus.

7. destroy

A. to cause (a liquid) to thicken into a semisolid mass.

B. to dispose of, remove, or destroy.

C. any of various kinds of association between people.

D. to damage beyond repair; ruin.

8. eliminate

A. any microscopic life form such as a bacterium, protozoan, or virus.

B. to eat, drink, or ingest.

C. to dispose of, remove, or destroy.

D. a plural form of fungus.

9. enzyme

A. the mass of gases surrounding the earth or any other celestial body.

B. to dispose of, remove, or destroy.

C. the collective human inhabitants of an area.

D. any of a large number of proteins that act as catalysts for chemical reactions within living things.

10. food chain

A. a succession of living organisms in which each serves as food for the next.

B. the central, essential, or highly concentrated part around which other parts are grouped.

C. of, pertaining to, or at an early stage or undeveloped condition.

D. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

11. fungi

A. the collective human inhabitants of an area.

B. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

C. a plural form of fungus.

D. any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

12. genetic

A. a plural form of fungus.

B. a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.

C. of, concerning, caused by, or influenced by heredity, especially by genes.

D. to cause (a liquid) to thicken into a semisolid mass.

13. microbe

A. of, concerning, caused by, or influenced by heredity, especially by genes.

B. borne or carried in the air.

C. to dispose of, remove, or destroy.

D. any microscopic life form, especially considered as a cause of infection or disease.

14. microorganism

A. any microscopic life form, especially considered as a cause of infection or disease.

B. any microscopic life form such as a bacterium, protozoan, or virus.

C. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

D. the collective human inhabitants of an area.

15. moisture

A. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

B. the mass of gases surrounding the earth or any other celestial body.

C. any of various kinds of association between people.

D. a plural form of fungus.

16. nucleus

A. the collective human inhabitants of an area.

B. any microscopic life form, especially considered as a cause of infection or disease.

C. the central, essential, or highly concentrated part around which other parts are grouped.

D. to eat, drink, or ingest.

17. photosynthesis

A. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

B. to cause (a liquid) to thicken into a semisolid mass.

C. of, pertaining to, or at an early stage or undeveloped condition.

D. the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical energy that is used to synthesize inorganic compounds into organic ones, especially sugars.

18. population

A. the collective human inhabitants of an area.

B. to eat, drink, or ingest.

C. the act or process of transmitting, or the fact or condition of being transmitted.

D. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

19. primitive

A. of, pertaining to, or at an early stage or undeveloped condition.

B. the act or process of transmitting, or the fact or condition of being transmitted.

C. a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.

D. the central, essential, or highly concentrated part around which other parts are grouped.

20. relationship

A. to dispose of, remove, or destroy.

B. any of various kinds of association between people.

C. the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical energy that is used to synthesize inorganic compounds into organic ones, especially sugars.

D. to cause (a liquid) to thicken into a semisolid mass.

21. transmission

A. of, pertaining to, or at an early stage or undeveloped condition.

B. the act or process of transmitting, or the fact or condition of being transmitted.

C. the collective human inhabitants of an area.

D. to dispose of, remove, or destroy.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. eliminate		the collective human inhabitants of an area.
2. food chain		a succession of living organisms in which each serves as food for the next.
3. atmosphere		of, pertaining to, or at an early stage or undeveloped condition.
4. population		to dispose of, remove, or destroy.
5. transmission		the mass of gases surrounding the earth or any other celestial body.
6. primitive		the central, essential, or highly concentrated part around which other parts are grouped.
7. consume		the act or process of transmitting, or the fact or condition of being transmitted.
8. nucleus		to eat, drink, or ingest.
9. bacterium		a plural form of fungus.
10. destroy		any microscopic life form, especially considered as a cause of infection or disease.
11. genetic		to damage beyond repair; ruin.
12. microorganism		any microscopic life form such as a bacterium, protozoan, or virus.
13. chain		a small amount of diffused or condensed liquid, especially water, felt as vapor in the air or as dampness on surfaces.
14. moisture		any of a large group of one-celled microscopic organisms of various shapes that are often agents of fermentation and putrefaction and that may cause disease.

15. microbe		of, concerning, caused by, or influenced by heredity, especially by genes.
16. fungi		a series of connected links, usually made of metal, used for attaching, pulling, binding, or ornamentation.
17. relationship		borne or carried in the air.
18. coagulate		the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical energy that is used to synthesize inorganic compounds into organic ones, especially sugars.
19. photosynthesis		any of various kinds of association between people.
20. airborne		to cause (a liquid) to thicken into a semisolid mass.
21. enzyme		any of a large number of proteins that act as catalysts for chemical reactions within living things.

5. Complete these sentences using the words on this list:

atmosphere, chain, coagulate, consume, eliminate, enzyme, genetic, nucleus, primitive, airborne, destroy, population

1) She put the dog outside on his _____.
2) Enzymes _____ the milk in the cheese-making process.
3) The harbor became the _____ of a booming city.
4) Many cleaning products claim to _____ germs.
5) I have only a _____ understanding of how computers work.
6) The corrupt and ruthless leader found ways to _____ his enemies.
7) It's important to know how many pills the child _____.
8) Amylase is a digestive _____ present in saliva.
9) The ozone layer is a part of the Earth's _____.

10) _____ engineering an important field of modern science.
11) The fire _____ the entire building.
12) He wore a gold _____ around his neck.
13) The prisoner hungrily _____ his meal.
14) Most of the city was _____ by the bombings.
15) He was elected by a large majority of the _____.
16) The prisoners were connected to each other by _____.
17) You _____ quite a lot of coffee every day.
18) The famine devastated the country's _____.
19) Life changed dramatically for _____ humans when they learned how to use fire.

6. Test your knowledge on the topic.

1. Fungi consume dead organic matter and thus play an important role in an ecosystem by

a. making nutrients available for recycling back
into the soil.

b. producing oxygen by photosynthesizing.

c. producing oxygen by respiration.

d. living in mostly aquatic environments.

2. Just in numbers alone (but not necessarily mass), which microorganism is the most numerous organism on Earth?

a. paramecium from the Protist Kingdom

b. yeast from the Fungi Kingdom

c. euglena from the Protist Kingdom

d. bacteria from the Moneran Kingdom

3. Which Kingdom contains organisms that are able to produce nitrates from the nitrogen in the air?

a. Animal

b. Plant

c. Moneran

d. Protist

4. Why do members of the Fungi Kingdom produce spores?

a. They are resistant to environmental conditions.

b. They contain special enzymes.

c. They are able to photosynthesize.

d. They are part of the support system.

5. Which of the following is true about the protest euglena?

a. It can only photosynthesize under certain conditions.

b. It is only heterotrophic.

c. It is both autotrophic and heterotrophic.

d. It has no chloroplasts.

6. Members of the Kingdom Monera are found in our digestive tracts and perform which of the following functions?

a. produce carbohydrates

b. produce vitamins

c. produce lipids

d. produce proteins

7. Translate the text into Ukrainian.

The general grouping of microorganisms (microbes) includes the bacteria (one-celled organisms without a true nucleus, also called prokaryotes) and the protists (one-celled organisms with a true nucleus, also called eukaryotes, along with all other organisms besides the bacteria). Single-celled fungi (yeasts) are also microorganisms, but multi-celled fungi also exist in abundance. We are completely dependent upon the action of microorganisms, and many more of them are beneficial rather than harmful.

Microorganisms (microbes) bacteria, protists, fungi nucleus; genetic decomposer food chain relationships population atmosphere airborne transmission eliminate destroy primitive consume photosynthesis coagulation multi-celled moisture enzyme

Unit 7.
PLANTS

4. Learn the active vocabulary to the text.

also	[adverb]	(adv.) in addition; as well; too. They have an apartment in the city and a house in the country also. She works as an artist and also as a musician.
bryophyte	[noun]	(adv.) any of the group of plants that consists of the true mosses, peat mosses, hornworts, and liverworts.
carbon dioxide	[noun]	(adv.) a colorless, odorless, incombustible gas that is produced naturally in breathing, combustion, and decomposition, and commercially for use in dry ice, fire extinguishers, and carbonated beverages.
cellulose	[noun]	(adv.) an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.
chlorophyll	[noun]	(adv.) the green pigment in the leaves and stems of plants that is necessary for the production of plant food by photosynthesis.
contain	[transitive verb]	(adv.) to hold or have within. Cheese contains a good deal of salt. The building contains two sets of staircases. Wine contains more alcohol than beer. (adv.) to have as components or contents; include. The water molecule contains two hydrogen atoms.
development	[noun]	(adv.) the process of developing or bringing to a completed state.

		A frog is called a tadpole during the early stage of its development. The development of the new highway took several years.
dominate	[transitive verb]	(adv.) to control or govern by the use of power or influence; rule. The Soviet Union dominated the smaller communist nations of Eastern Europe. His authoritarian father dominated him to a stifling degree.
evolve	[intransitive verb]	(adv.) to develop gradually; come into being. The revolution evolved during years of suffering. The plan evolved over many weeks of discussion.
extremely	[adverb]	(adv.) in a great degree; very. an extremely hot day.
fern	[noun]	(adv.) any of several flowerless, seedless plants having green, feathery leaves.
flower	[noun]	(adv.) the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.
gas	[noun]	(adv.) matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.
growth	[noun]	(adv.) the process of growing. Babies generally experience rapid growth in the first months of life. The city had undergone tremendous growth during the previous decade.

liverwort	[noun]	(adv.) any of numerous moss-related, flowerless plants that grow in wet places or on tree trunks.
locate	[transitive verb]	(adv.) to find the position or place of. Can you locate the town on the map?
locomotion	[noun]	(adv.) the act of moving or the power to move from one place to another.
moss	[noun]	(adv.) any of numerous small, leafy-stemmed, flowerless green plants that grow in mats on rocks, trees, and moist ground.
nutrient	[noun]	(adv.) a nourishing substance in a food.
oxygen	[noun]	(adv.) a chemical element that has eight protons in each nucleus and that occurs in pure form, as a colorless, odorless gas essential to the respiration of living things, or in important compounds such as water, carbohydrates, and oxide minerals. (symbol: O)
plant	[noun]	(adv.) a living organism of the vegetable group. The trees, ferns, and all other plants on the mountainside were destroyed by the fire. Only very hardy plants are able to survive under these desert conditions.
recognizable	[adjective]	(adv.) that is or can be recognized. He was barely recognizable after his illness Louis Armstrong's recognizable style.
seed	[noun]	(adv.) the small part of a flowering plant that is capable of growing into a new plant.
seedless	[adjective]	(adv.) combined form of seed.
seed plant	[noun]	(adv.) any plant that bears seeds; spermatophyte.
trachea	[noun]	(adv.) the tube in air-breathing animals that carries air

		to the lungs; windpipe.
variety	[noun]	(adv.) the condition or quality of being varied; diversity. The employees complained that the cafeteria food lacked variety. Taking part in these activities gives her life some variety now that she's retired.
vascular	[adjective]	(adv.) composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts. the human vascular system.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Plants

You can usually tell plants from other organisms because they (or parts of their bodies) are green. This is because plants contain a molecule called *chlorophyll*. Chlorophyll acts as a pigment to give plants their green color, but more importantly, it absorbs sunlight energy in the first step of the process known as *photosynthesis*. Plants also have *chloroplasts* and *cell walls*. This lesson introduces the world of plants. Photosynthesis is introduced in a later lesson.

What Is a Plant?

Many diverse organisms are classified within the Plant Kingdom, but they usually share certain characteristics that make them recognizable as plants. They are usually green (or part of their body is green), and they do not have the ability of locomotion, so they stay in one spot. They carry out the process known as *photosynthesis*, which turns carbon dioxide and water into sugars and oxygen gas.

This process takes place in structures called *chloroplasts*. Plant cells have a hard cell wall made of the carbohydrate, *cellulose*.

Diverse Environments and Plants

Plants are found in nearly every place on Earth. They are located in the ocean and on mountaintops, they are in extremely warm and extremely cold places, and they even exist in very dry places like deserts. Plants are dependent upon light, so their access to a source of light is what limits where they can live. Water is also important to plant growth and development because much of plants' support comes from the water contained within its cells by the cell wall.

Long ago, two major groups of land plants evolved from algae, the *bryophytes* or nonvascular plants and the *tracheophytes* or vascular plants.

BRYOPHYTES (NONVASCULAR PLANTS)

These plants lack roots, leaves, and stems, but they do have structures called *rhizoids* (root-like hairs) that absorb water and nutrients. However, the bryophytes have no vessels for conducting water throughout their bodies, so they rely on slow diffusion to distribute water and nutrients. This means that they cannot grow very large because the process of diffusion would be too inefficient to support large bodies. The most representative plants in this grouping are the liverworts and mosses.

TRACHEOPHYTES

Trachea refers to *tube*, and these vascular plants have *tubes* (vessels) that provide support and a means of transporting water and nutrients throughout their bodies. Vascular plants can thus grow very tall, up to hundreds of feet. This group is further broken down into two types, the seedless vascular plants and the seeded vascular plants. Seedless vascular plants include club mosses, horsetails, and ferns. These plants must be in moist environments because they need water to reproduce. Millions of years ago, these types of plants dominated the Earth, and they grew to large sizes. Many of these types of plants are still in existence, but the seed plants have become dominant. The remains of the many seedless plants from millions of

years ago have been transformed into oil and coal by tremendous heat and pressure.

Seed plants have become dominant today because they have developed pollen and seeds as adaptations. *Pollen* is a protective structure that ensures that the sperm cell used in pollination survives harsh conditions until it reaches the female part of a flower and can fertilize the egg found there. *Seeds* are an adaptation that allows these plants to undergo a period of inactivity in their life cycles. The seed contains and protects an immature plant in a state of dormancy. The small plant stays dormant until conditions are favorable, and then it germinates and forms a new plant. Seeds are also very highly adapted to many ways of being dispersed. Some seeds are distributed by wind, some by water, and others by animals. This dispersal is a way plants can establish themselves in new areas because they cannot transport themselves. Seed plants are divided into two groups, flowering and nonflowering plants.

Flowers and Cones

Gymnosperms is the name given to seed plants that do not form flowers. These plants were present on Earth before the flowering seed plants. Representatives of this group include pines, spruce, and cypresses. Gymnosperms are adapted to cold, dry areas. They have very thin, small leaves covered with a waterproof layer that keeps them from drying out. They also retain green leaves all year long (these are the plants we call *evergreens*) so that they can continue making food all year long. They also produce a kind of biological antifreeze in their sap that keeps them from freezing. This substance is what produces the scent from a pine tree, for example. Gymnosperms also produce seeds in cones. *Angiosperms* is the name given to seed plants that do form flowers. These plants now dominate the Earth (even more so than the gymnosperms) and are highly diverse with many different types of plants. The angiosperms have been successful because they have developed flowers, fruits, and broad leaves. Their broad leaves allow them to capture more sunlight and produce more of their own food than the narrow, thin leaves of the gymnosperms.

Their most attractive characteristic is their flowers. *Flowers* are structures that contain the male and female sexual parts where sperm and egg cells are produced.

The structure of flowers is designed to attract animals that will assist in the pollination process. Thus, flowers are colorful and fragrant. They also often offer a "reward" of nectar or pollen that the animal, such as a bee, uses for food.

Additionally, *fruits* are clearly important to animals and humans. They are also important to flowering seed plants because fruits are the remnants of the flower and contain the fully developed seed. The fleshy, sweet-tasting fruit encourages animals to eat them and disperse the seeds they contain.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. also

A. the act of moving or the power to move from one place to another.

B. in addition; as well; too.

C. a colorless, odorless, incombustible gas that is produced naturally in breathing, combustion, and decomposition, and commercially for use in dry ice, fire extinguishers, and carbonated beverages.

D. in a great degree; very.

2. bryophyte

A. any of the group of plants that consists of the true mosses, peat mosses, hornworts, and liverworts.

B. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

C. to develop gradually; come into being.

D. the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.

3. carbon dioxide

A. the condition or quality of being varied; diversity.

B. in a great degree; very.

C. any plant that bears seeds; spermatophyte.

D. a colorless, odorless, incombustible gas that is produced naturally in breathing, combustion, and decomposition, and commercially for use in dry ice, fire extinguishers, and carbonated beverages.

4. cellulose

A. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

B. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

C. the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.

D. to have as components or contents; include.

5. chlorophyll

A. the green pigment in the leaves and stems of plants that is necessary for the production of plant food by photosynthesis.

B. to control or govern by the use of power or influence; rule.

C. any of the group of plants that consists of the true mosses, peat mosses, hornworts, and liverworts.

D. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

6. contain

A. the process of developing or bringing to a completed state.

B. to hold or have within.

C. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

D. the small part of a flowering plant that is capable of growing into a new plant.

7. contain

A. the small part of a flowering plant that is capable of growing into a new plant.

B. to have as components or contents; include.

C. any plant that bears seeds; spermatophyte.

D. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

8. development

A. any plant that bears seeds; spermatophyte.

B. in a great degree; very.

C. the process of developing or bringing to a completed state.

D. to have as components or contents; include.

9. dominate

A. the tube in air-breathing animals that carries air to the lungs; windpipe.

B. to control or govern by the use of power or influence; rule.

C. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

D. the small part of a flowering plant that is capable of growing into a new plant.

10. evolve

A. to find the position or place of.

B. the condition or quality of being varied; diversity.

C. combined form of seed.

D. to develop gradually; come into being.

11. extremely

A. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

B. any of the group of plants that consists of the true mosses, peat mosses, hornworts, and liverworts.

C. in a great degree; very.

D. to hold or have within.

12. fern

A. any of numerous moss-related, flowerless plants that grow in wet places or on tree trunks.

B. any of several flowerless, seedless plants having green, feathery leaves.

C. the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.

D. to control or govern by the use of power or influence; rule.

13. flower

A. the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.

B. to develop gradually; come into being.

C. any plant that bears seeds; spermatophyte.

D. that is or can be recognized.

14. gas

A. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

B. any plant that bears seeds; spermatophyte.

C. the condition or quality of being varied; diversity.

D. to control or govern by the use of power or influence; rule.

15. growth

A. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

B. the tube in air-breathing animals that carries air to the lungs; windpipe.

C. the process of growing.

D. any plant that bears seeds; spermatophyte.

16. liverwort

A. the green pigment in the leaves and stems of plants that is necessary for the production of plant food by photosynthesis.

B. combined form of seed.

C. that is or can be recognized.

D. any of numerous moss-related, flowerless plants that grow in wet places or on tree trunks.

17. locate

A. to find the position or place of.

B. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

C. any plant that bears seeds; spermatophyte.

D. the small part of a flowering plant that is capable of growing into a new plant.

18. locomotion

A. the act of moving or the power to move from one place to another.

B. the small part of a flowering plant that is capable of growing into a new plant.

C. the condition or quality of being varied; diversity.

D. in addition; as well; too.

19. moss

A. any of numerous small, leafy-stemmed, flowerless green plants that grow in mats on rocks, trees, and moist ground.

B. in addition; as well; too.

C. the small part of a flowering plant that is capable of growing into a new plant.

D. the condition or quality of being varied; diversity.

20. nutrient

A. any of numerous small, leafy-stemmed, flowerless green plants that grow in mats on rocks, trees, and moist ground.

B. that is or can be recognized.

C. a nourishing substance in a food.

D. to find the position or place of.

21. oxygen

A. a chemical element that has eight protons in each nucleus and that occurs in pure form, as a colorless, odorless gas essential to the respiration of living things, or in important compounds such as water, carbohydrates, and oxide minerals. (symbol: O)

B. any of several flowerless, seedless plants having green, feathery leaves.

C. any plant that bears seeds; spermatophyte.

D. a nourishing substance in a food.

22. plant

A. a living organism of the vegetable group.

B. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

C. in addition; as well; too.

D. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

23. recognizable

A. matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.

B. that is or can be recognized.

C. any of numerous small, leafy-stemmed, flowerless green plants that grow in mats on rocks, trees, and moist ground.

D. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

24. seed

A. the small part of a flowering plant that is capable of growing into a new plant.

B. a nourishing substance in a food.

C. the process of developing or bringing to a completed state.

D. the tube in air-breathing animals that carries air to the lungs; windpipe.

25. seedless

A. to find the position or place of.

B. combined form of seed.

C. to develop gradually; come into being.

D. that is or can be recognized.

26. seed plant

A. a colorless, odorless, incombustible gas that is produced naturally in breathing, combustion, and decomposition, and commercially for use in dry ice, fire extinguishers, and carbonated beverages.

B. combined form of seed.

C. in addition; as well; too.

D. any plant that bears seeds; spermatophyte.

27. trachea

A. the tube in air-breathing animals that carries air to the lungs; windpipe.

B. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

C. the small part of a flowering plant that is capable of growing into a new plant.

D. to control or govern by the use of power or influence; rule.

28. variety

A. to find the position or place of.

B. a nourishing substance in a food.

C. to develop gradually; come into being.

D. the condition or quality of being varied; diversity.

29. vascular

A. any of several flowerless, seedless plants having green, feathery leaves.

B. combined form of seed.

C. an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.

D. composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. oxygen		that is or can be recognized.
2. cellulose		to find the position or place of.
3. gas		a chemical element that has eight protons in each

		nucleus and that occurs in pure form, as a colorless, odorless gas essential to the respiration of living things, or in important compounds such as water, carbohydrates, and oxide minerals. (symbol: O)
4. bryophyte		an inert carbohydrate that is the main element of plant tissue, used in manufacturing paper, cellophane, textiles, and the like.
5. locate		any of the group of plants that consists of the true mosses, peat mosses, hornworts, and liverworts.
6. seedless		in a great degree; very.
7. recognizable		matter that is neither liquid nor solid and expands or contracts rapidly and uniformly with temperature changes.
8. extremely		combined form of seed.
9. plant		to develop gradually; come into being.
10. development		composed of, containing, or having to do with tubes or ducts that carry a fluid, such as blood or lymph in animals or sap in plants, or with a system of such tubes or ducts.
11. evolve		the green pigment in the leaves and stems of plants that is necessary for the production of plant food by photosynthesis.
12. fern		any of several flowerless, seedless plants having green, feathery leaves.
13. trachea		the process of developing or bringing to a completed state.
14. vascular		the condition or quality of being varied; diversity.
15. chlorophyll		the tube in air-breathing animals that carries air to

		the lungs; windpipe.
16. variety		a living organism of the vegetable group.
17. carbon dioxide		the part of a plant, often marked by a distinctive color or fragrance, that generates fruit or seeds; blossom.
18. locomotion		in addition; as well; too.
19. nutrient		a colorless, odorless, incombustible gas that is produced naturally in breathing, combustion, and decomposition, and commercially for use in dry ice, fire extinguishers, and carbonated beverages.
20. moss		a nourishing substance in a food.
21. also		to hold or have within.
22. contain		the act of moving or the power to move from one place to another.
23. flower		any of numerous small, leafy-stemmed, flowerless green plants that grow in mats on rocks, trees, and moist ground.
24. liverwort		any of numerous moss-related, flowerless plants that grow in wet places or on tree trunks.
25. contain		to have as components or contents; include.
26. seed plant		the small part of a flowering plant that is capable of growing into a new plant.
27. seed		the process of growing.
28. growth		any plant that bears seeds; spermatophyte.
29. dominate		to control or govern by the use of power or influence; rule.

5. Complete these sentences using the words on this list:

also, development, dominate, evolve, growth, recognizable, contain, extremely, plant, variety, vascular, locate, recognizable

1) The _____ of the new highway took several years.
2) His authoritarian father _____ him to a stifling degree.
3) She works as an artist and _____ as a musician.
4) The Soviet Union _____ the smaller communist nations of Eastern Europe.
5) They have an apartment in the city and a house in the country _____.
6) The revolution _____ during years of suffering.
7) The city had undergone tremendous _____ during the previous decade.
8) The plan _____ over many weeks of discussion.
9) A frog is called a tadpole during the early stage of its _____.
10) He was barely _____ after his illness
11) The building _____ two sets of staircases.
12) Wine _____ more alcohol than beer.
13) Only very hardy _____ are able to survive under these desert conditions.
14) The water molecule _____ two hydrogen atoms.
15) Taking part in these activities gives her life some _____ now that she’s retired.
16) The employees complained that the cafeteria food lacked _____.
17) The human _____ system is_____ complex.
18) The trees, ferns, and all other _____ on the mountain side were destroyed by the fire.
19) Louis Armstrong's _____ style.
20) Babies generally experience rapid _____ in the first months of life.
21) Cheese _____ a good deal of salt.

22) Can you _____ the town on the map?

6. Test your knowledge on the topic.

1. Which of the following characteristics is NOT a plant characteristic?

a. They are able to engage in locomotion by moving from place to place.

b. They use chlorophyll contained in chloroplasts.

c. They produce sugars and oxygen.

d. They use carbon dioxide and water in photosynthesis.

2. Which of the following plants are called bryophytes?

a. horsetails

b. ferns

c. liverworts

d. spruce trees

3. Which plant group now dominates the Earth?

a. gymnosperms

b. bryophytes

c. seedless vascular plants

d. angiosperms

4. Tracheophyte is another name for which type of plant?

a. nonvascular plants

b. only angiosperm plants

c. only gymnosperm plants

d. vascular plants

5. Which of the following strategies does an angiosperm plant NOT use to attract animals who act as pollinators?

a. It produces pollen.

b. It produces nectar.

c. It produces chloroplasts.

d. It produces fruit.

6. Plants in the bryophyte classification use rhizoids to act as what similar structure in vascular plants?

a. leaves

b. chloroplasts

c. roots

d. stems

7. Translate the text into Ukrainian.

Many diverse organisms are classified within the Plant Kingdom, but they usually share certain characteristics that make them recognizable as plants. They are usually green (or part of their body is green), and they do not have the ability of locomotion, so they stay in one spot. They carry out the process known as photosynthesis, which turns carbon dioxide and water into sugars and oxygen gas. Long ago, two major groups of land plants evolved from algae, the bryophytes or nonvascular plants and the tracheophytes or vascular plants. Within vascular plants are two types, seedless and seeded. The seed plants also have two varieties, flowering and non-flowering.

Unit 8.
ANIMALS

5. Learn the active vocabulary to the text.

cell	[noun]	(adv.) a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.
cell membrane	[noun]	(adv.) the semipermeable membrane that encloses the contents of a cell; plasma membrane.
colony	[noun]	(adv.) a territory governed by a distant country, often occupied by numbers of citizens of that country. Before its independence, America consisted of thirteen British colonies. Many settlers died of starvation in the newly established colonies. The Republic of the Congo, a nation in Central Africa, was once a French colony.
compare	[transitive verb]	(adv.) to note the likenesses and differences of. The professor compared the economic system in the U.S. with the economic system in China. If you compare the two brothers, you'll see that they're both very intelligent but one is interested in academics and the other is not.
conjecture	[noun]	(adv.) the making of a guess or inference, especially with little evidence. Where the spectacular wedding was going to be held was a subject of much conjecture.
damage	[noun]	(adv.) harm or injury that reduces usefulness, value, or soundness.

		The accident caused a lot of damage to our car. Damage to crops caused by insects raised the price of bread and flour. They will have to pay for the damage they did to our front window.
directly	[adverb]	(adv.) in a direct line or way; straight. a road running directly south. (adv.) without space or action in between. Go directly home from work.
dominant	[adjective]	(adv.) most in control; ruling; leading. The British navy was the dominant naval force in the nineteenth century. The party of the Social Democrats has long been the dominant party in that country's parliament. Our team has been dominant over the others in the league for years. (adv.) in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.) The gene for dark hair is dominant over the gene for light hair.
earth	[noun]	(adv.) (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles. (adv.) the outer layer of the planet; ground. (adv.) soil or dirt.
exchange	[transitive verb]	(adv.) to give or receive (one thing) for another; trade; swap.

		He exchanged his car for his friend's motorcycle.
		(adv.) to give up for another of a similar kind. I exchanged that defective lamp for one that works right. They exchanged rings as a symbol of friendship. We can exchange some of our currency at the airport when we land.
	[noun]	(adv.) the act or result of giving or receiving one thing for another. The exchange of rings is a part of some wedding ceremonies.
exoskeleton	[noun]	(adv.) an external supporting structure such as the shell of a crustacean. (Cf. endoskeleton.)
fluid	[noun]	(adv.) a substance, such as a liquid or gas, that can flow and that tends to conform to the shape of its container. When its temperature rises above thirty-two degrees Fahrenheit, water becomes a fluid. The doctor told her to rest and drink fluids.
	[adjective]	(adv.) of, pertaining to, or resembling a fluid. When butter melts, it becomes fluid. (adv.) not stable; changeable. They have a fluid approach to problem solving.
increase	[transitive verb]	(adv.) to make larger or more numerous. I can't afford the bike I wanted since the company increased the price. The university has slowly increased the number of women on the faculty.

		The management was forced to increase wages for many of the workers.
	[intransitive verb]	(adv.) to multiply by reproduction.
	[noun]	(adv.) an addition in size or amount. I'm celebrating getting an increase in my salary. The doctor expressed his concern over the increase in the patient's weight. There was an increase in the number of violent crimes last year.
insect	[noun]	(adv.) the group of very small invertebrate animals that have segmented bodies, three pairs of legs, and usually wings.
internal	[adjective]	(adv.) located on the inside; inner. I don't know much about the internal mechanisms of the computer.
invertebrate	[adjective]	(adv.) without a spinal column or backbone. A slug is an invertebrate animal.
	[noun]	(adv.) an invertebrate animal. More invertebrates exist on earth than animals that possess a spinal column.
lung	[noun]	(adv.) one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.
membrane	[noun]	(adv.) a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms. Membranes connect the toes of frogs.

multicellular	[adjective]	(adv.) composed of many cells.
network	[noun]	(adv.) a system or process that involves a number of persons, groups or organizations. Their network of spies was operating all over Europe. The university has a network of libraries.
organ	[noun]	(adv.) in a plant or animal, a specialized structure that performs a particular function, such as the heart.
organism	[noun]	(adv.) any single living being, such as an animal, plant, fungus, or bacterium. The water sample contains numerous kinds of tiny organisms.
outer	[adjective]	(adv.) of or pertaining to that part farthest from the center.
protect	[transitive verb]	(adv.) to ensure the safety of; shield from danger or harm. A mother bear may attack to protect her young. The levee was built to protect the city from flooding. Wax will protect the car's finish.
protection	[noun]	(adv.) the act of protecting or condition of being protected.
reptile	[noun]	(adv.) any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all. The swamp is the habitat of various reptiles.
respiratory	[adjective]	(adv.) of, relating to, or used in respiration.
rudimentary	[adjective]	(adv.) of or pertaining to the basic or first principles;

		elementary. The rudimentary principles of chemistry will be covered in the first semester. He has only rudimentary skills in math.
single-celled	[adjective]	(adv.) of a living thing, composed of only one cell.
species	[noun]	(adv.) in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other species; subdivision of a genus.
sponge	[noun]	(adv.) any of various aquatic animals with a porous body and a tough fibrous or calcareous skeleton formed of irregular clumps or branched masses that are attached to underwater surfaces.
support	[transitive verb]	(adv.) to bear (a weight or load). These picture hangers can support thirty pounds. The little chairs are not made to support the weight of an adult. (adv.) to hold up; brace. The solid oak table is supported by four sturdy legs. (adv.) to sustain or encourage (someone) during periods of stress or affliction. Her family supported her during her time of grief.
	[noun]	(adv.) the act or process of supporting, or the condition of being supported. These beams give strong support to the ceiling. Blue collar support helped him win the election.
surface	[noun]	(adv.) the exterior boundary of something. The submarine finally rose above the surface of the

		water.
		(adv.) the external appearance of something. On the surface, the idea looked good.
vertebrate	[adjective]	(adv.) having a backbone.
volume	[noun]	(adv.) amount; quantity. The Red Cross was pleased with the volume of response to its appeal for blood donations.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Animals

Animals are multi-celled, usually highly mobile, and unable to produce their own food like plants can. The Animal Kingdom is divided into two large groupings, the *invertebrates* (animals with no internal skeleton, although they may have an external skeleton called an *exoskeleton*), and *vertebrates* (animals with an internal skeleton and a highly evolved nervous system, such as humans).

Animal Populations

Because birds and mammals are so large, obvious, and similar to us, we tend to think of them as being the dominant animals on Earth. The real picture is one in which smaller, less obvious, and boneless creatures are dominant. Such creatures are plentiful and have adapted to environments we cannot easily visit, such as the ocean depths. These animals are in the large group we call the *invertebrates*. We, along with other mammals, birds, fish, reptiles, and amphibians, are *vertebrates*. All the vertebrates together make up less than 5% of all the animal species on Earth; invertebrates make up the rest. It is conjectured that colonies of protists whose members became specialized to perform certain roles eventually developed into the earliest form of animals. Today, the sponges, which live mostly in saltwater, are the closest example of organisms that are a collection of single-celled

creatures. They have no specialized organs or tissues but maintain a well-defined shape and have a very rudimentary skeleton.

What Is an Animal?

From sponges to human beings, wherever they are found, animals share some fundamental characteristics. When an animal egg is fertilized, it undergoes several cell divisions or cleavages, quickly producing a cluster of cells called a *morula*. As cleavage continues, the morula develops into several distinct stages, reaching a stage called the *gastrula,* which is a double-layered simple embryo. From this gastrula, the full, multicelled organism develops tissues and organ systems, and eventually develops into its adult form. Immature as well as adult animals come in diverse forms. However, as multicellular animals, they all must come up with solutions to several basic problems, and these solutions give animals a different appearance from plants. The problems fall into several broad categories.

Surface-area-to-volume issues: This issue is a matter of size. Nutrients, air, and water must be able to enter an animal's body to sustain life. This means that the surface area of an animal's body must be large enough to allow a sufficient amount of these elements to be used by the whole volume of the organism. In single-celled organisms, this means the cell size is strictly limited to the amount of nutrients that can pass through the cell membrane to support the whole volume of the cell. In multi-celled organisms, specialized tissues and systems have evolved to bring in the necessary elements and then carry them to the cells. So it is not necessary for the body surface area of a large, multi-celled animal to be able to supply all necessary elements. Specialized tissues and organ systems with very large surface areas have developed that absorb nutrients or air and filter wastes for the entire body. By working in conjunction with the circulatory system, these tissues and organs are able to support a large-sized (large-volume) multi-celled body. The specialized tissues are found in the respiratory (breathing) system, urinary (excretory) system, and the digestive system.

Body support and protection: All animals have some form of support and protection for their bodies. Sponges have a rudimentary skeletal network;

crustaceans (such as crayfish) and insects have a hard outer coating called an *exoskeleton;* and mammals, birds, fish, reptiles, and amphibians have an internal skeleton. In all cases, these skeletal systems provide support to the animal's body and protect the internal organs from damage.

Locomotion: Animals are heterotrophs and cannot produce their own food from exposure to sunlight, so they must acquire food. This need, as well as the need to mate and reproduce, forces an animal to move. Plants move but usually just in place, where they are rooted. Animals, on the other hand, move from place to place; this is called *locomotion*. Locomotion requires a muscular system, which animals came to develop in conjunction with the skeletal system to provide movement. Muscles are found as an adaptation only in animals, not in plants, fungi, or one-celled microorganisms.

Sensory integration: Animals have complex bodies with many parts and systems that need coordination. This has resulted in the evolution of nervous tissue and, in many animals, a highly evolved nervous system, including a brain and spinal cord. In addition, animals have many specialized sensory organs (eyes, ears, noses, etc.) integrated into their nervous systems. These organs sense the environment and allow animals to show a very noticeable and marked response to environmental stimuli. The integration and coordination of sense organs, skeletal/muscular systems, and other bodily functions require an organized collection of specialized nervous tissue known as a *central nervous system*. The central nervous system has adapted into its most impressive form in human beings and other vertebrates.

Classifying Animals into Phyla

Phylum Porifera: sponges

Collections of individual cells, with no tissues or organs, and no nervous system or skeleton.

Phylum Coelenterata: jellyfish, sea anemones, coral

Usually very beautiful forms, their bodies are two-layered and symmetrical in a circular fashion with rudimentary organs and systems, but no skeleton.

Phylum Platyhelminthes: flatworms, tapeworms

Their bodies are symmetrical in a left/right fashion (like humans). Their bodies have three layers and have very rudimentary nervous tissue.

Phylum Nematoda: roundworms

They are symmetrical like the flatworms and have three body layers. Many are beneficial soil organisms, whereas some are parasites (such as hookworms and pinworms).

Phylum Annelida: segmented worms

These have bodies similar to other previous worms but with some more advanced characteristics, including sensory organs and a relatively developed nervous system. Their bodies are divided into segments; earthworms are the best example of animals in this category.

Phylum Echinodermata: sea stars and sea urchins

Their bodies have a circular symmetry with five body parts being arranged around a central axis. They have calcium spines or plates just under the skin and a unique water vascular system that is a series of fluid-filled vessels that provide body support and allow for locomotion.

Phylum Mollusca: snails, clams, and octopuses

These have a well-developed circulatory system, nervous system, and digestive system; octopuses have particularly well-developed brains with highly maneuverable tentacles.

Phylum Arthropoda: crustaceans, spiders, and insects

This phylum has more species than the other phylums, mostly because of all the insect species. Their bodies have exoskeletons, and most undergo metamorphosis (a transformation that allows them to grow by shedding their exoskeleton and developing into a larger or more adult form). They often have specialized body parts (antennae, pinchers, etc.), and they are well adapted to many environments.

Phylum Chordata: amphibians, reptiles, fish, birds, and mammals (including humans) These are the most familiar animals, and we all share four characteristics: a notochord that often develops into the vertebral column in vertebrates; a nerve

cord that runs along our backs; gill slits at some point in our development; and a tail or at least a vestigial tail (humans have the tailbone or coccyx).

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. cell

A. an external supporting structure such as the shell of a crustacean. (Cf.endoskeleton.)

B. to ensure the safety of; shield from danger or harm.

C. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

D. in a plant or animal, a specialized structure that performs a particular function, such as the heart.

2. cell membrane

A. not stable; changeable.

B. in a direct line or way; straight.

C. the semipermeable membrane that encloses the contents of a cell; plasma membrane.

D. the outer layer of the planet; ground.

3. colony

A. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

B. (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.

C. without a spinal column or backbone.

D. a territory governed by a distant country, often occupied by numbers of citizens of that country.

4. compare

A. to note the likenesses and differences of.

B. to give up for another of a similar kind.

C. composed of many cells.

D. an _____ animal.

5. conjecture

A. the semipermeable membrane that encloses the contents of a cell; plasma membrane.

B. the making of a guess or inference, especially with little evidence.

C. of, relating to, or used in respiration.

D. the outer layer of the planet; ground.

6. damage

A. harm or injury that reduces usefulness, value, or soundness..

B. to make larger or more numerous.

C. the outer layer of the planet; ground.

D. a substance, such as a liquid or gas, that can flow and that tends to conform to the shape of its container.

7. directly

A. an external supporting structure such as the shell of a crustacean. (Cf. endoskeleton.)

B. not stable; changeable.

C. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

D. in a direct line or way; straight.

8. directly

A. without space or action in between.

B. of or pertaining to that part farthest from the center.

C. without a spinal column or backbone.

D. (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.

9. dominant

A. without a spinal column or backbone.

B. a substance, such as a liquid or gas, that can flow and that tends to conform to the shape of its container.

C. most in control; ruling; leading.

D. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

10. dominant

A. in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.)

B. of, pertaining to, or resembling a _____.

C. of a living thing, composed of only one cell.

D. to note the likenesses and differences of.

11. earth

A. (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.

B. the group of very small invertebrate animals that have segmented bodies, three pairs of legs, and usually wings.

C. a system or process that involves a number of persons, groups or organizations.

D. to ensure the safety of; shield from danger or harm.

12. earth

A. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

B. harm or injury that reduces usefulness, value, or soundness.

C. the outer layer of the planet; ground.

D. an addition in size or amount.

13. earth

A. soil or dirt.

B. in a plant or animal, a specialized structure that performs a particular function, such as the heart.

C. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

D. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

14. exchange

A. an addition in size or amount.

B. one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.

C. most in control; ruling; leading.

D. to give or receive (one thing) for another; trade; swap.

15. exchange

A. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

B. to give up for another of a similar kind.

C. any single living being, such as an animal, plant, fungus, or bacterium.

D. of or pertaining to the basic or first principles; elementary.

16. exchange

A. most in control; ruling; leading.

B. harm or injury that reduces usefulness, value, or soundness.

C. of or pertaining to the basic or first principles; elementary.

D. the act or result of giving or receiving one thing for another.

17. exoskeleton

A. an external supporting structure such as the shell of a crustacean. (Cf. endoskeleton.)

B. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

C. of or pertaining to that part farthest from the center.

D. in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.)

18. fluid

A. without a spinal column or backbone.

B. one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.

C. to ensure the safety of; shield from danger or harm.

D. a substance, such as a liquid or gas, that can flow and that tends to conform to the shape of its container.

19. fluid

A. of, pertaining to, or resembling a _____.

B. to note the likenesses and differences of.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. of, relating to, or used in respiration.

20. fluid

A. without space or action in between.

B. an external supporting structure such as the shell of a crustacean. (Cf. endoskeleton.)

C. any single living being, such as an animal, plant, fungus, or bacterium.

D. not stable; changeable.

21. increase

A. to give or receive (one thing) for another; trade; swap.

B. to make larger or more numerous.

C. (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.

D. located on the inside; inner.

22. increase

A. to multiply by reproduction.

B. in a plant or animal, a specialized structure that performs a particular function, such as the heart.

C. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

D. of or pertaining to the basic or first principles; elementary.

23. increase

A. of, pertaining to, or resembling a _____.

B. an addition in size or amount.

C. composed of many cells.

D. the act or result of giving or receiving one thing for another.

24. insect

A. the making of a guess or inference, especially with little evidence.

B. the group of very small invertebrate animals that have segmented bodies, three pairs of legs, and usually wings.

C. without a spinal column or backbone.

D. of or pertaining to that part farthest from the center.

25. internal

A. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

B. located on the inside; inner.

C. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

D. of, pertaining to, or resembling a _____.

26. invertebrate

A. of or pertaining to that part farthest from the center.

B. without a spinal column or backbone.

C. to give up for another of a similar kind.

D. one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.

27. invertebrate

A. (often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.

B. to give up for another of a similar kind.

C. an _____ animal.

D. not stable; changeable.

28. lung

A. not stable; changeable.

B. to make larger or more numerous.

C. one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.

D. of a living thing, composed of only one cell.

29. membrane

A. of or pertaining to the basic or first principles; elementary.

B. an _____ animal.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. a system or process that involves a number of persons, groups or organizations.

30. multicellular

A. composed of many cells.

B. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

C. the making of a guess or inference, especially with little evidence.

D. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.

31. network

A. a system or process that involves a number of persons, groups or organizations.

B. to ensure the safety of; shield from danger or harm.

C. located on the inside; inner.

D. the making of a guess or inference, especially with little evidence.

32. organ

A. in a plant or animal, a specialized structure that performs a particular function, such as the heart.

B. to ensure the safety of; shield from danger or harm.

C. in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.)

D. to multiply by reproduction.

33. organism

A. not stable; changeable.

B. any single living being, such as an animal, plant, fungus, or bacterium.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. the group of very small invertebrate animals that have segmented bodies, three pairs of legs, and usually wings.

34. outer

A. one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.

B. of or pertaining to that part farthest from the center.

C. a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.

D. located on the inside; inner.

35. protect

A. to multiply by reproduction.

B. of or pertaining to the basic or first principles; elementary.

C. most in control; ruling; leading.

D. to ensure the safety of; shield from danger or harm.

36. protection

A. an addition in size or amount.

B. without a spinal column or backbone.

C. in biology, the most fundamental classification of living things, comprising individuals

that can breed with one another but not with those of other _____; subdivision of a genus.

D. the act of protecting or condition of being protected.

37. reptile

A. the group of very small invertebrate animals that have segmented bodies, three pairs of legs, and usually wings.

B. any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.

C. without space or action in between.

D. located on the inside; inner.

38. respiratory

A. the outer layer of the planet; ground.

B. to multiply by reproduction.

C. of, relating to, or used in respiration.

D. to give or receive (one thing) for another; trade; swap.

39. rudimentary

A. an _____ animal.

B. a system or process that involves a number of persons, groups or organizations.

C. of or pertaining to the basic or first principles; elementary.

D. any single living being, such as an animal, plant, fungus, or bacterium.

40. single-celled

A. in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.)

B. an _____ animal.

C. the semipermeable membrane that encloses the contents of a cell; plasma membrane.

D. of a living thing, composed of only one cell.

41. species

A. without space or action in between.

B. soil or dirt.

C. in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other _____; subdivision of a genus.

D. to give or receive (one thing) for another; trade; swap.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. fluid		to multiply by reproduction.
2. membrane		an addition in size or amount.
3. increase		the act or result of giving or receiving one thing for another.
4. multicellular		composed of many cells.
5. increase		a thin, flexible, tensile layer of tissue that separates, connects, lines, or covers various structures, such as organs, in living organisms.
6. compare		the semipermeable membrane that encloses the contents of a cell; plasma membrane.
7 exchange		to note the likenesses and differences of.
8. cell membrane		a substance, such as a liquid or gas, that can flow and that tends to conform to the shape of its container.
9. organism		a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.
10. earth		of a living thing, composed of only one cell.
11. protect		(often capitalized) the fifth largest planet in the solar system, which is third in order from the sun and has a diameter of about 7,930 miles.
12. reptile		to ensure the safety of; shield from danger or harm.

13. dominant		most in control; ruling; leading.
14. conjecture		the making of a guess or inference, especially with little evidence.
15. cell		any of the class of vertebrate cold-blooded animals, including lizards, turtles, snakes, crocodiles, and the like, that breathe with lungs, are covered with scales or hard plates, and have short legs or none at all.
16. single-celled		any single living being, such as an animal, plant, fungus, or bacterium.
17. species		in a direct line or way; straight.
18. fluid		to give or receive (one thing) for another; trade; swap.
19. respiratory		of, relating to, or used in respiration.
20. exchange		of or pertaining to that part farthest from the center.
21. internal		without space or action in between.
22. outer		located on the inside; inner.
23. directly		in biology, the most fundamental classification of living things, comprising individuals that can breed with one another but not with those of other __; subdivision of a genus.
24. directly		not stable; changeable.
25. invertebrate		without a spinal column or backbone.
26. earth		in a plant or animal, a specialized structure that performs a particular function, such as the heart.
27. colony		harm or injury that reduces usefulness, value, or soundness.
28. damage		an external supporting structure such as the shell of a crustacean. (Cf. endoskeleton.)
29. organ		of, pertaining to, or resembling a __.

30. fluid		the outer layer of the planet; ground.
31. dominant		in genetics, of a gene or trait that masks the influence of a recessive when the two appear together. (Cf. recessive.)
32. exoskeleton		a territory governed by a distant country, often occupied by numbers of citizens of that country.
33. rudimentary		the act of protecting or condition of being protected.
34. exchange		one of two saclike organs in the chest of man and some other vertebrates that function in the process of breathing; respiratory organ.
35. invertebrate		to give up for another of a similar kind.
36. protection		of or pertaining to the basic or first principles; elementary.
37. lung		an __ animal.

5. Complete these sentences using the words on this list:

colony, compare, exchange, increase, invertebrate, network, rudimentary, directly, dominant, fluid, organism, protect, reptile, conjecture, damage, internal, membrane

1) The Republic of the Congo, a nation in Central Africa, was once a French _____.
2) The doctor expressed his concern over the _____ in the patient's weight.
3) A slug is an _____ animal.
4) He has only _____ skills in math.
5) The management was forced to _____ wages for many of the workers.
6) We can _____ some of our currency at the airport when we land.
7) The university has a _____ of libraries.

8) The _____ principles of chemistry will be covered in the first semester.
9) If you _____ the two brothers, you'll see that they're both very intelligent but one is interested in academics and the other is not.
10) Many settlers died of starvation in the newly established _____.
11) There was an _____ in the number of violent crimes last year.
12) Wax will _____ the car's finish.
13) The party of the Social Democrats has long been the _____ party in that Country's parliament.
14) When butter melts, it becomes _____.
15) You have to take the road running _____ south.
16) The swamp is the habitat of various _____.
17) The water sample contains numerous kinds of tiny _____.
18) They have a _____ approach to problem solving.
19) When its temperature rises above thirty-two degrees Fahrenheit, water becomes a _____.
20) Go _____ home from work.
21) The university has slowly _____ the number of women on the faculty.
22) The levee was built to _____ the city from flooding.
23) The British navy was the _____ naval force in the nineteenth century.
24) The gene for dark hair is _____ over the gene for light hair.
25) The professor _____ the economic system in the U.S. with the economic system in China.
26) _____ to crops caused by insects raised the price of bread and flour.
27) Where the spectacular wedding was going to be held was a subject of much _____.
28) They _____ rings as a symbol of friendship.

29) Before its independence, America consisted of thirteen British _____.

30) I can't afford the bike I wanted since the company _____ the price.

31) I _____ that defective lamp for one that works right.

32) I don't know much about the _____ mechanisms of the computer.

33) Their _____ of spies was operating all over Europe.

34) The accident caused a lot of _____ to our car.

35) More _____ exist on earth than animals that possess a spinal column.

36) Our team has been _____ over the others in the league for years.

37) A mother bear may attack to _____ her young.

38) They will have to pay for the _____ they did to our front window.

39) _____ connect the toes of frogs.

40) The doctor told her to rest and drink _____.

41) He _____ his car for his friend's motorcycle.

42) I'm celebrating getting an _____ in my salary.

43) The _____ of rings is a part of some wedding ceremonies.

6. Test your knowledge on the topic.

1. Multicellular animals have developed respiratory and excretory (urinary) systems because they need to overcome which of the following issues?

a. weight versus mass

b. surface area to volume

c. height to weight

d. mass to volume

2. Animals are divided into which of the following two categories?

a. single celled and multicelled

b. autotrophic and heterotrophic

c. mobile and immobile

d. vertebrate and invertebrate

3. Jellyfish and coral are related to what other animal?

a. octopus

b. sea anemone

c. sea urchin

d. sponges

4. The Phylum Arthropoda contains which of the following animals?

a. spiders

b. sea stars

c. sponges

d. seals

5. Phylum Annelida contains which of the following animals?

a. flatworms

b. sponges

c. round worms

d. segmented worms

6. Humans are classified under which of the following Phyla?

a. Echinodermata

b. Chordata

c. Mollusca

d. Platyhelminthes

7. Translate the text into Ukrainian.

As multicellular animals, animals must come up with solutions to several basic problems. These solutions give animals a different appearance from plants.

These problems fall into several broad categories: surface-area-to-volume issues, body support and protection, locomotion, and sensory integration. Animals are also organized into several phyla.

Unit 9.
ECOSYSTEMS AND ECOLOGY

1. Learn the active vocabulary to the text.

abiotic	[adjective]	(adv.) characterized by an absence of living organisms; without life.
atmosphere	[noun]	(adv.) the mass of gases surrounding the earth or any other celestial body. The ozone layer is a part of the Earth's atmosphere.
biotic	[adjective]	(adv.) pertaining to life or living things.
bulk	[noun]	(adv.) large size or volume. The crate's bulk made it hard to move.
calcium	[noun]	(adv.) a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)
characteristic	[noun]	(adv.) a salient feature; distinctive trait. Tails that can grasp things are a characteristic of monkeys.
component	[noun]	(adv.) a part or element of a whole; constituent. One of the engine's components is damaged. Vegetables are an important component of a healthy diet. Oxygen and hydrogen are the chemical components that make up the water molecule.
create	[transitive verb]	(adv.) to bring into being. He created a magnificent work of art for the town hall.

		The chef has created three new dishes. A new division of the police department was created to deal with this problem. The new government pledged to create more jobs. A large mirror on a wall can sometimes create a feeling of more space.
ecology	[noun]	(adv.) the scientific study of the relationships between living things and their environments. An interest in ecology drew her to study the effects of warmer ocean temperatures on sea animals.
ecosystem	[noun]	(adv.) a community of living things, together with their environment. A pond is an interesting ecosystem to study.
energy	[noun]	(adv.) the power or capacity for activity. After a few days, the food and rest gave the soldier enough energy to get out of bed.
environment	[noun]	(adv.) the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings. With the warm light, the soft curtains, and the comfortable chairs, they tried to make the doctor's waiting room a pleasant environment. The hostile environment of the prison plunged him into depression. Every attempt has been made to make the mine a safe environment for workers. He was brought up in an environment in which education was highly valued. In the political environment of the time, it was

		dangerous to write books criticizing the government.
factor	[noun]	(adv.) something that has an influence on or is a partial cause of something that happens. The element of surprise was an important factor in determining the outcome of the battle. Several factors led to the weakening of the economy. Her decision to quit was influenced by several factors, not just the fact that she was passed up for a promotion.
habitat	[noun]	(adv.) the natural environment of a plant or animal. An animal may suffer if it is removed from its habitat.
hydrosphere	[noun]	(adv.) collectively, all bodies and forms of water on or around the earth's surface, including vapor and clouds in the atmosphere.
include	[transitive verb]	(adv.) to contain, as a whole contains its parts. The list includes all of our names. Does the recipe include eggs? The dinner menu includes appetizers and entrees, but not desserts.
inorganic	[adjective]	(adv.) lacking the qualities, structure, and composition of living organisms; inanimate.
interact	[intransitive verb]	(adv.) of two or more people, to act in conjunction with and in response to one another in a particular situation; or, of one person, to act in conjunction with and in response to another person or persons. We were pleased to see that the students from the two schools were interacting well. He’s always nervous about interacting with people at

parties.

interaction	[noun]	(adv.) action each upon the other or others; reciprocal action, influence, or effect. the group’s social interaction.
lithosphere	[noun]	(adv.) the earth's crust.
niche	[noun]	(adv.) a crevice or recessed area, especially an ornamental one set in a wall to hold a statue, urn, or the like. That niche is the best place to display that bust of Beethoven. The climber found a niche for his fingers and somehow pulled himself up.
nitrogen	[noun]	(adv.) a chemical element that has seven protons in each nucleus and that occurs as a colorless, odorless gas that comprises about eighty percent of the earth’s atmosphere, or in important compounds such as nitrates, proteins, nucleic acids, and ammonia. (symbol: N)
nonbiological	[adjective]	(adv.) combined form of biological.
organism	[noun]	(adv.) any single living being, such as an animal, plant, fungus, or bacterium. The water sample contains numerous kinds of tiny organisms.
phosphorous	[adjective]	(adv.) of, like, containing, or pertaining to phosphorus, especially trivalent phosphorus.
photosynthesis	[noun]	(adv.) the process in plants by which sunlight, with the help of chlorophyll, is converted to chemical energy that is used to synthesize inorganic

		compounds into organic ones, especially sugars.
physical	[adjective]	(adv.) of the body. We climbed ropes as part of our physical training. Yoga is good for your mental health as well as your physical health.
possible	[adjective]	(adv.) capable of or having the potential for being, occurring, being done, or being used. It is possible to drive from England to France through a tunnel under the English Channel.
refer	[transitive verb]	(adv.) to direct to a source for assistance. He referred me to a good doctor.
similar	[adjective]	(adv.) having resemblance or likeness. Joan and Joanna are similar names. The houses are quite similar to each other, but they're painted different colors. The two songs are similar in style.
soil	[noun]	(adv.) the uppermost layer of the earth's surface.
suitable	[adjective]	(adv.) appropriate for a particular person or to a purpose or situation; fitting. a husband suitable for a princess a dress suitable for the occasion.
surrounding	[noun]	(adv.) the process of encircling.

2. Read the text applying before reading, during reading and after reading strategies described in the introduction.

Ecosystems

The study of living organisms and the ways in which they interact with their physical environment and each other is called *ecology*. All these relationships form an *ecosystem*. The physical environment includes the type of soils, the amount of

sunshine and rainfall, the weather and climate, the topography (or shape) of the land, and many other factors. An organism's habitat provides for the needs of that organism. Large areas of the earth and its oceans share similar habitats and physical environment characteristics. These areas are called *biomes,* and because they include the relationships of many organisms and physical factors, they are also ecosystems.

Biosphere and Biome

Earth is a large planet, and much of its bulk is not suitable for living organisms, but three factors interact to make life possible. These three factors are air, water, and rock (or soil).We also refer to these factors as being the atmosphere (air), hydrosphere (water), and lithosphere (rocks and soil). An interaction takes place between these physical factors and the life of Earth to create an environment we call the *biosphere*. The biosphere contains all of Earth's living organisms. Large areas of the earth (both on land and in water) may contain several small living systems operating in a region with definable conditions. These large areas are called *biomes*. Each biome has organisms and physical environment characteristics that define it. Several biomes have been identified and defined.

Ecosystem

We define an ecosystem as being all the relationships between organisms in a defined area and their interactions with their physical environment. An ecosystem can be very large, including the entire Earth (in which case, we refer to it as the biosphere) or the large regions we call biomes. However, ecosystems can also be very small; even a single tree can be the foundation of a whole ecosystem, and a terrarium or aquarium is a model of an ecosystem you can create yourself. No matter the size or form of an ecosystem, groups of organisms will affect and be affected by each other and their physical surroundings. The living organisms in an ecosystem are collectively known as the *biotic* (biological) component, whereas the nonliving things such as water, minerals, and sunlight are collectively known as the *abiotic* (nonbiological) component. Studying the interactions between the biotic and abiotic components helps us understand an ecosystem. The particular

details of one ecosystem will differ when compared to another. They will have different organisms present or different abiotic factors available. But in all cases, ecosystems exhibit two primary features:

1. a single direction to the flow of energy, in the form of chemical bonds, from photosynthetic organisms, like green plants or algae, to animals that eat the plants or other animals.

2. the cycling of inorganic minerals, such as nitrogen, calcium, and phosphorous, through living organisms and then back to the environment. The return of these inorganic materials to the environment happens largely by the action of organisms known as *decomposers* (such as bacteria and fungi). Other organisms called *detritivores* (such as pillbugs, sowbugs, millipedes, and earthworms) help break down large pieces of organic matter into smaller pieces that the decomposers then work on. A complete definition of an ecosystem could be stated as a combination of biotic and abiotic components through which energy flows and inorganic material recycles.

Requirements of Organisms

Every organism needs food, water, and shelter, which must come from the area in which it lives. This area is called an organism's *habitat*. Within its habitat, an organism has a function or role to play to help maintain the community. The role of some organisms is to capture sunlight and produce food compounds. We call these organisms plants or *autotrophs*, a word that roughly translates as one who feeds oneself. We also call plants *producers* because they produce their own food. Other organisms eat plants and some eat each other. These organisms are called *heterotrophs*, which means eater of others. We also call heterotrophs consumers, and most animals are in this group because they must consume food (they cannot make their own). Still other organisms, such as pillbugs, eat the leftover remains or droppings of other organisms. These organisms are referred to as *detritivores*, which means eater of detritus (leaf litter).

An Organism's Niche

The roles an organism plays in a community and how it affects and is affected by its habitat are the factors that determine an organism's niche. An easy way to understand the concept of a niche is to think ofit as being an organism's "location" and "occupation" within a community. For example, birds and squirrels both live in a tree habitat, but they do not occupy the same niche because they eat different foods. Their "locations" are the same, but they have different food-gathering abilities and requirements as their "occupations."

Ecology: Organism sand Their Interactions

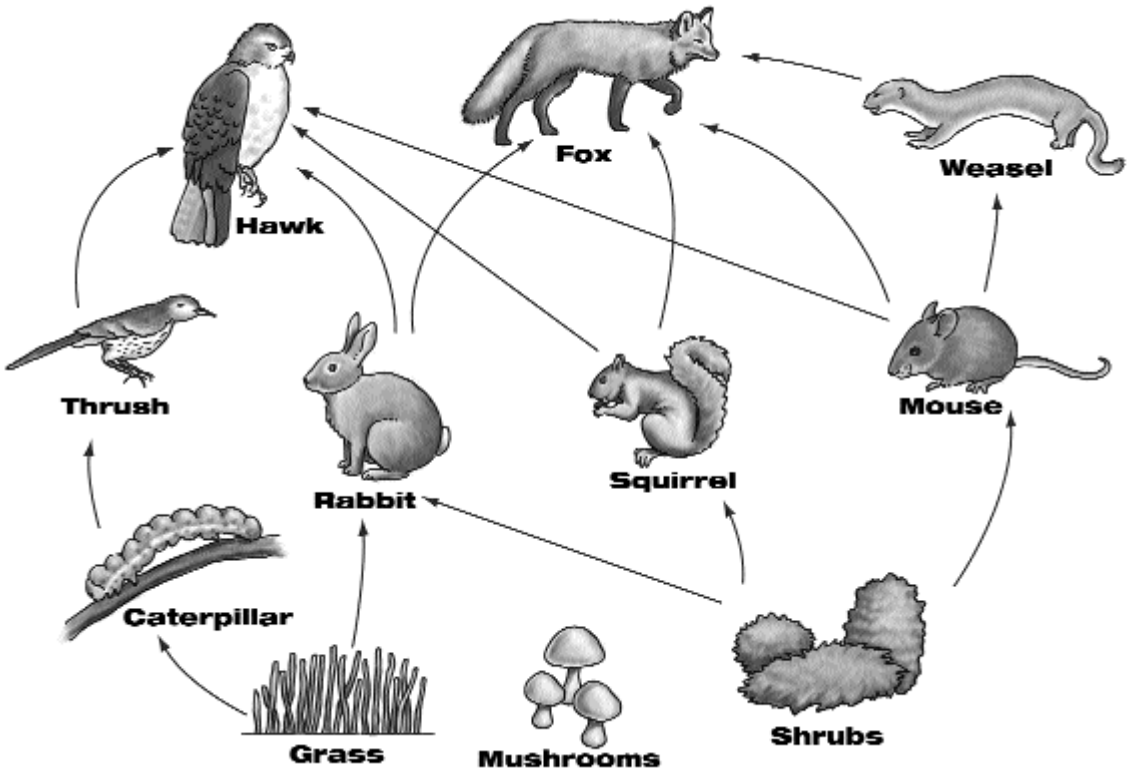
When we talk about the relationships among organisms in an ecosystem, the most important is how they relate to each other as predators and prey. The best means of illustrating these relationships is through food chains and food webs.

Food Chains

Food chains don't just show who eats whom, but instead, they represent the flow of energy contained in the chemical bonds of food molecules.When a fox eats a rabbit, the chemical bonds that make up the tissues of the rabbit's body will be broken down by the digestive system of the fox. This digestive process releases energy and smaller chemical molecules that the fox's body uses to make more fox tissue. Likewise, before the fox eats the rabbit, it uses the food energy in grass and plants to gain energy for its own life processes. Let's look at a simple food chain such as one that includes grass, grasshoppers, frogs, and raccoons. Sunlight energy enters the food chain during a series of chemical reactions called *photosynthesis*. These reactions take place in plant tissue. The plant uses this sunlight energy to make food molecules, which are stored within the tissues of the plant. When the grasshopper eats the plant, it consumes some of the food molecules and uses these molecules in its own body. An organism at the next level of the food chain, such as the frog, then eats the grasshopper and derives energy from the tissue of the grasshopper. A series of these steps from one organism to the next is called a food chain.

Food Webs

A *food web* is a more complex view of energy transmission that includes more predator-prey relationships between more organisms. Food chains are parts of food webs. Each step along a food chain or within a food web represents what is called a *trophic* (or feeding) *level*. The first step in any food chain or the first trophic level is always a photosynthetic organism. These organisms, such as plants in terrestrial ecosystems and algae in aquatic ecosystems, use light from the sun, water, carbon dioxide, and a few minerals to produce food molecules. The chemical bonds in food molecules represent captured energy that can then be available to fuel the whole food chain. Organisms at this first trophic level are known as *primary producers*. See the following illustration of a food web.



Energy and Food Webs

Energy becomes a part of the animal communities through those who eat plants. These organisms are called *herbivores* and, because they are at the second trophic level, are also known as *primary consumers*. Herbivores (primary consumers) eat plants and derive energy for their own life processes. However, much of the energy that transfers from the first trophic level to the second level (or from primary producers to primary consumers) is not turned into herbivore tissue but is instead

lost as heat, used in the digestive process itself or used for movement by the herbivore. Much of the plant material is not even digested, so it passes through the digestive system and is excreted as waste. This waste material still contains much energy in the chemical bonds that make up the material. Because much of the energy available from the primary producers (plants) does not become part of an herbivore's body mass, a given amount of plant material would not be able to sustain as many herbivores as you might think. As you move from one trophic level to another, it is usually estimated that only 10% of the available energy gets turned into body tissue at the next higher level. As a simple example, consider a field that has 100 pounds of plants. In terms of the energy available, you might think this field could provide for 100 pounds of rabbits, but the reality is that it would only be able to support a group of rabbits that weighs a total of ten pounds. The loss of 90% of the energy to other factors results in only one or two rabbits. If you then move to the next higher trophic level, a rabbit will only provide enough energy to sustain one pound of a fox's body. Again, the loss of 90% of the energy yields not even enough left over to completely sustain a fox, but only to sustain the fox for a short period of time.

VOCABULARY DEVELOPMENT AND READING COMPREHENSION

3. Select the most appropriate definition for the given words.

1. abiotic

A. a part or element of a whole; constituent.

B. to bring into being.

C. characterized by an absence of living organisms; without life.

D. the natural environment of a plant or animal.

2. atmosphere

A. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

B. the mass of gases surrounding the earth or any other celestial body.

C. a salient feature; distinctive trait.

D. pertaining to life or living things.

3. biotic

A. the natural environment of a plant or animal.

B. characterized by an absence of living organisms; without life.

C. pertaining to life or living things.

D. the mass of gases surrounding the earth or any other celestial body.

4. bulk

A. large size or volume.

B. the power or capacity for activity.

C. a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

D. something that has an influence on or is a partial cause of something that happens.

5. calcium

A. the natural environment of a plant or animal.

B. characterized by an absence of living organisms; without life.

C. a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

D. a part or element of a whole; constituent.

6. characteristic

A. the mass of gases surrounding the earth or any other celestial body.

B. characterized by an absence of living organisms; without life.

C. a part or element of a whole; constituent.

D. a salient feature; distinctive trait.

7. component

A. something that has an influence on or is a partial cause of something that happens.

B. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

C. a salient feature; distinctive trait.

D. a part or element of a whole; constituent.

8. create

A. a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

B. to bring into being.

C. something that has an influence on or is a partial cause of something that happens.

D. the power or capacity for activity.

9. ecology

A. the power or capacity for activity.

B. to bring into being.

C. the mass of gases surrounding the earth or any other celestial body.

D. the scientific study of the relationships between living things and their environments.

10. ecosystem

A. a community of living things, together with their environment.

B. a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

C. the mass of gases surrounding the earth or any other celestial body.

D. to bring into being.

11. energy

A. the power or capacity for activity.

B. the natural environment of a plant or animal.

C. the scientific study of the relationships between living things and their environments.

D. characterized by an absence of living organisms; without life.

12. environment

A. characterized by an absence of living organisms; without life.

B. a salient feature; distinctive trait.

C. the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.

D. the natural environment of a plant or animal.

13. factor

A. the natural environment of a plant or animal.

B. the mass of gases surrounding the earth or any other celestial body.

C. something that has an influence on or is a partial cause of something that happens.

D. a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)

14. habitat

A. characterized by an absence of living organisms; without life.

B. the mass of gases surrounding the earth or any other celestial body.

C. large size or volume.

D. the natural environment of a plant or animal.

4. For each definition bellow, select the matching word, and write the number of the word in the box next to the definition.

1. component		a chemical element of the alkaline-earth group that has twenty protons in each nucleus and occurs widely in nature, but only in compounds such as calcite or limestone. (symbol: Ca)
2. characteristic		large size or volume.
3. habitat		the natural environment of a plant or animal.

4. biotic		a community of living things, together with their environment.
5. bulk		the sum of things, circumstances, and conditions that surround one and may have an effect on one; surroundings.
6. environment		pertaining to life or living things.
7. calcium		a part or element of a whole; constituent.
8. ecosystem		a salient feature; distinctive trait.
9. ecology		the scientific study of the relationships between living things and their environments.
10. abiotic		the power or capacity for activity.
11. factor		to bring into being.
12. energy		characterized by an absence of living organisms; without life.
13. create		something that has an influence on or is a partial cause of something that happens.
14. atmosphere		the mass of gases surrounding the earth or any other celestial body.

5. Complete these sentences using the words on this list:

atmosphere, component, create, ecosystem, energy, environment, factor, bulk, ecology, habitat, characteristic

1) The new government pledged to _____ more jobs.

2) Her decision to quit was influenced by several _____, not just the fact that she was passed up for a promotion.

3) A pond is an interesting _____ to study.

4) Several _____ led to the weakening of the economy.

5) The hostile _____ of the prison plunged him into depression.

6) The chef has _____ three new dishes.

7) A new division of the police department was _____ to deal with this problem.

8) The ozone layer is a part of the Earth's _____.

9) Vegetables are an important _____ of a healthy diet.

10) After a few days, the food and rest gave the soldier enough _____ to get out of bed.

11) The element of surprise was an important _____ in determining the outcome of the battle.

12) Every attempt has been made to make the mine a safe _____ for workers.

13) A large mirror on a wall can sometimes _____ a feeling of more space.

14) He was brought up in an _____ in which education was highly valued.

15) With the warm light, the soft curtains, and the comfortable chairs, they tried to make the doctor's waiting room a pleasant _____.

16) The crate's _____ made it hard to move.

17) An animal may suffer if it is removed from its _____.

18) He _____ a magnificent work of art for the town hall.

19) An interest in _____ drew her to study the effects of warmer ocean temperatures on sea animals.

20) In the political _____ of the time, it was dangerous to write books criticizing the government.

21) One of the engine's _____ is damaged.

22) Oxygen and hydrogen are the chemical _____ that make up the water molecule.

23) Tails that can grasp things are a _____ of monkeys.

6. Test your knowledge on the topic.

1. Ecology is the study of organisms interacting with

a. the physical environment only.

b. the internal environment only.

c. the physical environment and each other.

d. each other and the internal environment.

2. In terms of energy, an ecosystem is defined as

a. moving energy back and forth between organisms.

b. moving energy in one direction from plants to animals.

c. not utilizing energy.

d. moving energy in one direction from animals to plants.

3. Decomposers are important because they

a. recycle nutrients.

b. produce sugars.

c. produce oxygen.

d. engage in asexual reproduction.

4. Which of the following best describes the concept of an organism's niche?

a. It is the organism's function or "occupation" in an ecosystem.

b. It is the organism's location or "address" in an ecosystem.

c. It is both an organism's function and location in an ecosystem.

d. It is the binomial classification of an organism in an ecosystem.

5. Pillbugs consume dead organic matter and are most accurately described by the name

a. decomposers.

b. detritivores.

c. producers.

d. autotroph.

6. The steps in a food chain or food web are called _____ and represent the _____ of an organism.

a. biome levels; energy level

b. trophic levels; energy level

c. trophic levels; feeding level

d. energy levels; feeding level

7. In this food chain, grass →rabbit →fox

how much of the energy captured in the grass's tissue is available to the fox?

a. 100%

b. 50%

c. 10%

d. 1%

8. Another term for herbivores is

a. plants.

b. second-order consumers.

c. first-order consumers

d. third trophic-level organisms.

9. Several interacting food chains form a

a. food pyramid.

b. food web.

c. food column.

d. food triangle.

10. Herbivores are at the second trophic level and can also be called

a. primary producers.

b. primary consumers.

c. secondary consumers.

d. secondary producers.

7. Translate the text into Ukrainian.

The study of living organisms and the ways in which they interact with their physical environment and each other is called ecology. All these relationships form an ecosystem. In all cases, ecosystems exhibit two primary features:

1. a single direction to the flow of energy, in the form of chemical bonds, from photosynthetic organisms, such as green plants or algae, to animals that eat the plants or other animals.

2. the cycling of inorganic minerals, such as nitrogen, calcium, and phosphorous, through living organisms and then back to the environment. The return of these inorganic materials to the environment happens largely by the action of organisms known as decomposers (such as bacteria and fungi) and others called detritivores (such as pillbugs, sowbugs, millipedes, and earthworms). A complete definition of an ecosystem could be stated as a combination of biotic and abiotic components through which energy flows and inorganic material recycles.

Organisms interact with each other, and the most common interaction is within the structure of a food chain in which one organism is the food and energy source for another organism. All food chains start with plants as producers because they can photosynthesize and capture sunlight energy. Animals are consumers and eat either plants or each other. Several food chains can be interwoven to create a food web in which many organisms interact with each other.

SELF-CHECK TEST

1. In which of the following organisms would cells have a cell wall?

a. dog

b. human

c. grass

d. fish

2. Nitrogen fixation, whereby atmospheric, gaseous nitrogen is assimilated into chemical compounds, is a process performed by which organism?

a. plants

b. animals

c. fungi

d. bacteria

3. The major sites of photosynthesis in most plants are the

a. stems.

b. seeds.

c. leaves.

d. roots.

4. Angiosperms are different from gymnosperms because

a. they produce flowers.

b. they have seeds.

c. they reproduce only asexually.

d. they are limited in their growth rate.

5. A distinguishing feature of the Kingdom Monera is that the cells of the organisms in that Kingdom

a. contain many organelles.

b. contain mitochondria.

c. obtain food through photosynthesis.

d. do not have a nucleus.

6. Which of the following categories of classification is the least specific?

a. phylum

b. class

c. order

d. genus

7. Which of the following characteristics best distinguishes nonliving organisms from living organisms?

a. Nonliving organisms can change position.

b. Nonliving organisms can reproduce.

c. Nonliving organisms are complexly organized.

d. Nonliving organisms are stationary.

8. Which of the following is NOT a member of the Fungi Kingdom?

a. mushroom

b. yeast

c. mold

d. algae

9. Which of the following is a characteristic function of the Plant Kingdom?

a. photosynthesis

b. respiration

c. digestion

d. inhalation

10. What is the light-sensitive pigment found in green plants?

a. cytochrome

b. melanin

c. chlorophyll

d. hemoglobin

11. The position a plant or animal occupies in the food chain may also be referred to as its

a. productivity.

b. producer level.

c. biomass.

d. trophic level.

12. Water and nutrients move through transport tubes, such as xylem and phloem, in which of the following plant groups?

a. nonvascular plants

b. tracheophytes

c. mosses

d. liverworts

13. According to the binomial classification system, which of the following categories is the most specific (or has the smallest number of organisms)?

a. phylum

b. genus

c. class

d. order

14. How are sponges and coelenterates different?

a. Coelenterates have nerve cells; sponges do not.

b. Coelenterates have bony skeletons; sponges do not.

c. Sponges are marine animals; coelenterates are not.

d. Sponges are multicellular; coelenterates are not.

15. In order to be considered organic, a compound must contain which of the following elements?

a. hydrogen

b. sodium

c. nitrogen

d. carbon

16. Which of the following is an organelle?

a. heart

b. chloroplast

c. liver

d. fibrin

13. Which of the following is a vertebrate?

a. sponge

b. sea star

c. octopus

d. snake

17. Which of the following plants lacks a vascular system?

a. moss

b. fern

c. fir tree

d. peanut plant

18. Which of the following is an abiotic factor in the life of a zebra?

a. grasses

b. trees

c. water

d. lions

19. Complete the two missing parts of the following food chain: X →plant →X →snake

a. water, owl

b. water, mouse

c. sunlight, deer

d. sunlight, mouse

20. In a food chain, which of the following are the producers?

a. dead organic matter

b. plant-eating animals

c. meat-eating animals

d. green plants

21. Which of the following best describes what an herbivore eats?

a. animal matter only

b. plant matter only

c. detritus only

d. both animal and plant matter

22. In the scientific name for the emperor penguin, *Aptenodytes forsteri*, the word *Aptenodytes* indicates the

a. phylum.

b. order.

c. species.

d. genus.

23. Which of the following groups of organisms produce flowers?

a. angiosperms

b. gymnosperms

c. mosses

d. fungi

24. Atoms are arranged according to the number of

a. electrons in the nucleus.

b. electrons around the nucleus.

c. protons in the nucleus.

d. protons around the nucleus.

25. Nucleic acids are large molecules made up of smaller molecules called

a. amino acids.

b. nucleotides.

c. lipids.

d. carbohydrates.

26. Which of the following is true of nonliving matter?

a. It reacts to environmental stimuli.

b. It is able to reproduce itself.

c. It undergoes chemical breakdown.

d. It has a high level of complexity.

27. Bacteria are part of which of the following Kingdoms?

a. Protist

b. Monera

c. Animal

d. Plant

28. Which of the following organisms form hyphae and mycelium tissue?

a. oak tree

b. whale

c. amoeba

d. mushroom

29. The system of classifying organisms developed by Carlos Linneaus is called

a. bipartional nomenclature.

b. binomial nomenclature.

c. fission nomenclature.

d. binary nomenclature.

30. Which of the following plant groups produces seeds in cones?

a. angiosperms

b. bryophytes

c. all vascular plants

d. gymnosperms

GLOSSARY

abiotic refers to nonliving things; the important abiotic factors of the environment include light, temperature, moisture, and atmospheric gases.

aerobic refers to the presence of the gas oxygen; aerobic respiration is a cellular metabolic function that uses oxygen.

allele one member of a pair of genes that occupy a specific position on a specific chromosome.

alveolus a tiny, thin-walled sac in the lungs that is rich in capillaries and acts as the exchange site for oxygen and carbon dioxide; the plural is alveoli.

actin a protein in muscle that acts in conjunction with myosin during muscle contraction.

arteriole the small terminal branch of an artery that connects to a capillary.

aorta the main artery that carries blood away from the left ventricle of the heart to the rest of the body (except for the lungs).

anabolism the phase of metabolism in which simple substances are built up into the complex materials of living tissue (see also catabolism, the opposite process).

anaerobic biochemical processes that proceed in the absence of oxygen; the yeast fermentation of sugarto beer or wine is anaerobic respiration.

antagonistic pairs muscles are arranged in pairs; when one contracts, the other relaxes, and a limb will move toward the contracting muscle. To move the limb back to its original starting position, the relaxed muscle will have to contract and the contracted muscle will have to relax. In this sense, the muscles are working in opposition to each other (they are “antagonistic” toward each other).

amino acid the organic molecules that, when linked together by chemical bonds, form proteins.

amphibian a cold-blooded, smooth-skinned vertebrate; examples are frogs and salamanders. Usually, they hatch from eggs and start life breathing with gills. They then grow through a metamorphosis that changes them into air-breathing adults.

angiosperm the name we give to seed plantsthat form flowers. These plants now dominate the earth (even more so than the gymnosperms) and are highly diverse with many different types of plants. The angiosperms have been so successful because they developed flowers, fruits, and broad leaves.

Animal Kingdom the organisms classified into this Kingdom are multicellular and, because they donot have chlorophyll, are unable to produce their own food. Herbivore animals eat plants, carnivore animals eat meat (other animals), and omnivores eat both plants and animals.

animate refers to a living being.

artificial selection the process in which humans choose desirable traits in animals or plantsand breed the organisms that exhibit only those traits. This results in a new species with characteristics that we find desirable but that may not necessarily be best adapted to a natural environment. This has been used for thousands of years to producecrop animals and plants; this contrasts with natural selection.

asexual reproduction reproduction that does not involve the union of sperm and egg. It is accomplished in processes such as budding, fragmentation, and binary fission (splitting into two);many animals and plants have asexual reproduction as part of their life cycle.

alternation of generations the regular alternation of forms of reproduction in the life cycle of organisms.

atoms a unit of matter; it is the smallest unit of an element and consists of protons, neutrons, and electrons. A single atom of an element will have the properties of that element and thus is the smallest piece of that element; however, the atom itself consists of even smaller particles that do not have the properties of that particular element because they are the same in every atom of every element.

autonomic nervous system part of the peripheral nervous system that is not under conscious control. It is responsible for critical life functions such as breathing and heart rate. It also has two divisions, the sympathetic nervous system and the parasympathetic nervous system.

autotroph an organism capable of producing its own food from inorganic substances such as carbon dioxide and water using light. Green plants and algae, as well as some bacteria and protists, are autotrophs.

axon a long extension of a neuron (nerve cell) that usually conducts impulses away from the cell body; it releases neurotransmitters at its end that cross the gap (synapse) to the next neuron in line.

bacteria microorganisms that do not have a true nucleus; their genetic material is free floating within the cell. Bacteria are very small one-celled organisms, and they do not contain very complex cell structures. Bacteria generally come in three varieties: bacilli (rod-shaped), cocci (sphereshaped), and spirilla (spiral-shaped). Bacteria are prevalent in all environments and are important members of an ecosystem.

binary fission a method of asexual reproduction that involves splitting a parent cell into two separate cells; used extensively by bacteria.

binomial nomenclature the classification system developed by Carlos Linneaus. It is called binomial nomenclature because any organism can be positively identified by two Latin words, the Genus and species words, that specifically name an organism. The Genus name is always capitalized and written in italics, whereas the species name is written lowercase but also in italics. The European wolf is *Canis lupus*, *Canis familiaris* is the common dog, *Felis tigrina* is a tiger, *Felis domesticus* is a common cat, and humans are *Homo sapiens*.

biome a major regional community of living

organisms, such as a grassland or desert that can be described by the dominant forms of plant life and the climate of the area.

biosphere the part of the Earth and its atmosphere where living organisms exist; the area of the Earth’s surface and atmosphere that is capable of supporting life.

biotic refers to life or living organisms.

birds a vertebrate organism that is warm blooded, egg laying, and feathered; the front limbs are wings, and they are usually able to fly.

blood a specialized fluid in the circulatory system that consists of red and white blood cells, plasma, and platelets. Blood is the vital fluid that carries oxygen and food molecules to the cells, and carbon dioxide and wastes away from the cells. It also transports the immune system cells that fight infections and disease.

brain a highly specialized organ where neurons have been grouped together into many specific areas, each with a particular function. The brain integrates all the signals in the nervous system and controls the body. It acts as a data storage organ by learning and keeping memories, and is the seat of the conscious mind in higher mammals and other vertebrate animals.

bronchioles a fine, small branching of a bronchus; bronchioles lead directly to alveoli.

bronchus one of two main branches of the trachea that leads into the lungs; its plural is bronchi.

bryophyte (nonvascular plant) these plants lack roots, leaves, and stems, but they do have structures called rhizoids (root-like hairs) that absorb water and nutrients.

budding a process of asexual reproduction in which an offshoot of an organism's body develops into a complete individual; it is used extensively in fungi and animals such as coral.

capillary a tiny blood vessel that connects arterioles and venules; they form an intricate network orweb that allows for the exchange of oxygen and carbon dioxide between the blood and body cells.

carbohydrate a group of organic molecules that includes sugars, starch, and cellulose, which are a major source of energy in an animal's diet and in the metabolism of plants. These substances also form the main support structure of plants; carbohydrates are produced by plants during photosynthesis.

carbon dioxide an odorless, colorless gas (abbreviated as CO2), it is used by plants in photosynthesis to produce organic compounds; it is produced by animals (and plants) as they respire and metabolize organic molecules.

cardiac muscle type of muscle tissue found only in the heart; this type of muscle tissue is so specialized to contract that it will continue to do so even without stimulation from the nervous system, although the contraction will not be coordinated or regular.

carnivore (secondary consumer) animals that eat other animals; because they eat herbivores, carnivores occupy the third trophic level of a food chain and are also known as secondary consumers (the first trophic level is occupied by plants as producers and the second is occupied by herbivores as primary consumers). Animals that consume other carnivores can be considered tertiary consumers.

cartilage connective tissue found in various parts of the body (joints, outer ear, nose) and is a major constituent of young vertebrate skeletons; it is converted to bone as the organism grows and develops.

catabolism the phase of metabolism in which complex molecules are broken down into simpler ones, usually resulting in the release of energy (also see anabolism, the opposite process).

cell the smallest unit of an organism that is capable of independent functioning; it usually has a nucleus, cytoplasm, and various organelles, all surrounded by a cell membrane

cell membrane the membrane that encloses the cytoplasm of a cell.

cell wall the rigid, outermost cell layer found in plants and bacteria; it is not present in animal cells and adds support to the plant.

central dogma the theory in biology that states that DNA contains hereditary information that is transcribed into RNA molecules, which are then translated into protein molecules, which then produce a physical trait in an organism. The process proceeds in that direction only, not in reverse.

central nervous system consists of the brain and spinal cord; it controls the functions of the body in both a conscious as well as an unconscious manner.

chlorophyll a green pigment found in the chloroplasts of plants and other photosynthetic organisms; it is used to absorb sunlight energy, which is then used to fuel the photosynthesis process.

chloroplast a small cellular organelle that contains chlorophyll and is found in photosynthetic organisms such as plants, algae, and some protists.

chromosome a linear strand of DNA and proteins in cells that carries the genes and functions in the transmission of hereditary information.

chyme a thick, soft mass of partly digested food that is produced in the stomach and passed into the small intestines to be acted upon by digestive enzymes.

cilia the very tiny, hair-like projections extending from the surface of a cell; they aid in the movement of the cell itself or in the movement of any fluid around itself.

circulatory system the organ system consisting of the heart, blood vessels, and blood; it acts to pump blood around the body and thus transport oxygen and food molecules to the cells, and carbon dioxide and wastes away from the cells.

classification scheme a system used to organize the living organisms on Earth that includes the following groupings:

Kingdom Animal

Phylum Chordates (this means the wolf had a notochord that developed into its backbone)

Class Mammals (this means the wolf has hair, it bears live young, and nurses them with mammary glands)

Order Carnivores (this means the wolf is a meat eater)

Family Canids (this means the wolf has nonretractable claws, a long muzzle, and separate toes)

Genus *Canis* (this means the wolf is a member of the dog family)

Species *lupus* (this refers to a particular type of wolf known as the European wolf)

covalent bond a chemical bond formed by the sharing of one or more electrons between atoms.

dendrite multiple extensions at one end of a nerve cell (neuron) that receive a neurotransmitter signal from a preceding neuron and transmit an electrical impulse inward toward the cell body; a single neuron may possess many dendrites.

deoxyribonucleic acid (DNA) a molecule belonging to the nucleic acids group that carries the genetic information and is located in the cell's nucleus. DNA consists of two long chains of nucleotides twisted into a double spiral (a helix);

four distinct base molecules are used to make the nucleotides in DNA: adenine, guanine, cytosine, and thymine. The sequence of nucleotides determines the protein molecule that will be produced and thus the trait that will be exhibited.

detritivore small, mostly invertebrate animals such as pillbugs, dung beetles, and worms that eat decaying organic matter such as dried leaves. The dead organic matter is known as detritus (litter) and the organisms are called detritivores (detritus or litter eaters). They perform a valuable service in the ecosystem as they break down large pieces of organic matter into pieces small enough for bacteria and funguses to decompose completely.

DNA an abbreviation for deoxyribonucleic acid.

dominant designates a gene (allele) that produces a physical effect (an effect that appears as part of the phenotype) when present with a recessive gene (allele) or when present with a similar dominant allele for the same trait. It is expressed as part of the phenotype when it is present in the homozygous state (two copies of the dominant allele are present) and when in the heterozygous state (where it is present with a recessive allele).

ecology the science that studies the relationships between organisms and their physical environment.

ecosystem a combination of biotic and abiotic components through which energy flows and inorganic material recycles; an ecological community together with its physical environment that functions as a whole unit.

egg cell the female gamete.

electron a negatively charged subatomic particle found in layers surrounding the nucleus of an atom; it has very little mass. Interaction between electrons is the basis of chemical reactions and chemical bond formation.

element a substance composed of identical atoms; using ordinary chemical means, elements cannot be reduced to simpler substances without losing their unique properties.

endoskeleton an internal supporting skeleton composed of bones; it is found in vertebrates and is often just called the skeleton.

enzymes a protein molecule that acts as a catalyst in biochemical reactions; enzymes speed up the rate of a biochemical reaction.

evolution a change, over time, in the genetic composition of a population during many generations as a result of natural selection acting upon the genetic variation inherent among individual organisms in the population. It results in the development of a new species.

exoskeleton a hard outer structure that provides protection or support for some invertebrate organisms such as insects and crustaceans (lobsters and crabs).

fish a cold-blooded vertebrate living in an aquatic environment; it has fins, gills, and a streamlined body for swimming.

flagellum a long, thread-like projection used by some single cells or some single-celled organisms to move with a whip-like motion.

food chain a chain of organisms in an ecological community through which food energy passes from one organism to another as each consumes a lower member and, in turn, is preyed upon by an organism at a higher trophic level.

food web a web of interconnected food chains in an ecological community.

fragmentation a process of asexual reproduction in which a portion of a whole organism can grow into a whole organism; this is used extensively in multicellular invertebrates such as sea stars.

Fungi Kingdom organisms in this Kingdom have some characteristics of plants and other characteristics that make them more animal-like. They lack chlorophyll and cannot perform photosynthesis, so they don’t produce their own

food and are called heterotrophs. However, they reproduce by spores like plants do.

gamete the sex cells produced by either male or female that join together during sexual reproduction; sperm in males, egg cells in females.

gametophyte the gamete-producing phase of a plant during alternation of generations.

gastrula in animals, this is a stage of the embryo following the blastula and consists of a hollow ball of cells.

gene a sequence of DNA that occupies a specific location on a chromosome and determines a particular characteristic of an organism.

genotype the genetic makeup of an organism that ultimately determines the physical characteristics of that organism.

glucose a simple sugar with the chemical formula C6H12O6; it is the initial product of photosynthesis. Glucose is very common in animal and plant bodies, and is a major source of energy for living organisms.

gymnosperms the name we give to seed plants that do not form flowers. These plants were present on Earth before the flowering seed plants. Representatives of this group include pines, spruce, and cypresses.

habitat the part of the environment where an organism normally lives; a habitat provides food, water, shelter, and space for an organism.

heart a four-chambered muscular organ that pumps blood received from the veins into the arteries and through the lungs to maintain the flow of blood through the circulatory system.

hemoglobin a substance in red blood cells that contains iron and is able to attract and bond with oxygen and carbon dioxide; it is the oxygen- and carbon dioxide-carrying molecule of blood.

herbivore (primary consumer) an animal that feeds primarily on plants; because an herbivore occupies the trophic level immediately above plants, it is known as the primary or first-order consumer.

heterotroph an organism (such as an animal) that cannot synthesize its own food and is dependent on consuming organic matter by eating other organisms (either plants or other animals).

heterozygous a condition where one gene (allele) of a pair is different from the other.

homeostasis the ability of a living organism to maintain an internal equilibrium by adjusting its metabolic reactions.

homozygous a condition where both genes (alleles) of a pair are the same.

hyphae a thread-like filament that forms the mycelium of fungi.

inanimate refers to a nonliving thing; inanimate objects do not have the qualities of life.

inorganic matter that is not composed of organic compounds; examples would be elements such as calcium, nitrogen, and oxygen or compounds such as salt. Water is also inorganic.

invertebrate an organism that lacks a backbone or spinal column; examples are insects, crayfish, lobsters, clams, sponge, jellyfish, and sea stars.

ion an atom that has acquired an electric charge by gaining one or more electrons (resulting in a negative charge) or losing one or more electrons (resulting in a positive charge).

ionic bond a chemical bond between two ions with opposite charges; most salts such as sodium chloride contain ionic bonds.

kidneys a pair of organs in the urinary system that filter wastes from blood while retaining necessary nutrients and water; the liquid formed by the kidneys is called urine.

Kingdom in the Linnean classification scheme, the highest category into which organisms are grouped; the five Kingdoms often used are animal, plant, fungus, protist, and monera (bacteria).

larynx the part of the respiratory system between the pharynx (the top of the throat) and the trachea (the tube leading to the lungs) that contains the vocal cords.

left atrium one of the four chambers of the heart; it receives oxygenated blood from the lungs via the pulmonary vein.

left ventricle one of the four chambers of the heart; it receives oxygenated blood from the left atrium and then pushes it out through the aorta to the rest of the body.

ligaments tough, fibrous connective tissue that connects bones together at a joint.

lung a spongy, sac-like organ that contains the alveoli where gas exchange takes place; it is part of the respiratory system.

lipid an organic molecule that is insoluble in water and feels oily. Examples are fats, oils, waxes, and triglycerides.

mammal a warm-blooded vertebrate animal with a covering of hair on the skin and milkproducing glands; humans are mammals.

marrow fatty, vascular tissue in animals that fills up many of the interior cavities of bones and is the source of red blood cells and many of the white blood cells.

metabolism all the biochemical processes that occur within a living thing that are necessary for the maintenance of life.

microbe a very small organism that cannot be seen with the unaided eye and requires the use of a microscope or at least a magnifying lens. We can also detect microorganisms by chemical tests; these living beings are everywhere, even in extreme environments such as very hot springs, very cold and dry areas, and even deep in the ocean under tremendous pressure. Some of these organisms cause diseases in animals, plants, and humans; however, most are beneficial to us and the Earth’s ecosystems. In fact, we are utterly dependent upon microbes for our quality of life.

microorganism *see* microbe.

molecules the smallest unit of a substance that still has the same chemical and physical properties of the substance and is composed of two or more atoms; this can be a group of similar or different atoms held together.

Monera Kingdom this is the Kingdom that contains bacteria; all these organisms are single celled and do not contain a nucleus.

morula a spherical ball of embryonic cells that comes before the blastula.

muscular system the system of organs responsible for movement, it consists of skeletal, cardiac, and smooth muscle tissue.

mycelium a large mass of interconnected, branching hyphae is called the mycelium and constitutes the main body of the multicellular fungi. However, the mycelium is usually not seen because it is hidden throughout the food source being consumed.

myosin a protein in muscles that works in conjunction with actin to produce muscle contraction.

natural selection the process by which organisms best adapted to their environment will tend to survive and reproduce, while those less adapted will not survive or will not reproduce. This results in a new species; this contrasts with artificial selection.

nephrons tiny filtering units found in the kidney that remove wastes from the blood, but preserve water and other valuable substances. They are responsible for the production of urine.

neurotransmitter a chemical substance released at the end of a nerve axon that crosses the gap (the synapse) between itself and the dendrite end of the next nerve cell. Upon arrival at the dendrite, it will either excite or inhibit the nerve cell.

nervous system the organ system that regulates the body's responses to internal and external stimuli. In vertebrate animals, it includes the brain, spinal cord, nerves, and sense organs; the basic cell of the nervous system is the neuron.

neuron a cell of the nervous system that conducts electrical impulses.

neutron an electrically neutral subatomic particle that exists in the nucleus along with protons; it has a mass that, when combined with the mass of any

protons also in the nucleus, results in almost the entire mass of the atom (electrons are very small in mass).

nucleic acid an organic molecule found in all living cells and viruses; nucleic acids in the form of molecules called deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) control cellular functions and heredity.

nucleotide the molecule that is linked together to form the DNA or RNA polymer; it consists of a sugar (ribose or deoxyribose), a phosphate, and a base molecule (guanine, cytosine, thymine, adenine, or uracil).

organic matter that is related to or derived from living organisms; matter from living organisms that contains carbon.

oxygen a colorless, odorless gas that makes up about 21% of the atmosphere; it is produced by plants during photosynthesis and is used by most living organisms in respiration and metabolism of organic matter.

parasympathetic division a division of the autonomic nervous system, it is responsible for the rest and digest response by slowing the body down.

peripheral nervous system consists of nerves that connect the central nervous system to the rest of the body; it connects the brain and spinal cord to all parts of the body, including sensory nerves that bring information to the central nervous system and motor nerves that carry signals away from the brain and to the muscles, glands, or organs.

peristalsis wave-like contractions of smooth muscle in the digestive system that move food along.

pharynx the upper throat and nasal cavities; leads into the larynx.

phenotype the observable physical or biochemical characteristic of an organism as determined by its genetic makeup and environmental influences.

phloem plant tissue that has small tubes that transport food between the leaves and the roots; it is found in vascular plants only (seed and nonseed varieties).

photosynthesis the biochemical process in green plants and certain other organisms (some bacteria and protists) during which organic matter is synthesized from carbon dioxide and water using light as an energy source; oxygen is released as a byproduct.

Plant Kingdom organisms in this Kingdom are multicellular and use chlorophyll in specialized cellular structures called chloroplasts to capture sunlight energy and convert it into organic matter.

plasma a pale yellow fluid that contains proteins, blood cells, and platelets; it is the fluid portion of blood.

platelets a tiny cellular fragment that is critical in the blood-clotting process.

predator an organism that lives by preying on other organisms; the term is used most often to describe carnivores in food chains and food webs.

prey an animal hunted or caught for food; the term is used most often to describe herbivores or lower trophic-level consumers in food chains and food webs.

primary producers a photosynthetic organism such as a green plant that exists at the first trophic level in a food chain; an autotrophic organism.

proteins a group of complex organic molecules that contains carbon, hydrogen, oxygen, nitrogen, and usually sulfur and are composed of one or more chains of amino acids. Proteins are fundamental components of all living cells and include many substances, such as enzymes, hormones, and antibodies, that are necessary for the proper functioning of an organism.

Protist Kingdom this Kingdom includes single-celled organisms that contain a nucleus as part of their structure. Some are autotrophs and some are heterotrophs.

protons a positively charged subatomic particle found in the nucleus. It has mass, and the number of protons indicates the atomic number of an element and its position on the periodic table of elements.

protoplasm a semifluid, semigel substance that makes up the living matter of organisms; it is found inside the cell membrane and contains the floating organelles.

pulmonary artery an artery that carries nonoxygenated blood from the right ventricle of the heart to the lungs; this is the only artery that carries nonoxygenated

blood, but because it is an artery, it carries blood away from the heart like all other arteries.

pulmonary veins a vein that carries oxygenated blood from the lungs to the left atrium of the heart; this is the only vein that carries oxygenated blood, but because it is a vein, it carries blood toward the heart like all other veins.

recessive designates a gene (allele) that does not produce a physical effect (an effect that will not appear as part of the phenotype) when present with a dominant gene (allele). It is expressed as part of the phenotype when it is present in the homozygous state (two copies of the recessive allele are present without a dominant allele also present).

red blood cells the cells in the bloodstream that have hemoglobin and carry oxygen to the body cells and carbon dioxide to the lungs; mature red blood cells do not have a nucleus.

renal system the organ system that includes the kidneys, ureters, urinary bladder, and urethra; it is responsible for filtering wastes from blood and then excreting these wastes in the form of urine. It is also called the urinary system.

reptile an organism that is a cold-blooded, usually egg-laying vertebrate of the class Reptilia. Examples are snakes, lizards, crocodiles, turtles, or dinosaurs. These organisms have an external covering of scales or horny plates and breathe with lungs.

respiration the act of inhaling and exhaling, or breathing. It can also refer to the process occurring within living cells where the energy in the chemical bonds of food is released in a series of steps that are made more efficient when the consumption of oxygen is involved. It is also known as cellular respiration and aerobic respiration when oxygen is involved or anaerobic respiration when done in the absence of oxygen.

respiratory system the body system consisting of the lungs, trachea, bronchi, bronchioles, and alveoli. It is designed for the inhalation of air and the exchange of bodily gases with that air that results in oxygenated blood. It works closely with

the cardiac system so that oxygenated blood can then be distributed throughout the body.

ribonucleic acid (RNA) a polymer existing in all living cells. It is used to translate the genetic information contained in DNA into proteins.

right atrium one of the four chambers of the heart that receives nonoxygenated blood from the body through the vena cava.

right ventricle one of the four chambers of the heart that receives nonoxygenated blood from the right atrium and then pumps it to the lungs for oxygenation through the pulmonary artery.

RNA an abbreviation for ribonucleic acid.

seeded vascular plants plants that have become dominant on the earth today because they have developed pollen and seeds as adaptations.

seedless vascular plants these include club mosses, horsetails, and ferns; these plants must be in moist environments because they need water to reproduce.

sexual reproduction reproduction that involves the union of gametes from the male (sperm) and the female (egg cells).

skeletal (or striated) muscle muscle tissue that is consciously controlled by the central nervous system; this type of muscle is attached to the bones, and when it contracts, it moves the bones. This muscle is the one that forms the visible muscles and much of the mass of the body.

skeletal system the organ system that consists of bones, cartilage, and joints; supports and protects the body; produces red blood cells in the marrow of bones; and stores and releases minerals.

smooth muscle a type of muscle tissue that is usually not under conscious control; this type is usually found in the internal organs (especially the intestinal tract and in the walls of blood vessels).

sperm the male gamete.

spinal cord a cord of nerves that extends from the lower brain stem through the spinal column (vertebral column) and from which the spinal nerves branch off to various parts of the body.

sporophyte the spore-producing phase of a plant during the alternation of generations.

stomata tiny pores in the surface of a leaf or stem through which gases and water vapor pass.

sugar a compound that is water soluble, is crystalline, and belongs to the larger classification known as carbohydrates; examples are sucrose and glucose. It has a sweet taste.

sympathetic division a division of the autonomic nervous system, it is responsible for the fight or flight response by preparing the body for high energy, stressful situations.

synapse the gap across which a nerve signal passes from an axon terminal to a dendrite of another neuron or to a muscle cell or a gland; the signal is transmitted as a chemical message using a neurotransmitter molecule.

tendon tough, fibrous connective tissue that connects a muscle to a bone.

trachea a tube that is part of the respiratory system; it leads from the larynx to the bronchi and carries air toward the lungs. It is also called thewindpipe.

tracheophytes trachea refers to “tube,” and these vascular plants have tubes (vessels) that provide support and a means of transporting water and nutrients throughout the plant’s body. Vascularplants can thus grow very tall, up to hundreds of feet. This group is further broken down into two types, the seedless vascular plants and the seeded vascular plants.

trophic (or feeding) level a group of organisms that occupy the same position in a food chain or food web; the level at which an organism exists in a food chain. Lower trophic levels are preyed upon by higher trophic levels. Plants occupy the first trophic level and are also known as producers, herbivores occupy the second trophic level and are known as primary consumers, and carnivores occupy the various levels above the herbivores and are known as primary, secondary, or tertiary consumers depending upon how many food chain links are below them.

ureter a tube that leads from a kidney to the urinary bladder; one ureter exists for each kidney. It transports urine from the kidneys to storage in the urinary bladder.

urethra a tube that leads from the urinary bladder to the outside of the body; it is used to excrete urine.

urinary bladder a sac-like organ that receives urine from the kidneys; as it fills, a signal to excrete urine is recognized by the brain, and the urge to void urine is felt.

urinary system *see* renal system.

urine the water-based liquid produced by the kidneys that contains nitrogen wastes from cellular metabolism as well as some salts and other wastes or harmful substances. It is excreted from the body through the urinary system.

vena cava a large vein (there are two) that carries blood to the heart from the upper body and the lower body; they empty into the right atrium of the heart.

vertebrates animals that have a backbone or spinal column. These include mammals, fish, birds, reptiles, and amphibians.

villus a tiny, finger-like projection inside the small intestine; the thousands of villi present in the small intestine greatly increase the surface area available for nutrient absorption; its plural is villi.

venules a small vein, usually joined to capillaries.

white blood cells various types of blood cells (except for the red blood cells) that have a nucleus. They are used by the body as part of the immune system to protect itself from disease and infection.

xylem plant tissue that supports and transports water from the roots to the leaves; it is found in vascular plants only (seed and nonseed varieties).

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