

UNIT 6. AQUATIC ECOSYSTEMS

Key words

transparent – прозорий	to be responsible for – відповідати за
constituent – складова частина	sediment – осад
to connect – з'єднати	steam – пар
pressure – тиск	to condense – конденсувати
solid – твердий	salt content – вміст солі
to occur – відбуватися	strait – пролив
groundwater – підземні води	gulf – затока
glacier – льодовик	to estimate – оцінювати
freshwater – прісна вода	density – щільність
solvent – розчинник	to recycle – переробляти
destruction – руйнування	supply – постачання

Ex.6.1. Discuss the following questions:

1. What do you know about water?
2. What is its chemical formula?
3. Why is water important for life?

Ex.6.2. Read the text and check your answers.

The Importance of Water for Life

Water is the transparent, tasteless, odorless, and nearly colorless chemical substance that is the main constituent of Earth's streams, lakes, and oceans, and the fluids of most living organisms, and that is vital for all known forms of life, even though it provides no calories or organic nutrients. Its chemical formula is H₂O, meaning that each of its molecules contains one oxygen and two hydrogen atoms connected by covalent bonds. Water is the name of the liquid state of H₂O at standard ambient temperature and pressure. It forms precipitation in the form of rain and aerosols in the form of fog. Clouds are formed from droplets of water and ice, its solid state. When finely divided, crystalline ice may precipitate in the form of snow. The gaseous state of water is steam or water vapor. Water moves continually through the water cycle of evaporation, transpiration, condensation, precipitation, and runoff, usually reaching the sea.

Water covers 71 % of the Earth's surface, mostly in seas and oceans. Small portions of water occur as groundwater (1.7 %), in the glaciers and the ice caps of Antarctica and Greenland (1.7 %), and in the air as vapor, clouds and precipitation (0.001 %).

Water plays an important role in the world economy. Approximately 70 % of the freshwater used by humans goes to agriculture. Fishing in salt and fresh water bodies is a major source of food for many parts of the world. Much of long-distance trade of commodities (such as oil and natural gas) and manufactured products is transported by boats through seas, rivers, lakes, and canals. Large quantities of water, ice, and steam are used for cooling and heating, in industry and homes. Water is an excellent solvent for a wide variety of chemical substances, it is widely used in industrial processes, in cooking and washing. Water is important in many geological processes. Groundwater is present in most rocks, and the pressure of this groundwater affects patterns of faulting. Water in the mantle is responsible for the melt that produces volcanoes at subduction zones. On the surface of the Earth, water is important in both chemical and physical weathering processes. Water, and to a lesser but still significant extent, ice, are also responsible for a large amount of sediment transport that occurs on the surface of the earth. Deposition of transported sediment forms many types of sedimentary rocks, which make up the geologic record of Earth history.

Ex.6.3. Match the words with their definitions:

- | | |
|----------------|---|
| 1) constituent | a) a slowly moving mass of ice formed by the accumulation and compaction of snow on mountains or near the poles |
| 2) pressure | b) matter that settles to the bottom of a liquid |
| 3) occur | c) continuous physical force exerted on or against an object by something in contact with it |
| 4) solid | d) water held underground in the soil or in pores and crevices in rock |
| 5) glacier | e) the action or process of causing so much damage to something that it no longer exists or cannot be repaired |

- | | |
|-----------------|---|
| 6) recycle | f) being a part of a whole |
| 7) groundwater | g) allowing light to pass through so that objects behind can be distinctly seen |
| 8) sediment | h) happen; take place |
| 9) destruction | i) firm and stable in shape; not liquid or fluid |
| 10) transparent | j) convert (waste) into reusable material |

Ex.6.4. For questions 1–15, read the text below and decide which word (a, b, c or d) best fits each space. There's an example at the beginning (0).

Water

Water is one of our most (0) ...*B*... resources; to (1) ... it simply, without water there would be no life. Unfortunately many of us seem to have (2) ... this fact, and as a result the world is (3) ... the danger of running (4) ... water. The actual (5) ... of water on earth has changed little since the time of the dinosaurs. The problem has been (6) ... by people's misuse of our water supply. This not only (7) ... that we have polluted our rivers and seas, but also that we are (8) ... a great deal of this precious resource. Unfortunately, the destruction of the rain forests has (9) ... this problem worse since much of the rain that falls is (10) ... because it runs off into the sea. The population of the earth is increasing daily, so it is vital that we (11) ... a solution to this problem before it is too late. The first step is to educate people, especially by reminding them of the (12) ... of water. For most of us it is available whenever we (13) ... it, whether to bathe in or to drink, so we seldom bother to think about it. People then need to be taught how to reuse or recycle water. One of the simplest ways of doing this is to reuse bath or shower water for (14) ... cleaning or watering the garden. Ponds which filter used water are also becoming popular. Whatever methods we might decide to use, we must (15) ... the worth of water and how we can conserve it.

- | | | | |
|--------------------|--------------------|------------------|--------------------|
| 0) a) <i>valid</i> | b) <i>precious</i> | c) <i>worthy</i> | d) <i>superior</i> |
| 1) a) show | b) make | c) write | d) put |
| 2) a) looked over | b) omitted | c) forgotten | d) missed |
| 3) a) facing | b) witnessing | c) viewing | d) noticing |
| 4) a) out of | b) into | c) off | d) away with |
| 5) a) sum | b) total | c) number | d) amount |
| 6) a) brought out | b) caused | c) done | d) happened |

- 7) a) underlines b) says c) means d) proves
 8) a) exploiting b) wasting c) spending d) throwing
 9) a) caused b) done c) created d) made
 10) a) missed b) fallen c) lost d) given up
 11) a) recover b) work c) come up d) find
 12) a) value b) cost c) price d) tag
 13) a) ask b) require c) command d) open
 14) a) housing b) household c) housekeeping d) housework
 15) a) comprehend b) estimate c) perceive d) realize

Ex.6.5. Complete the table with verbs.

Noun	Verb
<i>e.g. prediction</i>	<i>predict</i>
threat	
rotation	
evacuation	
survival	
contamination	
addition	
circulation	

Ex.6.6. Complete the table with adjectives.

Noun	Adjective
<i>e.g. chemistry</i>	<i>chemical</i>
importance	
universe	
insufficiency	
efficiency	
evidence	
catastrophe	

Ex.6.7. Read the text and answer the questions below.

Water Environment. Oceans

As it is seen from space, our planet is a brilliant blue sphere – a world of water. Indeed, it can be said that this planet is quite misnamed, for solid ‘earth’ covers only a fraction of its surface. Oceans cover 71 %

of the globe, almost 140 million square miles (362 million square kilometers). Moreover, the tallest mountains found on land would easily disappear if dropped into the deepest ocean trench. It was not always this way.

THE ORIGIN OF OCEANS

Some 4 billion years ago, Earth's surface was so hot that water evaporated on contact. Although the young planet's surface was dry, its atmosphere was filled with volcanic steam and dust. This thick cloud cover shielded Earth from the blazing Sun, and so helped cool it. As temperatures dropped, the atmospheric steam and dust began to condense into rain. The resulting downpour lasted for thousands of years. When the clouds finally parted, Earth had been transformed into a sparkling blue orb. One vast ocean blanketed the entire planet. Above the ocean's surface peeked the tips of the tallest volcanoes – the world's first islands.

Earth's primordial ocean was barely salty. Only later, after continents had formed, rain and waves washed salt and minerals from the land into the sea. The gradual leaching away of the continents increased the salt content until it reached the level that exists today.

After hundreds of millions of years, the rising continents took their present form – dividing Earth's primordial sea into three major oceans: the Pacific, Atlantic, and Indian. The Arctic Ocean, considered by many oceanographers to be a marginal sea of the Atlantic, is nonetheless often elevated to ocean status.

Although the oceans are distinct in character, all are interconnected. Each of the oceans contains many smaller sections, called seas, which are sometimes separated from the open ocean by a narrow opening called a strait. The Mediterranean and Caribbean are among the best known of the world's seas, which total 70 in number. Gulfs and bays are small sections of ocean that border land.

WHAT IS SEAWATER?

All the world's oceans and seas share certain basic traits. Certainly all are salty. Common salt, or sodium chloride, is the most abundant, but by no means the only, salt found in seawater. Seawater also contains magnesium, calcium, and potassium salts. The overall salt content of seawater is about 3.5 %. Of this fraction, 85 % is sodium chloride.

The saltiness, or salinity, of seawater varies slightly from place to place. The least saline seawater is found in the Baltic Sea. Its salt content is just 1 %. The saltiest seawater is found in parts of the Red Sea, where salinity soars to 27 %.

The variance in saltiness depends largely on climate. Abundant rainfall tends to decrease, or dilute, the salt content of seawater. Strong sunlight and high year-round temperatures increase salinity through evaporation.

The temperature of deep-ocean waters is more or less uniform around the world: just above freezing. But surface temperatures vary widely depending on latitude, seafloor depth, and prevailing ocean currents.

As might well be expected, ocean surface temperatures are highest in the tropics, where the water is continually warmed by strong sunlight. The highest ocean temperatures in the world, 96 °F (36 °C), occur in the shallow waters of the Persian Gulf.

Surface waters are coldest near the poles, where the Sun stays low in the sky throughout the year. The coldest—several degrees below freezing—can be found in Russia’s White Sea. Currents, which act like distinct rivers within the larger ocean, often contain unusually warm or cool waters. As a result, the Pacific Ocean waters are noticeably warmer on the North American side than they are on the Russian side.

Another important quality of seawater is its density, or specific gravity. Owing to its saltiness, seawater is denser, or ‘heavier’, than freshwater. The density of ocean water depends not only on its salinity, but also on its temperature: warmer water tends to be less dense than cold water. The greatest variance in ocean-water density occurs near the ocean surface, where water is subject to the influences of the weather. In general, density decreases in areas where freshwater is added to the ocean through runoff from land, melting of ice, or precipitation. The density of seawater increases with cooling and when freshwater is removed through the process of evaporation.

1. What is the origin of oceans?
2. What are three major oceans?
3. What do oceans include?
4. What common traits do oceans and seas share?

5. Where can the least saline / the saltiest seawater be found?
6. What does the variance in saltiness depend on?
7. Why are the Pacific Ocean waters warmer on the North American side than on the Russian side?
8. What does the density of ocean water depend on?

Ex.6.8. Work out all possible word combinations from column A and B and translate them into Ukrainian.

A	B
to cover	freshwater
to increase	temperature
to reach	salt content
to contain	surface
to border	level
to share	land
to depend on	sections
to decrease	traits
to remove	magnesium
	climate
	latitude
	seafloor depth
	ocean currents
	warm or cool waters

Ex.6.9. Complete the following sentences with the words from the box.

surface condense share freshwater varies density interconnected temperatures

1. All the world's oceans and seas ... certain basic traits.
2. Although the young planet's ... was dry, its atmosphere was filled with volcanic steam and dust.
3. As temperatures dropped, the atmospheric steam and dust began to ... into rain.
4. Although the oceans are distinct in character, all are
5. The saltiness, or salinity, of seawater ... slightly from place to place.

6. The highest ocean ... in the world, 96 °F (36 °C), occur in the shallow waters of the Persian Gulf.

7. Another important quality of seawater is its ..., or specific gravity.

8. Density decreases in areas where ... is added to the ocean through runoff from land, melting of ice, or precipitation.

Ex.6.10. Complete the following paragraph with the prepositions from the box.

by into for from of×3 in×2

The Pacific Ocean

The Pacific Ocean is by far the world's largest and deepest body ... water. The Ocean floor can be divided ... three main regions. Most of the Pacific is blessed with an even climate marked ... pleasant, steady trade winds. But storms of great violence, known as typhoons, occur ... the western Pacific. The Ocean is rich ... natural resources. Its vast fisheries supply three-fifths ... the world's catch, with tuna and salmon especially abundant. Salt, magnesium, sand, and gravel are harvested ... the Pacific's coastal regions. The Pacific is also used as a dumping ground ... vast amounts of waste. Although the Ocean as a whole has been able to absorb and dilute much of it, some ... the smaller seas and other local areas have become seriously polluted.

Ex.6.11. Read a magazine article about ocean exploration. Eight paragraphs have been removed from the article. Choose from the paragraphs (A–I) the one which fits each gap (1–7). There is one extra paragraph which you do not need to use. There is an example at the beginning (0).

Ocean Exploration

Although there has always been great interest in what mysteries the oceans hold, it has only been in recent decades that modern technology has enabled scientists to start exploring the ocean floor. As recently as the 1960's, scientists made developments in sounding and in recording what happened beneath the sea.

0 | H

Many nations took part in efforts to develop new ways of discovering the secrets of the oceans. They were interested in exploiting areas containing rich mineral deposits as well as documenting the wide variety of life forms found in the depths. They were also interested in investigating the earth's structure. The first step was to make maps of the ocean floor.

1 |

The sea bed is covered in mountain ranges, plains and valleys and can be hazardous for submarine vehicles. But detailed knowledge of the floor of the seas and oceans was also needed for a proper understanding of the constant movement of the earth's surface, such as the creation of new mountain ranges and the eruption of volcanoes. Such an eruption was recently witnessed by the crew of the Alvin, a unique type of submarine.

2 |

The cold sea water had hardened the lava. Other flows had broken into what looked like black glass, and hot fluids were bursting from the sea floor. The temperature outside the Alvin began to rise and the crew realised they had arrived in the middle of a volcanic eruption.

3 |

There would be a chance to record the chemical and geological changes, as well as the renewal of plant and animal life. They'd come to this particular spot because cameras had spotted an area that was rising rapidly. There'd also been an increase in active hot springs. The rising area suggested there might be an eruption, and that is exactly what happened in 1991.

4 |

During the first dive (April 1991) it was obvious there'd just been a volcanic eruption. Fresh lava lay on the sea bed, which was discovered to have been less than 2 weeks old. It seemed they had missed the explosion. There was a huge hole in the sea bed. Nothing was left alive.

5 |

The scientists dropped a marker so they could return to the spot and check the progress of the area. At this same spot just 21 months

later, giant tube worms had grown to a length of four feet. More discoveries were in store for the divers, though. Mineral chimneys allow fluid and steam to escape from the lava.

6

To do this, they took samples of water and minerals from the chimneys for analysis. Due to the heat caused by the eruption they put thermometers into the chimneys to discover the temperature of the sea water.

7

As they chanced to be in the right place at the right time, exciting discoveries have been made to help us understand the mysteries of the deep.

A. Although they saw no movement of lava, they knew they had stumbled on a unique opportunity. On return visits they could collect new data on the changes taking place.

B. The reason for mapping the sea bed was to aid submarines, like the Alvin, which are nowadays able to descend to great depths. The maps enable scientists to guide these submarines to prevent them from having accidents.

C. A year later, in March, 1992, a white mat of bacteria had covered the lava. This bacteria had attracted an army of crabs which were feeding off it, and plants had begun to appear.

D. At this depth seawater won't boil until it reaches 730 °Fahrenheit. In one of the chimneys they took the temperature of the water and it was 757 °F. This is one of the hottest temperatures ever recorded on the seafloor.

E. In April, 1991, after a one and a half hour descent to the bed of the Pacific Ocean, the crew of the Alvin did not see the sea life they expected. Instead they saw a scene of catastrophe. Fresh lava from a volcano had destroyed everything.

F. This, though, was the first time scientists had been able to witness the growth of these chimneys from birth and watch the development of an underwater 'plumbing' system.

G. Immediately after the eruption all kinds of animal life swarmed to the area in the hope of finding large quantities of food. This was the scene the divers witnessed when they arrived.

H. But they had to rely on irregular reports from ships that were on the surface of the water. The data that was collected was unreliable, so new methods of reaching the ocean floor had to be developed.

I. Since then scientists have returned twice, in March, 1992 and December, 1993. In the three years since the explosion there has been rapid change on the seabed.

Ex.6.12. Fill in the gaps with an appropriate word from the box:

renewal	constant	eruption	rapidly	samples	exploiting
	fluids	deposits	unique	hazardous	

1. After the volcanic... people fled from the boiling lava. (*explosion*)
2. Mountain climbing can be a(n) ... hobby. (*dangerous*)
3. Saudi Arabia is rich due to its many oil ... (*reserves, resources*)
4. The river banks were worn away by the ... flow of water. (*continuous*)
5. He became rich by ... the gold mine. (*extracting resources from*)
6. His ... strength meant he could do things others only dreamed about. (*one-of-a-kind*)
7. Drink water in the morning to replace lost body (*liquids*)
8. After a forest fire, the ... of the woodland occurs surprisingly quickly. (*recovery*)
9. The water level rose ... and soon the river burst its banks. (*quickly*)
10. The scientist collected ... of plants for analysis in his lab. (*specimens*)

Ex.6.13. Read the text and answer the questions.

Groundwater

Groundwater is water that occurs below the surface of Earth, where it occupies all or part of the void spaces in soils or geologic strata. It is also called subsurface water to distinguish it from surface water, which is found in large bodies like the oceans or lakes or which flows overland in streams. Both surface and subsurface water are related through the hydrologic cycle (the continuous circulation of water in the Earth-atmosphere system).

Most groundwater comes from precipitation. Precipitation infiltrates below the ground surface into the soil zone. When the soil zone becomes saturated, water percolates downward. A zone of saturation occurs where all the interstices are filled with water. There is also a zone of aeration where the interstices are occupied partially by water and partially by air. Groundwater continues to descend until, at some depth, it merges into a zone of dense rock. Water is contained in the pores of such rocks, but the pores are not connected and water will not migrate. The process of precipitation replenishing the groundwater supply is known as recharge. In general, recharge occurs only during the rainy season in tropical climates or during winter in temperate climates. Typically, 10 to 20 percent of the precipitation that falls to the Earth enters water-bearing strata (aquifers).

Groundwater is constantly in motion. Compared to surface water, it moves very slowly, the actual rate dependent on the transmissivity and storage capacity of the aquifer. Natural outflows of groundwater take place through springs and riverbeds when the groundwater pressure is higher than atmospheric pressure in the vicinity of the ground surface. Internal circulation is not easily determined, but near the water table the average cycling time of water may be a year or less, while in deep aquifers it may be as long as thousands of years.

Groundwater plays a vital role in the development of arid and semiarid zones, sometimes supporting vast agricultural and industrial enterprises that could not otherwise exist. It is particularly fortunate that aquifers antedating the formation of deserts remain unaffected by increases in aridity with the passage of time. Withdrawal, however, will deplete even the largest of groundwater basins so that development based on the existence of aquifers can be only temporary at best.

A vast amount of groundwater is distributed throughout the world, and a large number of groundwater reservoirs are still underdeveloped or uninvestigated. Scientists estimate that some 5.97 quintillion gallons (22.6 million cubic km) of groundwater reside in the upper 2 km (1.2 miles) of Earth's surface. The most frequently investigated or exploited groundwater reservoirs are of the unconsolidated clastic (mainly sand and gravel) or carbonate hardrock type found in alluvial valleys and coastal plains under temperate or arid conditions.

Though some groundwater dissolves substances from rocks and may contain traces of old seawater, most groundwater is free of pathogenic organisms, and purification for domestic or industrial use is not necessary. Furthermore, groundwater supplies are not seriously affected by short droughts and are available in many areas that do not have dependable surface water supplies.

1. Where does groundwater come from?
2. What process is called recharge?
3. When and where does recharge occur?
4. How deep can groundwater be found?
5. Why is it not necessary to purify groundwater for domestic use?

Ex.6.14. Match the sentence halves:

- | | |
|---|--|
| 1) Surface water is found in large bodies... | a) ...the rainy season in tropical climates. |
| 2) Most groundwater comes... | b) ...as recharge. |
| 3) Recharge occurs only during... | c) ...like the oceans or lakes. |
| 4) The process of precipitation replenishing the groundwater supply is known... | d) ...of pathogenic organisms. |
| 5) A vast amount of groundwater is distributed... | e) ...from precipitation. |
| 6) Most groundwater is free... | f) ...throughout the world. |

Ex.6.15. Match the words with their opposites:

- | | |
|-------------|--------------|
| 1) shallow | a) portable |
| 2) low | b) expensive |
| 3) immobile | c) hidden |
| 4) liquid | d) deep |
| 5) cheap | e) fresh |
| 6) visible | f) wet |
| 7) dry | g) weak |
| 8) salty | h) heavy |
| 9) strong | i) solid |
| 10) light | j) high |

Ex.6.16. Read the article and circle the correct answer for items 1 to 4.

What is the problem discussed? Which paragraphs include the writer's suggestions? What are these suggestions? What results/examples does the writer use to support his suggestions?

Water, Water Everywhere...

Imagine a world with no drinking water, and no water to wash or cook with. It's hard to imagine this, because we use water every day without even thinking about it. Yet there are terrible water shortages all over the world. In parts of Africa and China, for example, many people don't even have clean water to drink. In fact, over half of the people in the world have to live with water shortages every day. We all need water – not just for our homes and factories, but to survive. Fortunately, there are things that we can all do to save water.

The solution begins at home. We can save the water from our baths and use it for the garden, instead of wasting hundreds of litres of clean water on our lawns and plants. This would help to save many litres of water every day, especially in the summer.

Governments can help by passing laws to stop factories from wasting and polluting water. If factories recycled water and stopped pouring chemicals into our lakes and rivers, there would be a lot more clean water around.

Governments could also stop water companies from wasting millions of litres of water because of leaking pipes. Many cities have successfully saved water by repairing pipes.

All in all, there are many things we can do to save our planet's disappearing water supplies. The time has come to start understanding the value of water, before a world without clean water becomes a terrible reality.

1. The writer says that in many parts of the world people
 - a) don't have water at all.
 - b) don't have any clean water.
 - c) have too much water.
2. The writer suggests that we should
 - a) use more water at home.
 - b) stop using water at home.
 - c) stop using so much water at home.

3. There would be more clean water around if factories
 - a) produced more water.
 - b) used the same water several times.
 - c) only used water from rivers and lakes.
4. Water companies can help
 - a) by fixing pipes.
 - b) by giving us more water.
 - c) by making people pay a lot more.

Ex.6.17. Choose the best option to complete the text.

What is the water cycle?

Earth has a limited amount of water. So that water (1) ... going around. We call it the water cycle. The water cycle begins (2) ... evaporation. Evaporation is (3) ... the sun heats up water in rivers, lakes or the ocean, then (4) ... it into water vapor or steam. The water vapor or steam leaves the body of water (5) ... goes into the air. Transpiration is the process by (6) ... plants lose water out of their leaves. Condensation is when water vapor in the air gets cold and changes back into water to (7) ... clouds. Think of it this way. When you open a cold soda on a hot summer day, your soda will start (8) ... as water droplets form on the outside of the can. Precipitation occurs when so much water has condensed that the air can't hold (9) ... anymore. This is (10) ... we get rain or snow. Collection happens when the precipitation falls and (11) ... back in the oceans, lakes and rivers. When it falls to the ground, it will soak into the earth and (12)... ground water. This is the water cycle and it just keeps repeating.

- | | | | | |
|-----|-------------|-----------------|--------------|------------------|
| 1) | a) grows | b) keeps | c) takes | d) makes |
| 2) | a) on | b) at | c) by | d) with |
| 3) | a) when | b) why | c) what | d) where |
| 4) | a) pulls | b) turns | c) builds | d) gives |
| 5) | a) or | b) so | c) and | d) but |
| 6) | a) whose | b) whom | c) what | d) which |
| 7) | a) form | b) follow | c) find | d) feel |
| 8) | a) sweated | b) sweat | c) to sweat | d) sweats |
| 9) | a) them | b) it | c) they | d) there |
| 10) | a) what | b) who | c) which | d) how |
| 11) | a) collects | b) is collected | c) collected | d) was collected |
| 12) | a) become | b) change | c) cover | d) pick |

UNIT. 7 NATURAL DISASTERS

Key words

lightning – блискавка	charge – заряд
thunderstorm – гроза	current – електричний струм
thunder – грім	tornado – торнадо
sleet – дощ зі снігом	hurricane – ураган
hail – град	tsunami – цунамі
flash – спалах	flood – повені
precipitation – опади	avalanche – лавина
lightning bolt – блискавка	volcano – вулкан
storm cloud – штормова хмара	earthquake – землетрус

Ex.7.1. Read the text and answer the questions.

1. What is a thunderstorm?
2. Where do thunderstorms occur?
3. What do they usually accompanied by?
4. What do thunderstorms result from?
5. Where can thunderstorms occur?
6. Why are thunderstorms dangerous?

Thunderstorm

A thunderstorm, also known as an electrical storm, lightning storm, or thundershower, is a storm characterized by the presence of lightning and its acoustic effect on the Earth's atmosphere, known as thunder. Thunderstorms occur in a type of cloud known as a cumulonimbus. They are usually accompanied by strong winds, heavy rain, and sometimes snow, sleet, hail, or, in contrast, no precipitation at all. Thunderstorms may line up in a series or become a rainband, known as a squall line. Strong or severe thunderstorms include some of the most dangerous weather phenomena, including large hail, strong winds, and tornadoes. Some of the most persistent severe thunderstorms, known as supercells, rotate as do cyclones. While most thunderstorms move with the mean wind flow through the layer of the troposphere that they occupy, vertical wind shear sometimes causes a deviation in their course at a right angle to the wind shear direction.

Thunderstorms result from the rapid upward movement of warm, moist air, sometimes along a front. As the warm, moist air moves upward, it cools, condenses, and forms a cumulonimbus cloud that can reach heights of over 20 km (12 mi). As the rising air reaches its dew point temperature, water vapor condenses into water droplets or ice, reducing pressure locally within the thunderstorm cell. Any precipitation falls the long distance through the clouds towards the Earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft as it pulls cold air with it, and this cold air spreads out at the Earth's surface, occasionally causing strong winds that are commonly associated with thunderstorms.

Thunderstorms can form and develop in any geographic location but most frequently within the mid-latitude, where warm, moist air from tropical latitudes collides with cooler air from polar latitudes. Thunderstorms are responsible for the development and formation of many severe weather phenomena. Thunderstorms, and the phenomena that occur along with them, pose great hazards. Damage that results from thunderstorms is mainly inflicted by downburst winds, large hailstones, and flash flooding caused by heavy precipitation. Stronger thunderstorm cells are capable of producing tornadoes and waterspouts.

cumulonimbus – кумулоніміус (дощові хмари)

rainband – дощик

squall line – лінія шквалу

supercells – сильні грози

rotate – обертати

wind shear – зсув вітру

deviation – відхилення

dew point temperature – температура точки роси

waterspouts – водоспади, смерч

Ex. 7.2. Read the last part of the text about thunderstorms and fill in the gaps with appropriate words from the box.

a) severe	b) subtropics	c) myths	d) radar
e) precipitation	f) atmosphere	g) supercells	h) shear

There are four types of thunderstorms: single-cell, multi-cell cluster, multi-cell lines, and (1) Supercell thunderstorms are the strongest and most (2).... Mesoscale convective systems formed by favorable vertical wind (3) ... within the tropics and (4) ... can be responsible for the development of hurricanes. Dry thunderstorms, with no (5) ... , can cause the outbreak of wildfires from the heat generated from the cloud-to-ground lightning that accompanies them. Several means are used to study thunderstorms: weather (6)..., weather stations, and video photography. Past civilizations held various (7) ... concerning thunderstorms and their development as late as the 18th century. Beyond the Earth's (8) ..., thunderstorms have also been observed on the planets of Jupiter, Saturn, Neptune, and, probably, Venus.

Ex.7.3. Match the English words and word combinations with their definitions.

- | | |
|-----------------|---|
| 1) supercell | a) a cloud forming a towering mass with a flat base at fairly low altitude and often a flat top, as in thunderstorms |
| 2) downdraft | b) variation in wind velocity occurring along a direction at right angles to the wind's direction and tending to exert a turning force |
| 3) cumulonimbus | c) a rotating column of water and spray formed by a whirlwind occurring over the sea or other body of water |
| 4) dew point | d) a downward current or draft of air, especially one down a chimney into a room |
| 5) waterspout | e) a narrow band of high winds and storms associated with a cold front |
| 6) squall line | f) pellets of frozen rain that fall in showers from cumulonimbus clouds |
| 7) wind shear | g) a system producing severe thunderstorms and featuring rotating winds sustained by a prolonged updraft that may result in hail or tornadoes |
| 8) hail | h) the temperature to which air must be cooled to become saturated with water vapor |

Ex.7.4. Look at the words and find the odd one in each line.

- 1) snow, sleet, hail, water, rain;
- 2) thunderstorm, cumulonimbus, electrical storm, lightning storm, thundershower;
- 3) thunderstorm, hurricane, tornado, lightning, wind;
- 4) lightning, waterspout, water, river, flood;
- 5) water, snow, salt, vapor, ice;
- 6) weather radar, weather forecast, weather station, video photography.

Ex.7.5. Read the text and match each paragraph A–F with appropriate headline from 1–6.

Lightning

A _____

Lightning is an electrical discharge caused by imbalances between storm clouds and the ground, or within the clouds themselves. Most lightning occurs within the clouds. During a storm, colliding particles of rain, ice, or snow inside storm clouds increase the imbalance between storm clouds and the ground, and often negatively charge the lower reaches of storm clouds. Objects on the ground, like steeples, trees, and the Earth itself, become positively charged – creating an imbalance that nature seeks to remedy by passing current between the two charges.

B _____

Lightning is extremely hot – a flash can heat the air around it to temperatures five times hotter than the sun’s surface. This heat causes surrounding air to rapidly expand and vibrate, which creates the pealing thunder we hear a short time after seeing a lightning flash.

C _____

Cloud-to-ground lightning bolts are a common phenomenon – about 100 strike Earth’s surface every single second – yet their power is extraordinary. Each bolt can contain up to one billion volts of electricity.

A typical cloud-to-ground lightning bolt begins when a step-like series of negative charges, called a stepped leader, races downward from the bottom of a storm cloud toward the Earth along a channel at about 200,000 mph (300,000 kph). Each of these segments is about 150 feet (46 meters) long.

When the lowermost step comes within 150 feet (46 meters) of a positively charged object, it is met by a climbing surge of positive electricity, called a streamer, which can rise up through a building, a tree, or even a person.

When the two connect, the electrical current flows as negative charges fly down the channel towards earth and a visible flash of lightning streaks upward at some 200,000,000 mph (300,000,000 kph), transferring electricity as lightning in the process.

D _____

Some types of lightning, including the most common types, never leave the clouds but travel between differently charged areas within or between clouds. Other rare forms can be sparked by extreme forest fires, volcanic eruptions, and snowstorms. Ball lightning, a small, charged sphere that floats, glows, and bounces along oblivious to the laws of gravity or physics, still puzzles scientists.

E _____

Lightning is not only spectacular, it's dangerous. About 2,000 people are killed worldwide by lightning each year. Hundreds more survive strikes but suffer from a variety of lasting symptoms, including memory loss, dizziness, weakness, numbness, and other life-altering ailments. Strikes can cause cardiac arrest and severe burns, but 9 of every 10 people survive.

Lightning's extreme heat will vaporize the water inside a tree, creating steam that may blow the tree apart. Cars are havens from lightning – but not for the reason that most believe. Tires conduct current, as do metal frames that carry a charge harmlessly to the ground.

F _____

Many houses are grounded by rods and other protection that conduct a lightning bolt's electricity harmlessly to the ground. Homes may also be inadvertently grounded by plumbing, gutters, or other materials. Grounded buildings offer protection, but occupants who touch running water or use a landline phone may be shocked by conducted electricity.

- 1) The impact of a lightning strike
- 2) cloud-to-ground lightning
- 3) Protection from lightning
- 4) What is lightning?

- 5) Other types of lightning
- 6) Lightning causes thunder

Ex.7.6. Decide whether the statements are true or false.

1. Balance between storm clouds and the ground may cause a lightning.
2. The lower layers of a storm cloud and objects on the Earth's surface have opposite charges.
3. The sun's temperature is five times higher than the temperature of a lightning.
4. Negative charges go down towards the Earth to meet positive charges and produce a lightning.
5. Some types of lightning never reach the Earth's surface.
6. Scientists can't explain the nature of ball lightning.
7. About 2,000 people suffer from memory loss, dizziness, weakness, numbness, and other life-altering ailments every year.
8. A lightning can split a tree apart due to its extremely high temperature.
9. When you see a lightning, you have to leave your car immediately to survive.
10. Running water and a landline phone may still conduct electricity even in a grounded house.

Ex.7.7. Match the English words with their Ukrainian equivalents.

- | | |
|-------------------|---------------------------|
| 1) to conduct | a) заземлений |
| 2) to collide | b) електричний струм |
| 3) to charge | c) ступеневий провідник |
| 4) imbalance | d) проводити |
| 5) to remedy | e) іскритися, спалахувати |
| 6) current | f) передавати |
| 7) flash | g) зіткнутися |
| 8) grounded | h) випаровуватися |
| 9) stepped leader | i) блискавка |
| 10) to transfer | j) дисбаланс |
| 11) to spark | k) заряджати |
| 12) to vaporize | l) виправити |

Ex.7.8. Put the words into correct order to make a sentence.

1. occurs / Lightning / the clouds / or between / within / storm clouds / the ground / and.

2. the / heats / air / it / Lightning / temperatures / to / extremely / around / high.

3. electricity / Up / one / volts / of / a lightning / is / to / contained / in / bolt / billion.

4. from / Negative / a storm cloud / race / the / of / toward / the / Earth / along / downward / a channel / bottom / charges.

5. types / travel / areas / differently / between / charged / or between / of / lightning Some / clouds / within.

6. electricity / rods / are / houses / by / that / grounded / harmlessly / a lightning bolt's / to / Many / conduct / the ground.

Ex.7.9. Complete the sentences with appropriate words and then check your ideas in the text above.

1) Lightning is an electrical ... caused by imbalances between storm clouds and the ground, or within the clouds themselves.

2) During a storm, colliding particles of rain, ice, or snow inside storm clouds increase the ... between storm clouds and the ground, and often negatively charge the ... reaches of storm clouds.

3) A typical cloud-to-ground lightning bolt begins when a step-like series of negative charges races downward from the bottom of a storm cloud toward the ... along a channel.

4) ... is a small charged sphere that floats, glows, and bounces along oblivious to the laws of gravity or physics.

5) Lightning is not only spectacular, it's

6) Lightning's extreme heat will ... the water inside a tree, creating steam that may blow the tree apart.

7) Tires ... current, as do metal frames that carry a charge ... to the ground.

8) Many houses are ... by ... and other protection that conduct a lightning bolt's electricity harmlessly to the ground.

Ex.7.10. Read the text about tornadoes and choose the best answer (a, b, c, or d) to the questions 1–8 below.

Tornadoes

Tornadoes have been reported in all states, but most tornadoes happen in the central parts of America called ‘Tornado Alley’.

A tornado, funnel cloud, is born from a powerful storm called a supercell. In some supercells, warm moist air rises quickly into the atmosphere. Winds blowing at different speeds at different parts of the supercell produce wind shear and cause a horizontal, rotating column of air. A funnel cloud will form as the air column rotates faster and more tightly within the supercell. In the Northern Hemisphere, tornadoes rotate counter-clockwise. In the Southern Hemisphere, they rotate clockwise. The rain and hail within the storm cause the funnel cloud to touch the ground resulting in a tornado. The strength of a tornado is measured by what’s called the Fujita scale. The weakest tornadoes (F0) feature winds of 40–78 miles per hour, while the strongest tornadoes (F5) have winds of up to 318 miles per hour. All tornadoes can be devastating, especially if they touch down in areas with lots of people.

A spinning wind can reach speeds of more than 200 miles per hour. The best protection against a tornado is to take cover in a basement. If a basement is not available, you should crouch down in a bathtub or under a sturdy piece of furniture and you should stay away from windows.

Tornado Outbreak

A tornado outbreak occurs when one storm system produces multiple tornadoes. Some tornado outbreaks can result in the formation of dozens of tornadoes over several states. One particularly powerful tornado outbreak occurred between April 25 and April 28 of 2011, where a record 355 tornadoes in 21 states and Canada were recorded, an including an F5 tornado that completely destroyed parts of Tuscaloosa, Alabama. Much of the destruction was caught on camera and broadcast across the country and internet. The same weather system produced hailstones that measured 4.5 inches across in southern Virginia. 328 people were killed as a result of the outbreak, which totaled over \$11 billion in damages.

1. Which is NOT true about tornadoes?
 - a) They are born from supercells.
 - b) Most tornadoes occur in North America in Tornado Alley.
 - c) They only occur in some states.
 - d) Tornado strength is measured on the Fujita Scale.
2. What states have never had tornadoes?
 - a) Alaska and Hawaii
 - b) States outside of Tornado Alley
 - c) The passage doesn't say
 - d) All states have had tornadoes
3. What causes the supercell to tilt downward toward the ground?
 - a) Warm air
 - b) Rain and hail
 - c) Wind
 - d) Lightning
4. When are tornadoes most devastating?
 - a) When they register on the Fujita Scale
 - b) When they hit areas with lots of people
 - c) When they hit in Tornado Alley
 - d) When wind shear occurs
5. What is the theme of the first paragraph?
 - a) Birth and Strength of a Tornado
 - b) Wind Speed
 - c) The Fujita Scale
 - d) Historic Tornadoes
6. Why does the author refer to the hailstones that hit Virginia as part of the tornado outbreak of April 2011?
 - a) To show how powerful and destructive the storms were
 - b) To show that much of the damage was caught on camera
 - c) To show how long the storm lasted
 - d) To show that tornado outbreaks often happen in the spring
7. In a tornado outbreak.... (select all that are true)
 - a) A single storm system can produce multiple tornadoes
 - b) Only F5 tornadoes occur
 - c) Storms that produce damaging hail can occur as well
 - d) Dozens of tornadoes can form in distant locations
8. What did paragraph two include that paragraph one did not include?
 - a) Information on when tornadoes become very destructive
 - b) A specific instance
 - c) Information about how tornadoes form
 - d) Information about the Fujita Scale

Ex 7.11. Match the words with their synonyms.

- | | |
|----------------|-------------------|
| 1) supercell | a) pillar |
| 2) moist | b) gradation |
| 3) column | c) start |
| 4) funnel | d) powerful storm |
| 5) scale | e) destructive |
| 6) devastating | f) wet |
| 7) outbreak | g) happen |
| 8) occur | h) crater |

Ex.7.12. Complete the sentences with the words from box.

a) pushed	b) twisting	c) funnel	d) tornadoes
e) demolish	f) occur	g) protection	h) rotate

1. Tornadoes, sometimes called twisters, ... all over the world.
2. A tornado is a ... cloud.
3. In the Northern Hemisphere, tornadoes ... counter-clockwise.
4. Warm air mass is ... upward very quickly by a colder air mass.
5. The ... grows stronger until a funnel is formed.
6. When tornadoes touch the earth's surface, the violent rotating winds can ... almost everything in their paths.
7. The best ... against a tornado is to take cover in a basement.
8. Usually 700 or more ... form each year in the United States.

Ex.7.13. Read the article and choose the correct item.

Tornado Sweeps across Northern England

Twenty people have been injured by a violent tornado which struck northern England yesterday afternoon.

The tornado caused a 1) *great deal / good number* of damage to the small village of Oakbridge in Lancashire. 2) *Many / Much* people were injured by falling roof tiles and 3) *very few / very little* homes were left unharmed by winds that reached speeds of up to 100 mph. The tornado also caused 4) *some / a few* damage to the village's famous Gothic church and 5) *a few / few* shocked locals even claimed to have seen a car being lifted up and dropped some distance away. 6) *Most / Much* residents are now calculating 7) *how much / how little* it will cost to repair the damage to their homes and say that

8) *not enough / not many* help is being made available to them. 9) *Very few / Very little* nearby towns were as badly affected as Oakbridge but there are further warnings of strong winds and heavy rainfall in the region.

Ex.7.14. Read the text and choose the best answer (a, b, or c) to the questions 1–3 below.

Tornadoes Vs. Hurricanes

When the wind is howling, the rain is crashing down, and storm warnings are being blared on all radio and television stations, you may find yourself wondering if you are in the middle of a tornado or a hurricane. Both are wicked weather events that involve wind, rain-and significant threat. Which type of storm is more dangerous? That is a question experts have been trying to decide for years.

Hurricanes are commonly located over oceans and typically begin as tropical storms during the late summer or fall. Strong winds rotate and, as they do, they pull water up from the sea and dump it on the closest land. As the eye of the storm reaches shore, everything calms. The sun may shine, but it does not last long before the other half of the storm hits. Frequently hurricanes bring storm surges or huge rushes of water that come ashore and cause floods, knocking down buildings and dragging homes and cars back out to sea. Hurricanes often last for hours, or even days before finally fading away.

Tornadoes, on the other hand, are found more on land, usually beginning as thunderstorms with thunder, lightning, and even hail. As they build in strength, the winds begin to rotate and become like a huge, powerful vacuum. These winds create a funnel cloud, which moves up to 30 miles an hour across the sky. If the tornado touches the ground, it can destroy homes, and lift cars.

As to which storm is the most dangerous, the answer has not been decided yet. Tornadoes move faster, but hurricanes last longer. There is no question, however; being a part of one is an event no one is likely to ever forget.

1. What factor do tornadoes and hurricanes share?
 - a) Both begin over water as tropical storms.
 - b) Both have a central eye where it is calm.
 - c) Both are dangerous weather events.
 - d) Both include thunder, lightning, and hail.

2. What is the difference between tornadoes and hurricanes?
 - a) Tornadoes last for hours to days.
 - b) Tornadoes include a strong storm surge.
 - c) Tornadoes are made up of ocean water.
 - d) Tornadoes create powerful funnel clouds.
3. What does a hurricane have that a tornado does not?
 - a) A funnel cloud
 - b) A central eye
 - c) A thunderstorm
 - d) A high risk of danger

Ex.7.15. Read the text about volcanoes and decide whether the statements below are true or false. Correct the false ones.

Volcanoes

There are three layers inside the Earth: the crust, the mantle and the outer and inner cores. The crust is like the skin of the earth which is divided into plates, called tectonic plates. There are 16 main plates and they are 70 km thick. These plates float on the mantle and move over the earth surface. They move only a few centimetres each year. Volcanoes and earthquakes occur due to these movements. Volcanoes mainly emerge at cracks or plate outlines. When they widen, ash and rocks are thrown into the air. Soon red hot lava pours out. Volcanic eruptions occur when the molten rock beneath the earth's crust, called magma, forces its way up through a vent and is spilt as lava. Larger lumps are called bombs.

Cases may concentrate and cause a great explosion. The biggest explosion ever recorded happened when Krakatau in Indonesia, erupted in 1883. It was heard 5,000 km away.

As the rocks and ash cool, they make layers of solid rock. When the Vesuvius erupted in 79 AD the city of Pompeii was completely buried under volcanic ash.

Most volcanoes form on land, but there are some volcanoes that form on the ocean floor. Mauna Loa, in Hawaii, is the world's largest volcano. It reaches 4,170 m above the sea level. But its base is on the Pacific Ocean floor, 5,180 m below the sea level.

We can divide volcanoes according to their activity: active volcanoes are still active and erupt frequently (Etna, Sicilia and Santa Maria, Guatemala), dormant volcanoes are temporarily inactive but not fully extinct (Vesuvius, Italy); a volcano is extinct, or dead, when it hasn't erupted for at least 100,000 years (Menengai Crater, Kenya).

Volcanologists study volcanoes and volcanic phenomena.

1. The mantle is the outer layer of the Earth.
2. Plates' movement is the reason why volcanoes occur.
3. Lava and magma are the same thing.
4. Most inactive volcanoes are dead.

Ex.7.16. Answer the following questions. Use a relative pronoun (who / which / where) in the answers.

1. What is an active volcano?
2. What is a dormant volcano?
3. What is an extinct volcano?
4. What is Krakatau?
5. What happened in Pompeii in 79 AD?
6. What are volcanologists?
7. What is Mauna Loa in Hawaii?

Ex.7.17. Complete the sentences with appropriate words from the box.

a) Pacific	b) conductor	c) basalt	d) lava	e) plates	f) cloud
g) igneous	h) openings	i) icecaps	j) fault	k) magma	l) extinct

1. Volcanoes are ... in the Earth's surface.
2. Volcanoes are usually located where tectonic ... meet.
3. Over 75 % of the Earth's volcanoes are found in the ... Ocean.
4. Hot liquid rock found deep under the Earth's surface is known as
5. When magma erupts to the surface through a volcano, it's called... .
6. Rocks formed from lava cooling are called ... rocks.
7. Granite and ... are examples of Igneous rocks.
8. Volcanoes can be active, dormant, or

9. Volcanoes can be found on the ocean floor and even under
10. Lava cools slowly because it is a poor ... of heat.
11. An ash ... is formed by a volcanic explosion.
12. A ... is a crack or fracture in the Earth's surface.

Ex.7.18. Complete the text using the best option (a or b).

An American Volcano

Mount Saint Helens is an active volcano in the state of Washington. In 1980, this volcano erupted, spewing hot (1) ... into the air. Explosions caused a huge cloud of (2) This gray dust filled the air and settled on houses and cars many miles (3) The thick dust made it hard for people and animals to (4) The explosions (5) ... trees on the side of the mountain. The hot rocks (6) ... forest fires. The snow that was on the mountain melted quickly, causing (7) ... and mud slides. Mount Saint Helens still (8) ... from time to time, but not as badly as it did in 1980. But who knows when it will blow its top again!

- | | |
|------------------|-----------------|
| 1. a) lava | b) water |
| 2. a) dust | b) lava |
| 3. a) ahead | b) away |
| 4. a) breathe | b) talk |
| 5. a) covered | b) flattened |
| 6. a) ignited | b) extinguished |
| 7. a) avalanches | b) floods |
| 8. a) occurs | b) erupts |

Ex.7.19. Read the text about Cumbre Vieja and decide if the statements are true or false.

1. The volcano is in Africa.
2. The volcano could cause a tsunami.
3. We can prevent the eruption of the volcano.

Wave Power

Cumbre Vieja is a huge active volcano on La Palma in the Canary Islands. Every few decades it *erupts* and scientists are worried because

the walls of the volcano are getting weaker. Scientists fear that when it erupts, one side of the volcano could collapse and fall into the sea. If this happened, it would be a catastrophe. Why? Because it would cause a tsunami – an *enormous* wave – the biggest ever recorded in history.

How would it happen?

The volcano is by the sea, and the water next to the volcano is about six kilometres deep. If the volcano collapsed, 500 billion tonnes of rock would fall into the sea. This would create a *huge* tsunami about 100 metres high.

What would happen next?

The wave would travel away from the Canary Islands in all directions about 800 km/h. The other Canary Islands would be immediately covered by water. In less than an hour a 90-metre wave would hit north-west Africa. The side of the volcano faces west, across the Atlantic Ocean, which would *protect* Europe a little. However, a 12-metre tsunami would still reach Lisbon within three hours. After five hours it would reach Britain. The wave could travel a kilometre inland, and *devastate* towns and villages. London would be flooded.

How far would it travel?

The wave would have enough energy to travel right across the Atlantic Ocean. Eight hours after the eruption it would hit the east coast of America. It would still be about 30 metres high. Boston would be hit first, followed by New York, then the coast down to Miami. The wave would cause a lot of damage in the Caribbean and Brazil too. It would travel for several kilometres inland because the coast is very flat. It would *destroy* everything and kill thousands of people.

What can we do about it?

Nothing much, it seems. The scientists believe that it is not a question of if, but when. The volcano will collapse at some time in the future, but it could be hundreds or thousands of years from now.

Furthermore, if only part of the volcano collapsed into the sea, the tsunami would be much smaller.

Scientists want to put better equipment on Cumbre Vieja, so that they can *predict* the volcano's eruptions in the future and give us an early warning of possible problems.

Ex.7.20. Read the text again. What do the numbers refer to?

- 1) 6 2) 500 billion 3) 800 4) 90 5) 8

Ex.7.21. Answer the questions.

1. Why are scientists worried about Cumbre Vieja?
2. How long would it take the wave to reach the African coast?
3. Why would Europe be in less danger than America?
4. How big would the wave be when it reached Portugal?
5. Why would it travel a long way inland in the Caribbean and South America?
6. What can scientists do to predict the eruptions?

Ex.7.22. Find in the text these words in italics.

- 1) two adjectives that mean ‘very big’
- 2) two verbs that mean ‘damage very badly’

Ex.7.23. Find the highlighted verbs in the text that belong to the same word family as the nouns.

- 1) destruction
- 2) devastation
- 3) eruption
- 4) prediction
- 5) protection

Ex.7.24. Read the letter. Put the verbs in the correct form and choose the best option (a, b, or c) for 1–4.

What to Do if a Volcano Erupts

Dear Jerry,

I (write) _____ to tell you what you need (do) _____ if a volcano erupts in your area. I (be) _____ sure you think that you should (run) _____ as fast as you can to a (1) _____ place, well, this is (2) _____. You won't be able (run) faster than the lava of the volcano. This is what you must (do) _____ first. Make sure you know the location of an emergency shelter.

It is also a good idea (have) _____ some disaster supplies at hand. Make sure you (have) _____ a flashlight with extra

batteries so that you can light your way through the darkness. Another idea is (take) _____ a cellphone or portable battery-operated radio to communicate with other people if you (be) _____ in danger.

If you get (3) _____, you will also need a first aid kit. It is also important (have) _____ some emergency food and water. In addition, you will also need some (4) _____ medicines, cash and credit cards, and some strong shoes.

There are some certain things that you could (wear) _____ to protect yourself from any danger, wear long sleeved shirts and pants and use goggles; also hold a damp cloth over your face to help breathing. You don't want your car (explode) _____, so make sure you (keep) _____ your car and engine off. If you (do) _____ everything I have just told you, then you (have) _____ a good chance of staying alive.

- | | | |
|-------------------|----------------|--------------|
| 1. a) safe | b) unsafe | c) insecure |
| 2. a) correct | b) incorrect | c) right |
| 3. a) injured | b) uninjured | c) unharmed |
| 4. a) unnecessary | b) unessential | c) essential |

Ex.7.25. Match the words in column A with their synonyms in column B.

- | A | B |
|-------------|----------------|
| 1) sure | a) illuminate |
| 2) disaster | b) well built |
| 3) light | c) wet |
| 4) strong | d) catastrophe |
| 5) damp | e) living |
| 6) alive | f) certain |

Ex.7.26. Complete the following sentences according to the letter above.

1. When a volcano erupts, you should
2. When a volcano erupts, you shouldn't
3. It is a good idea
4. When a volcano erupts, it is important
5. When a volcano erupts, the best thing you can do is
6. I advise you
7. Make sure you

Ex. 7.27. Read the text about earthquakes and complete the sentences below.

Earthquakes

Earthquakes are natural disasters that humans cannot control. Sometimes earthquakes can be dangerous and people need to know more about where earthquakes come from, and how to protect themselves from them and any other natural disasters.

Earthquakes are the shaking, rolling or sudden shock of the earth's surface. They are the Earth's natural means of releasing pressure. More than a million earthquakes occur in the world each year. They can be felt over large areas although they usually last less than a minute. However, earthquakes cannot be predicted although scientists are still working on the problem.

There are about 20 plates along the surface of the earth that move continuously and slowly past each other. When the plates squeeze or stretch, huge rocks form at their edges and the rocks shift with great force, causing an earthquake. As the plates move, they put forces on themselves and each other. When the force is large enough, the crust is forced to break.

Shaking and ground breaking are the main effects created by earthquakes, principally resulting in more or less severe damage to buildings and other structures. The severity of the effect depends on the complex combination of the earthquake magnitude. Ground break is a major risk for large engineering structures such as dams, bridges and nuclear power stations and requires careful mapping of existing faults to identify any likely to break the ground surface within the life of the structure.

1. The above reading is mainly about
 - a) the destruction caused by earthquakes
 - b) protecting people from earthquakes
 - c) describing a violent earthquake
 - d) why and where earthquakes occur
2. Earthquake are considered natural disaster because
 - a) they are man-made
 - b) man has no control over them
 - c) man can control them
 - d) they are always expected

Ex.7.28. Complete the sentences choosing the best option a, b, or c.

1. Lava and hot gases are produced by
a) earthquakes b) tornadoes c) volcanoes
2. The layer below the earth's crust is called
a) core b) mantle c) inner core
3. Melted rocks come to the surface of the earth because of the activity of ...
a) earthquakes b) volcano c) soil erosion
4. Earthquakes are most likely to take place
a) where two plates meet
b) on the sea bed
c) on the mountain top
5. The outer most part of the earth is called
a) inner core b) mantle c) crust
6. A volcano which has not erupted for thousands of years can be termed as..
a) dormant b) extinct c) active

Ex.7.29. Answer the questions.

1. What is an earthquake?
2. Can earthquakes be controlled by people?
3. How many earthquakes do occur in the world each year?
4. How long does an earthquake usually last?
5. What causes an earthquake?
6. Why does the crust break?
7. What do earthquakes result in?

Ex.7.30. Combine the words in the column A with the words in the column B to make word combinations.

A	B
earth's	pressure
natural	means
releasing	surface
natural	power
huge	magnitude
earthquake	break
ground	disaster
nuclear	rocks

Ex.7.31. Read the text about tsunamis and answer the questions below.

Tsunamis

Did you know that an earthquake occurring under the ocean or a volcano erupting under water can trigger off giant sea waves known as tsunamis? Even though tsunamis are considered a global phenomenon and are likely to happen where large bodies of water are found, they tend to occur most frequently in the Pacific Ocean.

The term tsunami comes from the Japanese language meaning *harbour* ('tsu') and *wave* ('nami'). The term was created by fishermen who returned to the coast to find the area surrounding their harbour devastated, although they had not noticed any wave while being in the open sea.

Once a tsunami occurs in the middle of the ocean, it moves with great energy at high speed (from 460 to 900 km an hour) and travels great distances without losing its tremendous force. When all that force hits the shores of islands or countries, it hits them hard causing enormous damage thousands of kilometres from its origin.

When a tsunami reaches the coast, it generally consists of a series of waves. But, unlike the regular waves you might see at the beach or during a normal storm, these might be as high as 24 metres tall – more than ten times higher than a normal wave. The amount of time between each wave generally ranges from 10 to 45 minutes, although in some cases they have been reported to be over an hour apart.

Many people have lost their lives after returning home in between tsunami waves, thinking that the waves had stopped coming. If they had waited for the government to give official instructions, they would still be alive.

Scientists cannot determine exactly when a tsunami will strike, however, some changes in nature can help people become aware of the possibility of a tsunami. For instance, right before this natural disaster an earthquake might be felt, the water may either become unusually hot or smell of rotten eggs: it could also retire a considerable distance from the shore, and sometimes a flash of red light might be seen near the horizon. If any of these events should take place, people must take action immediately to reduce the damage and loss of life a tsunami can cause.

On the morning of December 26th, 2004 an undersea earthquake occurred 150 km off the coast of Indonesia, generating fatal tsunamis that killed nearly 300,000 people from nearby countries and tourists from all over the world. In addition to the deaths caused by the tsunami itself, this natural disaster created many social and health problems. Many people were left homeless and were exposed to extreme weather conditions. To make matters worse, food and water supplies became contaminated by bacteria, which helped spread serious diseases. These problems became even more serious since it was difficult to get medical assistance for the people who needed it.

1. How does a tsunami start?
2. Why can tsunamis bring about much devastation?
3. What shouldn't people do when a tsunami has hit their hometown?
4. How can people predict a tsunamis coming? Give an example.
5. What makes a tsunami such a terrible disaster for humanity?

Ex.7.32. Match the English words with their Ukrainian equivalents.

- | | |
|-------------------------|---------------------------|
| 1) trigger | a) спустошити, розгромити |
| 2) harbor | b) тухлі яйця |
| 3) to devastate | c) понижати |
| 4) tremendous, enormous | d) підводний |
| 5) to determine | e) викликати, спричиняти |
| 6) rotten eggs | f) гавань |
| 7) shore | g) величезний |
| 8) to reduce | h) заражений |
| 9) horizon | i) визначати |
| 10) undersea | j) беріг |
| 11) contaminated | k) горизонт |

Ex.7.33. Complete the sentences.

1. Tsunamis are enormous walls of
2. The name *tsunami* is ... and means
3. Most tsunamis are caused by ... or
4. A tsunami can be up to ... times higher than a normal wave.
5. Right before tsunami, an ... might be felt.
6. The smell of ... might be a sign of an approaching tsunami.

Ex.7.34. Complete the text with the words from the box.

a) eruptions	b) normal	c) earthquake	d) strikes	e) caused
f) shore	g) tide	h) approaching	i) sign	j) emergency

Today we have many early detection systems that warn us about (1) ... tsunamis. A tsunami doesn't actually look like a (2) ... wave. Initially, a tsunami is seen as the ocean actually leaving the (3) This is the trough of the wave and is the first warning (4) ... of an oncoming tsunami. As the wave draws near it is seen as a rapidly approaching (5) Most tsunamis are caused by earthquakes or volcanic (6) They can also be caused by landslides or meteorite (7)

In 2009 a 9.1 magnitude (8) ... hit just off the coast of Sumatra, which resulted in a 50m tsunami causing over 200,000 deaths and billions of dollars worth of damage. On the 11th of March in 2011 a powerful tsunami was (9) ... by a 9.0 magnitude earthquake. The tsunami hit Japan and killed more than 18,000 people and the damage even caused a nuclear (10) ... when a nuclear power plant started leaking radioactive materials.

Ex.7.35. Complete the text using appropriate tenses.

The Day of the Tsunami

Pavaiai, America Samoa

We awoke on Tuesday morning to the house shaking. Earthquakes in this part of the world usually (1) _____ (last) for a minute or two. But this time the house (2) _____ (shake) for five minutes. The children and I (3) _____ (leave) our beds and (4) _____ (run) outside to the clearing in front of our house, where our neighbors (5) _____ (already/gather). Then just as suddenly as it (6) _____ (start), everything (7) _____ (become) quiet, and we (8) _____ (go) back inside. I (9) _____ (pack) up my three boys and (10) _____ (drive) them to school. Just after I (11) _____ (drop) them at the gate and (12) _____ (head) to my office, I (13) _____ (turn) on the radio. The announcer (14) _____ (talk) about cars floating like toys in the parking lot of the Pago Plaza shopping center and (15) _____ (warn) that the tsunami's second

and third waves (16)_____ (expect) to hit us on Tutuila Island in less than an hour's time. Instinctively, I swung the car back toward the school. I just wanted to get to my children.

The road (17)_____ (jam) with traffic and, at the school, frantic parents (18)_____ (call) out their children's names. Teachers (19)_____ (urge) us to remain calm. Mr. Moi, the principal, (20)_____ (also/ encourage) everyone not to panic. Our children, he said, (21)_____ (evacuate) to the highest point on the school grounds, and we could pick them up there.

On my way, I heard hymns. Some children (22)_____ (sing), while others (23)_____ (pray) and (24)_____ (cry). I saw one of my sons and told him to go look for his brother's while I did the same. After 15 minutes he ran to me and said everyone was at the car, and I quickly (25)_____ (run) there, too.

My 10-year-old was in tears. 'Mom, I (26)_____ (not want) to die', was how he greeted me. My only thought was to drive to the highest accessible point on Tutuila – the village of Aoloau. The drive up, usually 5 minutes, took 20; it seemed everyone (27)_____ (head) there. We (28)_____ (stay) in Aoloau for three hours before we realized that were in safe.

Ex. 7.36. Complete the sentences using conditionals.

1. The towns _____ (not/be destroy) if the volcano hadn't been so destructive.

2. If the inhabitants _____ (evacuate) early enough, the terrible disaster would have been averted.

3. If the weather is gloomy, I _____ (stay) in the hotel and read.

4. If I heard a loud, shrill, frightening noise while at the beach, I _____ (return) to the hotel immediately.

5. A tsunami would be set off, if a nearby volcano _____ (erupt).

6. If the curious children and adults hadn't gone on the beach to investigate the strange sound, they _____ (not lose) their lives.

7. The disaster wouldn't have been so terrible, if all the hotels _____ (prepare) for the possibility of a tsunami.

8. If you want to be safe during a tsunami, you _____ (move) miles inland.
9. When the sea draws back it means that a tsunami _____ (come) soon.
10. Many lives would have been saved, if the guest at the hotel _____ (take) precautions.
11. If there is a serious tsunami, the coastline _____ (be) damaged.
12. If the scientists who had observed the ash from volcano had alerted the nearby countries, the extent of the disaster _____ (be) much less.
13. If there were strong winds along with a tsunami, there _____ (be) tremendous damage to the coastline.
14. If scientists predict tsunamis, they _____ (save) many lives.

Ex.7.37. Read the text and answer the questions below.

Japan Earthquake and Tsunami

A 9.0 magnitude earthquake occurred on the 11th of March 2011 in Japan at 05.46.23 GMT, hitting the northeast coast of Honshu, Japan. The worst affected area is the east coast of Tohoku region.

Based on official Japanese government figures 1,627 people are confirmed dead, 1962 injured with at least 1,720 missing. Figures are expected to rise.

Rescue operations are ongoing and 371,833 persons have been evacuated.

There has been some improvement in the provision of electricity and water services. 1.5 million households remain without electric power and at least 1.4 million households are without running water.

Ten nuclear reactor units automatically shut down after the earthquake in three separate nuclear power plants, Onagawa, Fukushima Daiichi and Fukushima Daini. The automatic shut down went as planned for the Onagawa plant. The problems with the cooling systems in both Fukushima Daiichi and Fukushima Daini continue. Temporary measures for the cooling systems are in place. The state of emergency declared still remains.

National emergency management committee, led by the Prime Minister, has been established to oversee and coordinate all response

activities. All relevant ministries and agencies such as Ministry of Foreign Affairs, Ministry of Land and Transportation and Ministry of Health have been involved in the response. The nuclear disaster response committee has been activated.

More than 39 countries have offered support. Rescue teams coordinated by UN Disaster Assessment and Coordination (UNDAC) team arrived on 13 March. Rescue teams from Australia, USA, Republic of Korea, Mexico, New Zealand, China, United Kingdom, France, Singapore, Germany and Switzerland have been deployed.

1. How many dead people have been reported?
2. What are the consequences as for the services?

Ex. 7.38. Decide whether the statements are true or false according to the text above. Correct the false ones.

1. The worst affected area is the northeast coast of Honshu.
2. The total number of dead, injured and missing people is about 5.5 thousand.
3. Almost 400 thousand people were removed from the place of danger to a safe place.
4. There are some problems in the cooling systems of some nuclear power plants.
5. Only National Services helped to solve the situation.
6. Only a few countries have offered support.

Ex. 7.39. Match the word expressions with the correct definitions.

- | | |
|-----------------------|--|
| 1) aftermath | a) the act of destroying something |
| 2) earthquake | b) carried away by water |
| 3) radiation | c) powerful and dangerous rays |
| 4) atomic power plant | d) to move people away from danger |
| 5) rescue teams | e) energy produced by splitting atoms |
| 6) destruction | f) a sudden shaking of the earth's surface |
| 7) debris | g) place where nuclear power is made |
| 8) survivors | h) people who save/help others in danger |
| 9) evacuate | i) pieces of wood, metal etc. after destruction |
| 10) nuclear energy | j) situation after an unpleasant event (e.g war) |
| 11) swept away | k) to continue to live after nearly being killed |

Ex.7.40. Complete the table.

Noun	Verb
destruction	
	predict
observe	
	evacuate
	save
damage	
protection	
	survive
rescue	
radiation	
	inhabit

Ex.7.41. Complete the sentences choosing the correct answer from a, b, c or d.

1. The ongoing crisis at Japan's Fukushima nuclear plant has turned into a slow-moving nightmare, with fires, leaks of ... radiation, and mass evacuations.

- a) safe b) delicious c) poisonous d) positive

2. Japan ... by one of the largest earthquakes ever recorded on March 11.

- a) hit b) was hit c) was hitting d) hits

3. Thousands of people are dead and many more are still missing or

- a) injury b) injuring c) injured d) injures

4. You can help people affected by ... like floods, fires, tornadoes and hurricanes by donating money.

- a) corruption b) disasters c) attention d) blessings

5. A team of doctors flew to Japan, ... they will be delivering supplies, assessing needs, and identifying communities that have not yet been reached.

- a) which b) whose c) when d) where

6. Whole cities are literally disappearing (washed away) ... the tsunamis.

- a) despite b) because of c) because d) without

7. My wife just arrived in Japan to see her family and is still worried ... the shaking of the earthquake even in Tokyo.
a) about b) of c) on d) at
8. What would you do if you ... in an earthquake area.
a) are b) were c) has been d) had been
9. Japan is used to ... earthquakes but this time it was so destructive.
a) face b) faced c) facing d) faces
10. The March 11 earthquake is now Japan's ... natural disaster since the 1923 Great Kanto Earthquake, which killed more than 142,000 people.
a) deadlier b) deadliest c) as deadly d) the deadliest
11. While rescuers ... for victims, the earthquake hit again.
a) searched b) were searched
c) were searching d) searching
12. Egypt has not faced an earthquake ... 1990.
a) for b) since c) in d) lately
13. The tsunami ... damage everywhere.
a) makes b) does c) carries d) brings
14. Japan can't solve this nuclear power problems by
a) itself b) themselves c) herself d) himself
15. After I ... of the disaster in Japan, I logged on the internet.
a) heard b) had heard c) have heard d) hearing

Ex.7.42. Read this news article from Reuters about the March 2017 flooding in Peru and do the exercises below.

**Abnormal El Nino in Peru Unleashes Deadly Downpours;
More Flooding Seen**

A sudden and abnormal warming of Pacific waters off Peru has unleashed the deadliest downpours in decades, with landslides and raging rivers sweeping away people, clogging highways and destroying crops.

At least 62 people have died and more than 70,000 have become homeless as Peru's rainy season has delivered 10 times as much rainfall than usual, authorities said Friday. About half of Peru has been declared in emergency to expedite resources to the hardest hit areas, mostly in

the north where rainfall has broken records in several districts, said Prime Minister Fernando Zavala.

Peru is bracing itself for another month of flooding. A local El Nino phenomenon, the warming of surface sea temperatures in the Pacific, will likely continue along Peru's northern coast at least through April, said Dimitri Gutierrez, a scientist with Peru's El Nino committee.

Coastal El Ninos in Peru tend to be preceded by the El Nino phenomenon in the Equatorial Central Pacific, which can trigger flooding and droughts around the world, said Gutierrez. But this year's event in Peru has developed from local conditions.

The U. S. weather agency has put the chances of an El Nino developing in the second half of 2017 at 30–55 per cent.

While precipitation in Peru has not exceeded the powerful El Nino of 1998, more rain is falling in shorter periods of time – rapidly filling streets and rivers, said Jorge Chavez, a general tasked with coordinating the government's response.

'We've never seen anything like this before', said Chavez. 'From one moment to the next, sea temperatures rose and winds that keep precipitation from reaching land subsided'.

Some scientists have said climate change will make El Ninos more frequent and intense.

In Peru, apocalyptic scenes recorded on cellphones and shared on social media have broadened the sense of chaos. A woman caked in mud pulled herself from under a debris-filled river earlier this week after a mudslide rushed through a valley where she was tending to crops. Bridges have collapsed as rivers have breached their banks, and cows and pigs have turned up on beaches after being carried away by rivers.

'There's no need to panic, the government knows what it's doing'. President Pedro Pablo Kuczynski said in a televised event, urging people to stay clear of rivers.

In Lima, the capital, classes have been suspended and running water has been restricted after treatment systems were clogged – prompting a rush on bottled water that produced shortages at some supermarkets.

The vast majority of people affected by the extreme weather are poor, including many who built makeshift homes on floodplains that

had been dry for 20 years, said Chavez. ‘There’s no electricity, no drinking water ... no transit because streets are flooded’, said Valentin Fernandez, mayor of the town Nuevo Chimbote.

Chavez said Peru must rethink its infrastructure to prepare for the potential ‘tropicalization’ of the northern desert coast, which some climate models have forecast as temperatures rise.

‘We need more and better bridges, we need highways and cities with drainage systems’, said Chavez. ‘We can’t count on nature being predictable’.

Ex.7.43. Match the words with their definitions.

- | | |
|-------------|--------------------|
| 1) unleash | a) be violent |
| 2) rage | b) release |
| 3) clog | c) sewage |
| 4) debris | d) waste, remains |
| 5) drainage | e) block, obstruct |

Ex.7.44. The following root words appear in the story above with suffixes. Find these words and write them next to the root words (e.g. dead – deadliest).

- 1) home _____
- 2) hard _____
- 3) most _____
- 4) equator _____
- 5) precipitate _____
- 6) power _____
- 7) broad _____
- 8) electric _____

Ex.7.45. Combine the words in the first column with the words in the second column to form new words.

rain	slide
make	fall
mud	plain
flood	slide
land	shift

Ex.7.46. Turn these active sentences into the passive form.

1. People recorded scenes on cellphones.
2. The government has suspended classes.
3. The government has restricted running water.
4. The water flooded the streets.

Ex.7.47. Decide whether the statements are true or false according to the article above.

1. It is possible there will be more flooding later this year.
2. The 2017 floods were worse than the 1998 floods.
3. El Ninos will lessen as time goes by.
4. Water restrictions caused bottled water supply problems.
5. Chavez thinks that nature is predictable.

Ex.7.48. Complete the text with the words from the box.

a) warnings	b) outages	c) storm	d) visability	e) snowfall
-------------	------------	----------	---------------	-------------

Blizzard

A blizzard is a (1) ... with high winds and blowing snow. Sometimes a blizzard consists of heavy (2) ... and extreme cold temperatures. The National Weather Service issues (3) ... when winds exceed 33 miles an hour and (4) ... is low. Blizzards can cause a variety of problems including power (5)

Ex.7.49. Complete the article. Use past tenses of the verbs in brackets.

Avalanche Survivors in Good Health

A survivor of Monday's avalanche (1)_____ (describe) his experience to reporters yesterday.

Duncan Wood and his friend Steven Taylor (2)_____ (return) from a climb when the avalanche (3)_____ (hit) them. 'We (4)_____ (check) the weather reports before leaving, of course, and we (5)_____ (chose) an area that was safe – we thought', Mr Wood said. 'The weather was OK – it (6)_____ (not snow). We (7)_____ (walk) down the mountain when suddenly, the snow under me (8)_____ (start) moving and (9)_____ (carry) me

down the mountain. I was terrified! Snow and rocks (10) _____
(fall) everywhere around me! ‘When it (11) _____ (stop),
I was covered in snow, but I could still see the sky above me.
I (12) _____ (manage) to dig a hole and get out. Then
I (13) _____ (see) an arm in the snow near me. Steven
(14) _____ (land) right next to me! I (15) _____ (dig) a hole
for him and he (16) _____ (get) out. We weren’t badly injured
and we feel fine now. We were very lucky’.

Ex.7.50. Complete the sentences with the words from the box.

Extreme Weather

drought	blizzard	hurricane	earthquake	tornado
---------	----------	-----------	------------	---------

1. After the ... was over, we had over 3 feet of snow!
2. The swirling winds of the ... picked up houses and cars and tossed them aside.
3. Last autumn’s ... brought strong winds and huge waves into New York and New Jersey.
4. An ... shook my house and knocked things off my shelves and walls.
5. The summer’s long ... left farms with loose soil and dried creeks and rivers.