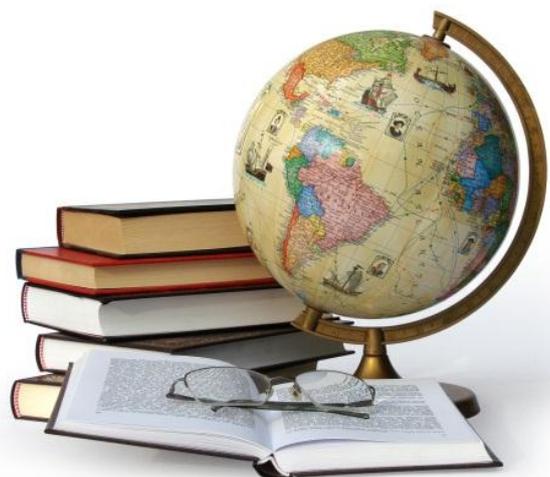


Viktoriia UDOVYCHENKO

GEOGRAPHY

SYLLABUS



Kyiv
2021

*Approved at the meeting of the section of General disciplines
of the Preparatory Department
Taras Shevchenko National University of Kyiv
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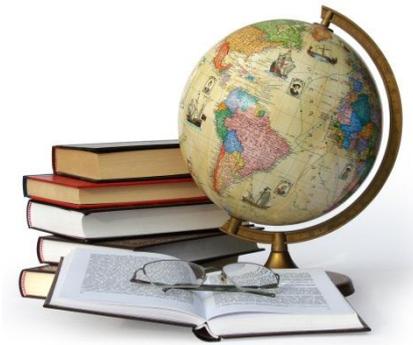
Udovychenko V. V.

U 31 Geography: Syllabus / V. V. Udovychenko. – Sumy, 2021. – 52 p.

Syllabus “Geography” provides students of the Preparatory Department with the introduction to the course, expanded program, and recommended reading sources. After working out with this Syllabus, student will have developed their levels of knowledge of the goal, educational tasks, object and subject, key requirements of the course.

This syllabus provides comprehensive coverage of the information needed to understand the Geography structure as a course within the Preparatory Department.

The syllabus serves the interests of students of the Preparatory Department, lecturers and instructors.



INTRODUCTION

The educational course “Geography” is one of the fundamental academic disciplines, part of the cycle of the professional training of listeners-foreign citizens at the first level of education. It constitutes a basic element of the general education courses, and the key basis for further learning of such courses as Physical Geography, Geology, Meteorology and Climatology, Basics of Soil Science and Geography of Soils, The Geography of Continents and Oceans, The Geography of Ukraine, Human Geography, etc.

“Geography” as an educational discipline within the Preparatory Department focuses on the basic knowledge of principles, theoretical grounds, and methods of modern geographical concepts and paradigms.

This course aim is to provide listeners with the deep knowledge and accurate use of different facts about the Earth, laws of formation and development of Earth’s layers and their general structure, and understanding phenomena of geosystems as an integral system; diversity of natural conditions and resources of the territory, cause-and-effect connections between natural processes and phenomena which are the key basis of formation of natural territorial complexes; general features of world’s nature according to components and characteristics of regional geographic units, etc. These objectives require a good standard of



knowledge in various environmental sciences: Physical Geography, Ecology, and Nature Protection, etc.

On the other hand, listeners should learn Geography because geographic knowledge will help them to impress people with deep awareness of the Earth and accurate use of different facts about our planet. Studying Geography will help you to improve your English vocabulary. For example, you will get a sense of such terms as “scale”, “grid”, “arcdegree”, “equinox”, “solstice”, “terminator”, “ductility”, “core”, “subduction”, “evaporation”, etc., and learn to choose a word that fits the context better and has a more precise meaning.

During the classes of this course, we pay special attention both to gaining new information about Geography itself, Earth’s layers, their structure, properties, and the main parameters. Also, we will be mastering corresponding glossary and vocabulary, becoming familiar with prevailing syntactic constructions, and developing them through different exercises such as reading, speaking, listening, and writing. Such skills have invaluable significance for the foreign citizens (especially, the future specialists in humanitarian specialties) in the context of the complex preparation for the entrance and future study in the high schools of Ukraine.

This Syllabus is useful and highly recommended if you are taking a *Geography exam* (enrollment exam), want to understand this exam structure, and gain high grades. You are more likely to do this effectively if you have assimilated the patterns of Geography presented in this Syllabus.

The Geography’ course objectives provide students with:

- ✓ the basic knowledge of principles, theoretical approaches and methods, main directions and specific features of the modern geographic concepts and paradigms;



✓ deep knowledge and accurate use of different facts about the Earth, general and planetary laws of formation, etc. A study of Geography will also help students to increase their range of English vocabulary.

The educational tasks of the course relate to:

- 1) acquiring knowledge about the theoretical, methodological, and methodical background of Geography;
- 2) forming of the conceptual and terminological background of the contemporary Geography;
- 3) providing comprehensive coverage of the information needed for the updated Geography exam and making students confident that they have covered all the basic geographic knowledge needed for it;
- 4) improving understanding of geographic phenomena and regularities;
- 5) providing knowledge about peculiar properties of natural conditions and resources;
- 6) forming awareness on geographic regularities of natural conditions and natural resources spreading;
- 7) offering plenty of the practice activities helpful to pass the enrollment exam successfully;
- 8) providing the ability to individual Geography comprehension;
- 9) providing practical skills of gained theoretical knowledge usage for the geographic, geoecological, and others explorations of the territory;
- 10) providing the necessary conditions for practical skills gaining and vocabulary mastering, basic syntactic constructions familiarization by executing different exercises;
- 11) developing the basic speech skills, e.g. reading, speaking, listening, and writing.

Practice lessons within the course focus on developing student's abilities to apply gained knowledge and skills to the analysis of natural



resources distribution, global and regional geoecological problems solving correctly and creatively, etc.

The subject field of the course embraces the most important environmental features and attributes:

a) methodological background, technologies, and the best worldwide and national practices of natural management, general and planetary laws of formation and development of Earth's layers and their general structure, phenomena within Earth's layers as an integrated system;

b) diversity of natural conditions and resources of the territory;

c) cause-and-effect connections between natural processes and phenomena;

d) general features of world's nature; specific features of components and definite characteristics of regional geographic units, etc.;

e) basic characteristics of Earth's layers and factors which ensuring harmony in human and nature co-existence.

Preliminary requirements to the educational course:

- ✓ Students are expected to **know** basic concepts and terms of Geography, layers of the Earth, their structure and composition of structural components, their properties; the main parameters of the Earth, and data about geospheres and different territories.
- ✓ Students are expected to **be skilled in** the usage of earlier acquired knowledge in order to understand the field of Geography, existent general and special geographic models and practices.
- ✓ Students are expected to **be capable of** explaining the main characteristics and patterns of layers of the Earth, make conclusions about the interaction between structural parts of Earth's layers, and use well-known geographic categories and terms for the purpose of listening, summarizing, and fulfilling the practice activities (Table 1).



Table 1.

Learning results of the course

Learning results (1 – to know; 2 – to be able to; 3 – communication; 4 – autonomy and responsibility)		Forms and technolo- gies of teaching	Methods of evaluation and criteria	Perce- ntage in the final grade on the course
Code	Result			
1	<p>Demonstrate the geography comprehension in the context of environment studying, knowledge about the geographical maps diversity and their elements</p> <p>Demonstrate knowledge about geographical map and the manner of their usage to gain geographical information</p> <p>Demonstrate knowledge about Earth's layers, their interconnectedness, and importance for the natural conditions and resources formation; knowledge about Earth's layers differentiation using different approaches and principles for structural and functional geographical phenomena investigation</p> <p>Demonstrate knowledge about the basic geospatial features of Earth's layers, specificity of their identification</p> <p>Demonstrate basic knowledge about potential of natural resources, and geological, hydrological, meteorological, soil, and biological systems formation</p>	<i>Practical lesson</i>	<i>Question, exercises, final test</i>	55%
2	<p>Be able to show on the map location of different geographical phenomena; to master basic methods of the geographical information processing, skills of mapping and the methods of geographical maps formalization</p> <p>Be able to show an ability to use knowledge, geographical skills, and geographical experience for the self-study and creative self-development</p>	<i>Practical lesson</i>	<i>Question, exercises, final test</i>	23%
3	<p>Be able to use gained theoretical knowledge in practical situations (during the classroom exercises and in daily life)</p> <p>Be able to communicate English oral and written</p> <p>Be able to search, process, elaborate, and analyse the geographical information gained from different resources</p> <p>Be able to show the skills of presentation and self-presentation; lead a discussion and show the skills of professional activity</p>	<i>Practical lesson</i>	<i>Question, exercises, final test</i>	22%



**The logical framework of the course in educational programs
(for the proper qualification of professionals).**

The information and tasks presented in this Syllabus were all selected from those identified as significant by the Ministry of Education and Science of Ukraine, developed at the Taras Shevchenko National University of Kyiv, particularly, at the Preparatory Department. We also made extensive use of a corpus of national and foreign student's knowledge which showed us what kind of geographical errors learners tend to make during the final test of Geography at the Preparatory Department.

These corpora show that there is a significant amount of information in Geography. So how should we select which one would be the most useful for students to work on within the course? – Firstly, of course, we wanted to choose and start with important information relating to learning about Geography as the science in general. So, in the chapter *Geography as a science*, we include, for example, different geography specialties characteristics, which is a little bit theoretical, but useful for the next chapter's material understanding. Then there is a section focusing on different types of geographical maps, topographical symbols, the specificity of their usage, the Earth's rotation, time, etc. Secondly, we decided it would be also useful for students if in the rest of the themes we focused on and dealt with the material that related to *the particular topics* such as different types of Earth's layers, *concepts* such as their basic features, and *regional aspects*. Though, there are 10 themes. Each theme includes different sections: **Key concepts**, **Topics for discussion** and **Reading**. For instance, *Key concepts* help students to study theme's material properly and deeply understand its structure. *Topics for discussion* help to study textual material deeply and to check students understand well the information given in the text, keep in mind new acquired knowledge, and



to answer a large variety of question, observe or manipulate real objects or materials; helps you to develop scientific attitudes and open-mindedness and to understand and communicate information how to use maps and other geographic representations, geospatial technologies.

For appropriate studying Geography at the end of the Syllabus, we give a list of terms with their explanations which presented as a **Glossary**, and the list of **Reading** which at this level of Geography study we strongly recommend using to find the kind of information needed to master about Geography and geographical phenomena.

What else do students need to know to work with this syllabus?

Definitely, students need to understand the system and scheme of **the grades formation, the system of current, module and final control.**

The learning process includes classroom work (practice activities), Internet searches, discussions, individual task fulfilments, and topical abstracts (see the second part of this edition). Testing is based on grades earned at the classroom activities and individual task fulfilment.

The control and evaluation are taken according to the modular-rating system. Educational course consists of two substantial modules (SM).

The students' work evaluation is accomplished within the educational terms and examination (examination session) in the form of current, module (mid-term), and final control as shown below (Table 2).

The level of achievements and the planned results of listeners' study are determined according to the current, module (mid-term), and final control (final test) results.

Current control includes and evaluates the following components:

- textual material knowledge;



- classroom work (practice activities) results in estimation of individual cognition and presentations;
- results of the Internet searches;
- individual tasks fulfilments: abstracts, reports, essays, translations which are proposed by the lecturer.

Table 2.

Educational results due to types of testing

Educational result	Classroom work (practice activities)					Exam		Percentage in the course's final grade
	Test	Oral activities	SM 1	SM 2	Self-dependent work and homework activities	Written part	Oral part	
To know: terms, definitions, phenomena, laws, principles, key features	5	3	5	5	1	10	20	49%
Reading	-	-	2	2	2	-	-	6%
Speaking	-	2	-	-	-	-	20	22%
Writing	5	-	3	3	2	10	-	23%
Sum of marks	10	5	10	10	5	20	40	100
Weight	10%	5%	10%	10%	5%	20%	40%	100%
Total	40					60		100*

* – Point's calculation according to the 100-point scale is realized due to the principle of accumulation. It was taken into account that calculated and given above marks are thought as weighted coefficients.

Current control could be done in the form of tests, oral and written tasks fulfilling, homework activities, and self-dependent work activities.

Modular (mid-term) control includes written forms of modular activities such as tests that include questions about aspects that were studied within the classroom activities.

The highest point earned per each thematic (substantial) module is



10 (see Table 2).

The final control is performed as an exam that takes place according to the exam session schedule. This type of control could be done in the form of two types of activities: written (as answers to different questions *in the form of a test* that contains different types of the test's exercises) and oral (as speaking about geographical phenomena). The maximum amount of points that could be received by a student within the exam is 60.

Grades formation. In accordance with the module-rating system, grade formation includes the current and module testing (up to 40 points), and final testing (exam) (up to 60 points).

The current testing includes the results/success of textual material processing, oral answers to raised questions, practice activities fulfilling, presentations, searching for the information on the Internet, independent individual tasks, and abstracts fulfilling.

For the purpose of sufficient study the results of homework and self-study activities are estimated according to the rating system (Table 3).

Table 3.

Rating system for the current grade formation

Grade	A	B	C	D	E	F
Explanation	Excellent	Very good	Good	Satisfactory	Satisfactory (enough)	Fail (not enough)

The module testings are conducted twice per term in the form of the module test activities based on the problems solving reviewed before.

Final grade calculation is taken according to the 100-point' scale due to the principle of an accumulation and taking into account the fact that the final grade is a sum of points received by the student for 1) practice activities fulfilling and module tests passing (maximum sum of points is 40) and 2) final (exam) activities fulfilling (maximum sum of points is 60).



The total sum of points accumulated by the student in such a way corresponds with the grade from the scale (Table 4).

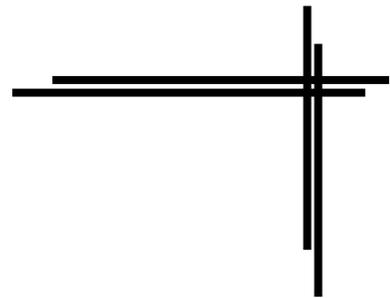
Table 4.

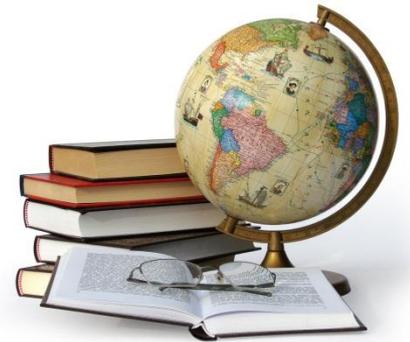
Rating system for the final grade formation

100-point' scale	National grade scale		
90-100	5	Excellent	Passed
75-89	4	Good	
60-74	3	Satisfactory	
0-59	2	Fail	Fail

We also deeply hope and will be very grateful for any feedback about materials presented in the Syllabus. It will be invaluable for us from both students and teachers whose comments have a great influence on the future manuscripts. Please send it to:

reussite303@gmail.com.





STRUCTURE OF THE COURSE

The structure of the course is depicted in a form of the Outline of Studies (Table 5) that contains themes for study, the number of hours for classroom activities fulfilling, achievement test activities and self-study activities fulfilling.

Table 5.

Outline of Geography Studies

No	Theme	Hours	
		Practical lesson	Individual work
1	Introduction. Theme 1. Geography as a science. Geography structure, tasks and significance	6	6
2	Theme 2. Geographical maps. Common features of geographical maps. Types of maps	6	6
3	Theme 3. Maps Gridlines. Coordinates	6	6
4	Theme 4. The Earth as a planet. The shape of the Earth. The Earth rotation. The Earth revolution. An equinox. A solstice. Seasons changing. Time and time zones	6	6
5	Theme 5. Earth's Spheres. Lithosphere. The Earth's interior. The Earth's exterior: Tectonic Activity (Plate Tectonics)	6	6
6	Theme 6. Lithosphere: Landforms. Earth's landforms created by inner forces	6	6

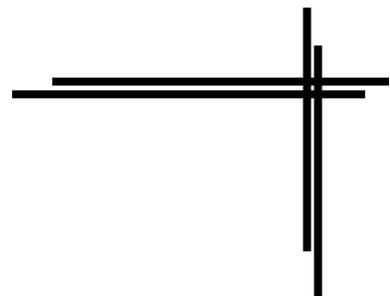


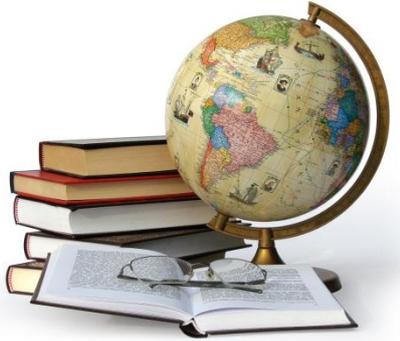
№	Theme	Hours	
		Practical lesson	Individual work
7	<i>Module test №1</i>	2	-
8	Theme 7. Lithosphere: Landforms. Earth's landforms created by external forces	6	6
9	Theme 8. Hydrosphere. The mainland water. Groundwater. Surface water. Hydrological cycle. World's ocean and its relief. Water movements in the World's ocean	6	6
10	Theme 9. Atmosphere: bounds and structure. Atmospheric heating and pressure. Winds, their origin and types. The weather and climate. Conception about the geographical (latitudinal/natural) and altitudinal zones	6	6
11	Theme 10. Biosphere. Type of living organisms. Soil: origin and structure. Nature protection	2	6
12	<i>Module test №2</i>	2	-
TOTAL		60	60

Total amount 120 hours, including:

Practical lessons – **60 hours.**

Individual work – **60 hours.**





AN EXPANDED COURSE OUTLINE



THEME 1 GEOGRAPHY AS A SCIENCE

KEY CONCEPTS

Geography as a course, tasks, and significance. Links to other disciplines.

Object and subjects of the course; basic terms and ideas. The trouble of understanding the complete scope of the course of Geography. Communicative sources and methods of information processing. Recommended readings, basic legal documents, useful Internet resources.

The concept of Geography as a science, essence, and significance; current status, definition. The term “geography” understanding.

Object and subjects of Geography as a science. Geographers’ fields of exploration. Geographical spatial questions.

Geography structure, Geography division into some subdisciplines by using classification. Geography division into specialties at the broadest level.



Physical Geography as one of the major subdiscipline of Geography: field of exploration, definition, object and subjects, the division into subfields. Physical Geography's subfields: Geomorphology, Hydrology, Meteorology, Climatology, Pedology, and Biogeography, their definition and explanation, objects and subjects.

Human Geography as one of the major subdiscipline of Geography: field of exploration, definition, object and subjects, the division into subfields. Human Geography's subfields: Economic Geography, Population Geography, Historical Geography, Behavioral Geography, Cultural Geography, Political Geography, and Health Geography, their definition and explanation, objects and subjects.

TOPICS FOR DISCUSSION

- 1) What does Geography seek to understand?
- 2) Why is Geography important?
- 3) What is the difference between Physical and Human Geography?
- 4) What is the difference between Geomorphology and Pedology?
- 5) What is the difference between Meteorology and Climatology?
- 6) What is the difference between Economic and Population Geography?
- 7) What is the difference between Cultural Geography and Political Geography?

READING

1. Географія: навчальний посібник для старшокласників та абітурієнтів / П. Г. Шищенко, Я. Б. Олійник, А. В. Степаненко, П. О. Масляк. – К.: Знання, 2008. – 456 с.
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7. The Dictionary of Human Geography / Edited by Derek Gregory. 5th edition. – Wiley-Blackwell, 2009. – 1052 p.
8. Witherick M., Ross S., Small J. A Modern Dictionary of Geography. Fourth edition. URL: <http://geografi.ums.ac.id/ebook/A%20Modern%20Dictionary%20of%20Geography.pdf>.



THEME 2

GEOGRAPHICAL MAPS

KEY CONCEPTS

A geographical map as a distinct object in Geography: definition, significance. Key objects on maps. Cartographers' fields of exploration. Purposes of geographical map making.

Common features of geographical maps.

Scale as a key feature of geographical maps: definition, significance; types. Examples of scale. Understanding of a graphic scale, a verbal scale, and a representative fraction; their expression. Scale and real size of objects shown on maps. Types of maps according to their scale: a large-scale map, a middle-scale map, and a small-scale map. Concept of computerized maps.

Symbols as a key feature of geographical maps: definition, significance, examples.



A grid pattern as a key feature of geographical maps: definition, significance, examples.

Other maps' features that appear regularly on maps: title, date, orientation, index, legend, author, and sources; their definition, significance, examples.

Surveying: definition and significance for cartographers, ways of doing. Surveyors' fields of exploration. Topography. Compass rose and compass. Bearing: definition, understanding, practicing of "reading" and estimation.

Types of geographical maps: their classification and distinct features, key objects and differences, the purpose of making and usage. Physical Maps. Political Maps. Topographic Maps. Contour Maps.

Elevation on maps. Sea level. An absolute altitude and a relative altitude: definition, understanding, practicing of "reading".

Thematic maps: key objects, the purpose of making and usage. Satellite imagery. A cartogram and a shading map. Atlas.

History of mapmaking: key dates, areas, types of representation; the earliest maps. The most skilled cartographers. Lithography.

TOPICS FOR DISCUSSION

- 1) For what purposes are geographical maps created?
- 2) What is the difference between a graphic scale, a verbal scale, and a representative fraction?
- 3) What is the difference between a cartogram and a shading map?
- 4) Describe how on the map are contour lines used to show which terrain is steep?

READING

1. Географія: навчальний посібник для старшокласників та абітурієнтів / П. Г. Шищенко, Я. Б. Олійник, А. В. Степаненко, П. О. Масляк. – К.: Знання, 2008. – 456 с.



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THEME 3 MAPS GRIDLINES

KEY CONCEPTS

Concept of “a location” and “a locality”: definitions, importance.

Concept of “maps’ gridlines” and concept of “latitude and longitude”: definitions, importance, understanding.

Lines of latitude (parallels), their specificities, importance, and usage.

Lines of longitude (meridians), their specificities, importance, and usage.

The Equator, its latitude. The Prime (Greenwich) Meridian as an arbitrarily



defined line, its longitude. The North Pole. The South Pole. The antemeridian (the International Date Line). The Tropic of Cancer and the Tropic of Capricorn: latitude and longitude, meaning, and importance.

Specificity of latitude and longitude measuring. Units of latitude/longitude measuring, the Earth's curvature influence on it.

The Earth's Hemispheres: definition and examples, measurement.

Coordinates in a grid system: meaning, definition, and importance. Absolute and relative location, the waypoints, rules of their estimation, measuring units. Understanding of global positioning system (GPS). Practical activities dealing with the estimation of coordinates.

TOPICS FOR DISCUSSION

- 1) Why do you think lines of latitude and longitude might have been drawn on the map?
- 2) What is the difference between an absolute and a relative location?
- 3) Why in some cases absolute location is thought of as a form of relative location?
- 4) Why and when latitude and longitude are helpful map tools?
- 5) Do the research on the history of latitude and longitude as it was used by explorers. Discuss it.
- 6) Think and say about what to do if the location is not on a line but in between latitude/longitude lines?
- 7) How easy or difficult would it be to pinpoint a location on a globe without using a coordinate system? Explain your opinion.

READING

1. Географія: навчальний посібник для старшокласників та абітурієнтів / П. Г. Шищенко, Я. Б. Олійник, А. В. Степаненко, П. О. Масляк. – К.: Знання, 2008. – 456 с.
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THE EARTH AS A PLANET: ROTATION AND REVOLUTION

KEY CONCEPTS

The Earth as a planet of the Solar system.

The shape of the Earth: an oblate spheroid, an ellipsoid, the geoid; history of its description.

The Earth rotation: definition, the key aspects, results, and consequences. An axis and the Earth's axis definition; an axial tilt, or



obliquity, its results on the Earth. The rotation period: definition, duration, and direction. A day understanding in the context of the rotation period. A solar day. Speed of the Earth rotation, rules.

The Earth revolution: definition, the key aspects, results, and consequences. An orbit. The key differences between the Earth rotation and the Earth revolution. The revolving period: definition, duration, and direction. A year understanding in the context of the revolving period.

Equinox and solstice as the key consequences of the Earth revolution. An equinox (the spring (“vernal”) equinox and the autumn (“autumnal”) equinox) and solstice’s (summer (“June”) solstice and winter (“December”) solstice) time in the Earth: description, explanation, and dates in the Earth’s Hemispheres. The solar terminator in the Earth. A planet’s subsolar point: description and explanation, position, exceptions. A solar declination: description and explanation. Equinoxes as historic markers of seasonal changes. Continuous daylight and a continuous night, “midnight sun” and “polar night”: understanding, description, regions in the Earth. The culture of the solstices.

The astronomical year and its seasons: astronomical spring and astronomical autumn, astronomical summer, and astronomical winter; their dates. Seasons changing: definition, causes, results in the sequence, distinct features, dates. Seasonal variation increasing with latitude.

Time in the Earth and time zones concept: causes, understanding. The World standard time zones, counting rules. Local time, it’s meaning. Coordinated Universal Time (UTC). The International Date Line establishing, its special features.

TOPICS FOR DISCUSSION

- 1) What is the difference between spheroid and geoid?
- 2) What do you know about the Earth’s movement on its axis?
- 3) What are the consequences of an axial tilt?



- 4) What is the difference between a rotation and a revolution?
- 5) What are the consequences of the Earth revolution?
- 6) Explain the role of an axis and its tilt in the Sun-Earth relationship.
- 7) Why are the tropics thought of as important geographic locations on the Earth?
- 8) Why do we contemplate the phenomena of “Polar night”?
- 9) Why do seasons occur on the Earth?
- 10) What is the difference between standard time and local time?
- 11) Do the research and explain what “daylight saving time” is.

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THEME 5 EARTH'S SPHERES. LITHOSPHERE

KEY CONCEPTS

Earth's physical environment, and Earth's spheres, their linkages. Short descriptions of Earth's spheres: the lithosphere, the hydrosphere, the atmosphere, and the biosphere.

The lithosphere: key features.

The Earth's interior: definition and understanding. Earth's interior structure, major layers. The Earth's as a planet, its geological history short description.

The Earth's brittle crust: definition and understanding, composition. Earth's crust rocks origin: igneous, metamorphic, and sedimentary rocks. The most abundant rocks in Earth's crust, samples. Types of Earth's crust: 1) oceanic crust, and 2) continental crust; their differences. Temperature changes within the Earth's crust. Causes of the Earth's crust formation and shaping.

The Earth's bulky mantle: definition and understanding, composition. Temperature changes within the Earth's mantle. Motions in the mantle: causes, areas, types (plate tectonics, volcanoes, seafloor spreading, earthquakes, and orogeny (mountain-building)). Layers of Earth's mantle: 1) the upper mantle, and 2) the lower mantle; their differences.



The Earth's dense core: definition and understanding, composition. Temperature changes within the Earth's core. Layers of the Earth's core: 1) the outer core, and 2) the inner core; their differences. Earth's magnetic field: understanding, significance. Temperature changes within the Earth's core. Studying the core.

The lithosphere as the solid, outermost layer of Earth's inner structure. Types of the lithosphere: 1) oceanic lithosphere, and 2) continental lithosphere; their differences. Earth's lithosphere bounds. The asthenosphere: definition and understanding, bounds. The lithosphere-asthenosphere boundary (LAB). The most well-known feature associated with the Earth's lithosphere.

The Earth's exterior – Tectonic Activity (Plate Tectonics): definition and understanding. Tectonic plate examples. A variety of forces makes Plate Tectonics possible. Processes associated with some of Earth's the most dramatic geologic events: subduction, faulting, convergence, and divergence or rifting (seafloor spreading); their description and differences, importance.

TOPICS FOR DISCUSSION

- 1) What is the difference between the oceanic crust and the continental crust?
- 2) What is the difference between the upper mantle and the lower mantle?
- 3) What is the difference between the outer core and the inner core?
- 4) There are two basic types of the lithosphere. List them. What is the difference between them?
- 5) Where do the most tectonic activities take place? Why?
- 6) How do diverging currents influence the tectonic plate's movement?
- 7) How does the density of the rock depend on the temperature?



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THEME 6

EARTH'S LANDFORMS CREATED BY INNER FORCES

KEY CONCEPTS

A landform: definition, understanding, the key agents of formation. Landform types: 1) major landforms, and 2) minor landforms; their examples. The highest and the deepest landform on the Earth. Landforms dependence on Earth's forces/strength, types of such forces (inner and external); their influence on Earth's surface.



Earth's inner forces that noticeably change Earth's surface and create specific landforms. Tectonic activity: influence on Earth's landforms formation. Shifting (seafloor spreading); rift valleys and mid-ocean ridges formation; mid-ocean ridges examples. Major active continental rift valleys: location, and distinct features.

Landforms that occur at boundaries between tectonic plates: geysers, earthquakes, and volcanoes.

A geyser: definition, understanding, the key agents of formation. The geyser eruption process. The most famous geysers in the World.

An earthquake: definition, understanding, structural elements, the key agents of formation. Seismic reflections: importance and usage. A special instrument (a seismograph) that is used to measure vibrations in the Earth's crust; earthquakes measuring scales (Richter scale and Mercalli Scale). Tsunami as one of the consequence of the earthquake: agents of formation, area of occurrence, importance.

A volcano: definition, understanding, the key agents of formation, structural elements, area of occurrence, and distribution. Types of volcanoes; a stratovolcano, a caldera, shield, and subglacial volcanoes. Different landforms produced by volcanic eruptions. Volcanoes as the most potent natural hazards and agents of changes. The most hazardous volcanoes in the World. "Ring of Fire": definition, understanding, the key agents of formation, area of occurrence, and distribution.

TOPICS FOR DISCUSSION

- 1) How does tectonic activity such as subduction and faulting shape the crust? What landscapes are formed as a result?
- 2) What is the difference between Richter Scale and Mercalli Scale?
- 3) Why does an earthquake appear?
- 4) Where on Earth's surface do earthquakes appear? Why?
- 5) What is the difference between magma and lava?



- 6) Discover more about unique landforms and landscapes around the World. Describe them.
- 7) Research, find examples, and explain how does plate tectonics (e.g. subduction and rifting) change a variety of landscapes?
- 8) Research, find examples, and explain how we predict earthquakes? How do we protect our buildings?
- 9) Research, find examples, and talk about tsunamis and tsunamis effects.
- 8) Why are most volcanoes located around the Pacific Ocean in places that are commonly called the Ring of Fire?

READING

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THEME 7

EARTH'S LANDFORMS CREATED BY EXTERNAL FORCES

KEY CONCEPTS

A landform: definition, understanding, the key agents of formation. Landforms dependence on Earth's forces/strength. Types of such forces (inner and external); their influence on Earth's surface.

Earth's external forces (weather, weathering, and erosion) as landscape-forming processes that noticeably change Earth's surface and create specific landforms.

Weathering: definition, description, influence on Earth's landforms formation; key agents which contribute to weathering. Types of weathering: mechanical (or physical), chemical, and biological. Mechanical (or physical) weathering (disaggregation): understanding, the key agents of formation, types (frost weathering or cryofracturing, thermal stress, haloclasty, and honeycomb weathering); plants and animals as agents of mechanical weathering. Chemical weathering: understanding, the key agents of formation, types (carbonation, karst, oxidation, hydration, hydrolysis), areas of distribution. Biological weathering: understanding, the key agents of formation. Weathering and People: increasing rate of weathering; acid rain.

Erosion: definition, understanding, influence on Earth's landforms formation; the key agents which contribute to erosion. Types of erosion: soil, wind, moving ice (glaciers), water; physical erosion and chemical erosion, bioerosion, thermal erosion. Landforms examples associated with



different types of erosional processes: landslides, rockslides, and avalanches, the permafrost, “floating islands”, fjords, cliffs, dunes, etc. Erosion and human activity: increasing rate of erosion, consequences; the dust storms/“black blizzards”.

TOPICS FOR DISCUSSION

- 1) Why does weathering appear?
- 2) What is the difference between erosion and weathering?
- 3) How does permafrost influence landscape changes?
- 4) Search through Internet sources to discover and discuss unique landforms and landscapes around the World. Explain what forces created it. What do you know about these force’s distinctive features?
- 5) Why do “black blizzards” have such a name?
- 6) Research and find examples about: how does climate change a variety of landscapes?
- 7) How do you think erosion has a negative or positive influence on agricultural development? Explain your opinion.

READING

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THEME 8 HYDROSPHERE

KEY CONCEPTS

The hydrosphere: key features, definition, and understanding, components, importance; planet's water forms, their examples, and location. Groups of hydrological elements: 1) the mainland water; 2) oceanic water; 3) atmospheric water (water in the atmosphere).

Water cycle: understanding, key features, stages/phases, importance.

The mainland water: structure and key elements, location.

Groundwater: definition, understanding, origin; importance. Permeable and impermeable rocks: their influence on groundwater formation; infiltration, porosity and rock's saturation, an aquifer or aquiferous stratum of an artesian basin formation; boreholes; wells; springs. The largest aquifers in the World.

Surface water: definition and understanding; its key elements: their distinct features, classification, spreading within Earth's surface, importance. Rivers as a major type of surface water: definition and understanding, variety, spreading within Earth's surface, importance, pollution. River's anatomy; river valley. Hydroelectric power plants construction on rivers: significance, ecological effects. Waterfalls: their



formation and classification, the most well-known examples; importance. Lakes as another major type of surface water: definition, classification, variety (e.g. pond, seas), spreading within Earth's surface, importance; pollution, "an algal bloom"/eutrophication. Lakes as valuable resources for people. Swamps: definition, classification, spreading within Earth's surface, importance and value. Ice sheets: definition, variety, spreading, formation. Anthropogenic elements (channel, reservoir/storage pond) as another type of surface water: definition and the key aspects of formation.

Oceanic water: understanding, key elements, and their distinct features, classification, spreading within Earth's surface, importance. World's Ocean and its floor structure. Oceanic water movements: diversity, formation, spreading within the Earth, importance.

TOPICS FOR DISCUSSION

- 1) What is the water cycle?
- 2) What is the difference between evaporation and precipitation?
- 3) What is the difference between permeable and impermeable rocks?
- 4) What is the importance of impermeable rocks' existence on our planet?
- 5) What is porosity? How does it influence groundwater formation?
- 6) What are meanders? How do they influence the river valley?
- 7) Why is a delta important in agricultural activities?
- 8) What is the difference between lake and pond?
- 9) Why are lakes called "valuable resources for people"?
- 10) Explore and explain why blue-green algae are called a major problem that threatens many natural and artificial lakes.

READING

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THEME 9 ATMOSPHERE

KEY CONCEPTS

The atmosphere as the Earth's sphere: definition and understanding, importance. Air composition; the oxygen origin.

A layered structure of the atmosphere: the troposphere, stratosphere, mesosphere, thermosphere, and exosphere, their distinct features, bounds, temperature changes. The greenhouse effect: definition, understanding, importance. The ozone layer: definition, location, importance.

Atmospheric pressure/air pressure: definition and understanding, measuring devices, measuring units, changes. Decompression sickness. Atmospheric pressure as an indicator of the weather. The Earth's pressure system.



Winds: definition, measuring devices, measuring units, changes, influences, and importance. Wind's origin, winds interconnectedness with the Earth's pressure system. Prevailing winds: definition and understanding. Major wind zones and types of winds within them: Polar Easterlies, Westerlies, Horse Latitudes, Trade Winds, the Intertropical Convergence Zone (ITCZ), Doldrums; their specific features and differences, spreading within Earth's surface and in the atmosphere. Wind as a major factor in determining the weather and climate; wind energy.

Air masses: definition and understanding, boundaries, formation, categories/types (Arctic, Polar, Tropical, and Equatorial) and source regions, distinct features.

The weather and climate: definition, distinct features, and differences, measuring devices, interlinkages. Forecasts, their importance. Climate changes: leading factors; greenhouse gases; global warming.

Conception about climate zones: the most familiar features description. Geographical (latitudinal/natural) and altitudinal zones as the product of many factors: the Arctic and Antarctic Climate, Tundra Climate, Subarctic (Taiga) Climate, Humid Continental Climate, West Coast Marine Climate, Mediterranean Climate, Steppe or Semiarid Climate, Desert Climate, Tropical Rain Forest Climate, Tropical Savanna (Wet and Dry) Climate, Humid Subtropical Climate, and Highland Climate; their distinct features, bounds, temperature changes.

TOPICS FOR DISCUSSION

- 1) What is the difference between the troposphere and the stratosphere?
- 2) How does atmospheric pressure change? Why?
- 3) What do you know about winds' impact? Explain your opinion.
- 4) What is the difference between the Arctic and Polar air masses?
- 5) What is the difference between the weather and climate?
- 6) Explain where greenhouse gasses come from.



READING

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THEME 10 BIOSPHERE

KEY CONCEPTS

The biosphere as the Earth's sphere: understanding, boundaries. Biosphere's origin, photosynthesis.

Types of living organisms and the major groups of organisms of the ecosystem: Producers (Autotrophs), Consumers, Heterotrophs; Herbivores



and Carnivores, Decomposers. Trophic levels: differences, distinct features. The food pyramid and the food web. Biosphere as a self-supporting and self-regulating system. Ecosystems: definition and understanding. Invasive species/biological pollutants, their role in ecosystems.

Soils: origin, components/elements, biotic, and abiotic factors, composition; examples; importance. Humus: its origin and distinct features.

People and biosphere; international projects. Nature protection: key goal, importance, examples.

TOPICS FOR DISCUSSION

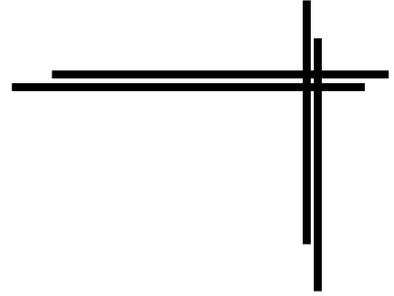
- 1) How do you think the biosphere appeared? Explain your opinion.
- 2) What is the difference between Autotrophs and Heterotrophs?
- 3) Explain what is the importance of photosynthesis?
- 4) What is the difference between biotic and abiotic elements of an ecosystem?
- 5) Why do plants grow better in high-quality soils than in low-quality soils?
- 6) Determine which farming practices best preserve and increase soil quality. Explain your opinion.
- 7) Explore and describe how climate impacts life on the Earth.
- 8) Explain why invasive species are thought to be harmful one in an ecosystem?

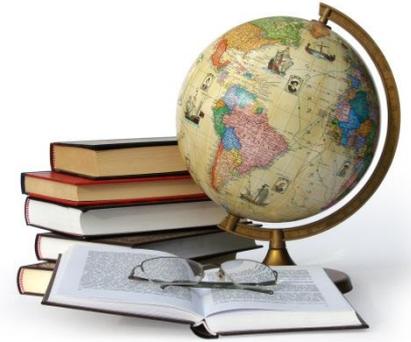
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GLOSSARY

THEME 1. GEOGRAPHY AS A SCIENCE

Classification	any scheme for structuring data that is used to group individuals or sometimes attributes
Geographer	a scientist who explore both the physical properties of Earth's surface and the human societies spread across it; examine how human culture interacts with the natural environment and the way that locations and places can have an impact on people
Geography	the study of places and the relationships between people and their environments done by <i>geographers</i> ; the science dealing with the areal differentiation of Earth's surface shown in the character, arrangement, and interrelations over the World of such elements as elevation, climate, soil, vegetation, population, land use, industries, or states
Human geography	the part of <i>Geography</i> concerned with the spatial analysis of the human population, its such aspects as numbers, composition, economic and social activities, and settlement
Physical geography	the scientific study of the natural features of Earth's surface (of our environment), physical surroundings especially in its current aspects, including land formation, and landforms, climate, oceans, currents, soils, vegetation, and distribution of flora and fauna



THEME 2. GEOGRAPHICAL MAPS

Absolute altitude	the height relative to the <i>sea-level</i>
Altitude	a height above or below <i>sea level</i> ; there are two types of altitude: <i>absolute</i> and <i>relative</i>
Atlas	a collection of <i>maps</i> bound together in one book
Bearing	a direction or an angle that is shown by <i>a compass</i> and refers to a compass reading between 0 and 360°, indicating the direction of one location from another
Cartogram	<i>a map</i> showing statistical data in diagrammatic form
Compass	measuring device, an instrument that shows directions and has a needle that always points north
Map	a symbolic representation of selected characteristics of a place, usually drawn on a flat surface; diagrammatic representation of an area
Relative altitude	the height of the one point/object relatively to another
Scale	the relationship between the distances on <i>a map</i> and the actual distances on the Earth; there are a graphic scale, a verbal scale, and a representative fraction
Sea level	an average height of the surface of the oceans and seas
Shading map	<i>a map</i> in which shading of varying intensity is used
Surveying	the science of determining the exact size, shape, and location of a piece of land
Topography	the composition of the visible landscape, comprising both physical features (e.g. relief, drainage, and vegetation) and those made by people (e.g. roads, railways, and settlements)

THEME 3. MAPS GRIDLINES

Absolute location	spot exact place on the Earth
Arcdegree	one degree of latitude or longitude divided into 60



minutes that are further divided into 60 seconds

Equator	an imaginary line of 0° (0 degrees) latitude that circles the middle of the Earth, and divides it into the Northern and the Southern Hemispheres
Gridlines	the imaginary lines of <i>latitude</i> and <i>longitude</i> (<i>parallels</i> and <i>meridians</i>) running up and down and across the maps page, intersect each other, covers the Earth, and measured in degrees; they added to <i>the map</i> to help people locate places on the map more easily and used to communicate the exact location of places on the Earth
International Date Line	the antemeridian, halfway around the World point from <i>the Prime Meridian</i> at 180° longitude; as you pass the Line, you either add a day or subtract a day
Latitude	the measurement of the angular distance north or south of <i>the Equator</i> along a meridian
Location	the place where a particular point or object exists
Longitude	the measurement of the distance around the Earth west or east of the <i>Prime (Greenwich) Meridian</i>
Meridians	the imaginary not parallel to each other lines of longitude that form circles around the Earth, running north-south (up and down the map's page), passing through the North and South Poles, and show locations to the west or east of <i>the Prime Meridian</i>
Parallels	lines of <i>latitude</i> , imaginary circles that run around the World from west to east (across the page of the map), parallel to <i>the Equator</i> ; every point along it has the same latitude (the distance north or south of <i>the Equator</i>)
Prime Meridian	the meridian, internationally accepted the line of 0° (0 degrees) longitude, that runs from the Pole to Pole through Greenwich in London, England; the starting point for measuring distances both west and east around the Earth
Relative location	a description of how a place location is related to other places, and how two places are connected, whether by



distance, or even culture

THEME 4. THE EARTH AS A PLANET: ROTATION AND REVOLUTION

Axial tilt	the angle between the planet's rotational <i>axis</i> and its orbital axis; Earth's axial tilt is about 23.5°
Axis	an invisible line around which an object rotates, or spins, running down (inside) its center
Earth's axis	vertical, an invisible line runs up and down, through Earth's center, from the North Pole to the South Pole
Earth rotation	the movement of the Earth about its <i>axis</i> that is tilted
Equinox	one of the two times in a year when the Sun's center crosses the Earth's <i>Equator</i> , making the day and night in both the Northern and Southern Hemispheres of equal length (they experience equal amounts of daytime and nighttime); an event and the only times of the year when a planet's <i>subsolar point</i> is directly on <i>the Equator</i> ; there are two equinoxes every year: about March 21 st and September 23 rd
Geoid	the model shape of the Earth
Local time	a time that differs from the standard time because of the difference of longitude between the given place and standard meridian
Midnight sun	the phenomenon in which the Sun never dips below the horizon, keeping the region bathed in sunlight 24 hours a day
Obliquity	see <i>an axial tilt</i>
Orbit	an elliptical path of the Earth's constantly moving around the Sun
Polar night	the opposite phenomenon to "Midnight sun"; a time in which the Sun never rises, keeping the region dark for 24-hour periods
Revolution	movement; passage of the Earth around the Sun; one complete circular spinning movement, made by the Earth around the Sun
Rotation period	the time it takes for a planet or other celestial object to



	complete one spin around its <i>axis</i>
Season	a period of the year distinguished by climate conditions (light, temperature, and weather patterns)
Subsolar point	an area where the Sun's rays shine perpendicular (have a right angle) to the Earth's surface
Solar day	a day defined as the length of time it takes for the Earth to rotate on its <i>axis</i> relative to the Sun
Solar declination	the latitude of the Earth where the Sun is directly overhead at noon
Solar storms	a process during which solar storms particles are flung through space from explosive events on the Sun, such as solar flares and coronal mass ejections (CMEs)
Solar terminator	the shadowed line indicating daylight and sunlight on a globe
Solstice	an event in which a planet's Poles are most extremely inclined toward or away from the star it orbits; twice-yearly phenomena (about June 22 nd and December 22 nd) when the Sun's rays 90° angle is the furthest north or south of <i>the Equator</i> (<i>solar declination</i> reaches the Tropic of Cancer or the Tropic of Capricorn); the longest or shortest day of the year

THEME 5. THE EARTH'S SPHERES. LITHOSPHERE

Asthenosphere	the part of the upper <i>mantle</i> that lies between about 100 kilometers and 410 kilometers beneath Earth's surface; the denser and weaker layer beneath the lithospheric mantle that composed by softening and partly melt (semi-molten) rocks much more ductile than either in the <i>lithosphere</i> or lower <i>mantle</i>
Convergence	the process at which tectonic plates crash against one another in fault zones
Core	a very dense ball-shaped metal (specifically, iron and nickel) and the hottest inner part of our planet
Crust	the outermost shell of a terrestrial planet



Ductile	a solid material's ability to deform or stretch under stress
Earth's crust	the planet's thinnest inner layer which includes landforms, rocks, and soil and that is made of solid rocks and minerals
Earth's core	the innermost zone of the Earth that lies beneath the cool, brittle <i>crust</i> and the mostly solid <i>mantle</i>
Faulting	the process at which tectonic plates shift against each other in fault zones
Hot spot	a section of the Earth's <i>crust</i> where plumes of magma rise, weakening the crust; these are away from plate boundaries
Igneous rocks	the Earth's crust rocks are formed by the cooling of <i>magma</i>
Lava	<i>a magma</i> that extruded onto Earth's surface via some form of volcanic eruption or flows from a volcano; it varies in color and chemical composition
Lithosphere	the coolest the most rigid of Earth's layers; single geologic unit, Earth's solid shell that shapes the environment of the Earth; the outermost layer of Earth's inner structure (<i>the crust</i> and the upper portion of <i>the mantle</i>) that extends from Earth's surface to between 50 and 280 kilometers below it
Magma	the molten rock from beneath <i>the crust</i> originating in the Earth's <i>mantle</i> ; the source of all igneous rocks
Mantle	the largest and the mostly-solid bulk of Earth's interior
Mantle convection	the slow, churning motion of Earth's <i>mantle</i>
Metamorphic rocks	the Earth's crust rocks have undergone drastic changes due to heat and pressure
Mid-ocean ridge	large mountain range rising from the ocean floor, the result of seafloor <i>spreading</i>
Plate tectonics	the theory that describes the interaction and constant movement relative to each other at their boundaries of <i>tectonic plates</i>



Rifting	a geologic process in which new <i>crust</i> is created along <i>mid-ocean ridges</i> and <i>rift valleys</i> , and where plates pull apart from each other at <i>divergent</i> plate boundaries
Seafloor spreading	a geologic process in which <i>tectonic plates</i> split apart from each other (see also <i>rifting</i>)
Subduction	the process at convergent plate boundaries between continental and oceanic <i>lithosphere</i> in which always the denser (usually the larger and deeper ocean basin) tectonic plate subducts (slips or melts beneath) a less-dense (continental) plate
Tectonic activity	the movement of large pieces of the Earth's <i>crust</i> called <i>tectonic plates</i> , responsible for such phenomena as earthquakes and volcanoes
Tectonic plates	huge, massive, rocky slabs of the Earth's <i>lithosphere</i> (its <i>crust</i> and upper <i>mantle</i>)

THEME 6. EARTH'S LANDFORMS CREATED BY INNER FORCES

Basin	a depression, or dip, in Earth's surface, "bowl" shaped formation, with sides higher than the bottom; it can be oval or circular, similar to a sink or tub, some are filled with water, others are empty; they are formed by forces above the ground (like erosion) or below the ground (like earthquakes), it can be created over thousands of years or almost overnight; the major types of basins are river <i>drainage basins</i> , <i>structural basins</i> , and <i>ocean basins</i>
Butte	single hill or rock formation that rises sharply from a flat landscape, usually in a desert
Canyon	deep, narrow valley with steep sides
Focus	the point at which the rock moves and the seismic waves start
Landform	a feature on Earth's surface that is part of the terrain (e.g. mountains, hills, plateaus, and plains, etc.) (see also <i>Major types of landforms</i> and <i>Minor types of landforms</i>)



Major types of landforms	include <i>mountains, hills, plateaus, and plains</i>
Minor landforms	include <i>buttes, canyons, valleys, and basins</i>
Mountain	the landmass that forms as <i>tectonic plates</i> interact with each other
Mountain range	series or chain of <i>mountains</i> that are close together
Plain	a flat, smooth area at a low elevation
Plateau	a large region that is higher than the surrounding area and relatively flat
Rift valley	a lowland region created by the process of <i>seafloor spreading</i> (by tectonic activity) where <i>Earth's tectonic plates</i> move apart
Seismic waves	the shock waves released by earthquakes at or near the surface
Valley	depression in the Earth between hills

THEME 7. EARTH'S LANDFORMS CREATED BY EXTERNAL FORCES

Barchan	a type of crescent-shaped dune formed in desert regions where the wind direction is very constant
Clastic sediments	eroded rocks composed of fragments of older rocks that have been transported from their place of origin
Deposition	the geological process in which earthen materials are deposited, or built up, on <i>a landform</i>
Gully	<i>a valley</i> , an area of lower land between two lines of hills of <i>mountains</i> , usually with a river flowing through it
Fjords	deep inlets along the coast of Scandinavia
Glaciology	the study of glaciers
Hill	a piece of land that rises above its surroundings and has a rounded summit, usually less than 300 meters; it rises higher than everything surrounding it; it looks



	like a little bump in the Earth; it is a good place to get a nice view
Ice sheet	a mass of large glacial ice with an area usually greater than about 50 000 square kilometres
Oxidation	a type of chemical weathering that works on rocks that contain iron; as a result, such materials turn to <i>rust</i> ; as rust expands, it weakens rock and helps break it apart
Pedosphere	part of <i>the lithosphere</i> made of soil and dirt
Rills	discrete streams that take place as runoff develops; a result of soil erosion
Rust	a compound created by the interaction of oxygen and iron in the presence of water
Sediment	a naturally occurring material that is broken down by processes of <i>weathering</i> and <i>erosion</i> , and is subsequently transported by the action of <i>wind</i> , water, ice, or by the force of gravity, acting on the particles
Sedimentary rocks	formed by the accumulation of material at Earth's surface
Weathering	the breakdown of rocks

THEME 8. HYDROSPHERE

Aquifer	the underground chamber in which underground water collected
Borehole	a deep hole made using special equipment, especially to get water or oil out of the ground; it can be sunk into the structure to trap the water in <i>the aquifer</i>
Catchment	the area from which <i>a river</i> and its <i>tributaries</i> or a groundwater system derives its water
Channel	<ol style="list-style-type: none">1) a wide strait or waterway between two landmasses that lie close to each other;2) a narrow body of water that connects two larger bodies of water;3) the deepest part of a river bed that is usually located in the middle of <i>a river</i>, where the current is



often strong and along large *rivers* ships travel in it

Condensation	the process by which cooling vapor (as a fog, mist, steam, smoke, etc.) turns into a liquid; clouds, for example, are formed by the condensation of water vapor in <i>the atmosphere</i>
Convection	the process in which air, having been warmed close to the ground, rises; the convective uplift of air parcels; one of the main processes leading to <i>condensation</i> and cloud formation
Dam	a barrier that stops or diverts the flow of water along <i>a river</i>
Delta	the end of rivers journey where <i>the river</i> slows, has less energy to cut into the land, and can no longer carry a heavy load of <i>sediment</i> ; here new land is formed because <i>the river</i> can deposit so much <i>sediment</i>
Drainage basin	See <i>river drainage basin, watershed, or catchment</i>
Eutrophication	a process when <i>a lake</i> gets too many nutrients, causing blue-green algae growth
Evaporation	the process of liquid water turning into a gas, or vapor
Hydrosphere	the shell is composed of all the water on the Earth: oceans, freshwater (underground as well as <i>rivers, lakes, springs, ice sheets, and glaciers</i>), and water vapor (condensed into clouds and precipitation)
Infiltration	the gradual movement of water into the ground; water infiltrated quickly through the sandy soil, but slowly through a clay soil
Lake	a body of water that is surrounded by land and unconnected to the sea except by <i>rivers</i> or streams
Mouth	the end of <i>a river</i>
Pond	a small <i>lake</i> that is measured only a few square meters and is small enough to fit in a backyard
Porosity	the ratio, expressed as a percentage, of the volume of the pores
River	a natural flowing watercourse, usually freshwater,



	flowing towards an ocean, sea, <i>lake</i> , or another river
River drainage basin	the area from which <i>a river</i> and its tributaries derive its water; an area drained by a river and all of its tributaries, sometimes referred to as a <i>catchment area</i>
River system	a river and its tributaries together
Swamp	an area of land permanently saturated, or filled, with water; normally covered by water all year and is not subject to drying out during the summer
Waterfall	a place where water from <i>a river</i> or stream falls over a cliff or rocky ledge into a pool below
Watershed	the boundaries of the river basin; a small version of <i>a river drainage basin</i>

THEME 9. ATMOSPHERE

Air mass	a large volume of air in <i>the atmosphere</i> that is mostly uniform in temperature and moisture
Atmosphere	the Earth's shell, a blanket of gases enveloping and surrounding the Earth that has a layered structure
Greenhouse effect	a process of solar heat absorption in the troposphere while it is reflected from the ground; the most abundant atmospheric greenhouse gases are carbon dioxide, water vapor, and methane
Mesopause	the upper boundary of the mesosphere
Stratopause	the boundary or transition layer between the stratosphere and the mesosphere; the upper boundary of the stratosphere
Tropopause	the boundary, or traditional layer, between the troposphere and the stratosphere; the upper boundary of the troposphere
Wind	the movement of air caused by the uneven heating of the Earth by the Sun

THEME 10. BIOSPHERE

Biosphere	the Earth's shell, the area of the Earth where life
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exists; Earth's living things

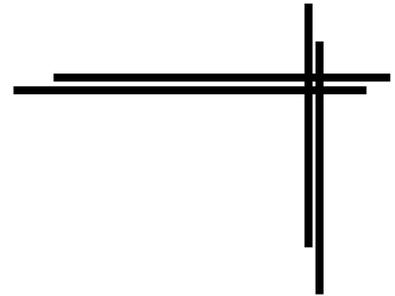
Food chain a chain of living organisms that are classified into *trophic levels* based on their feeding behavior

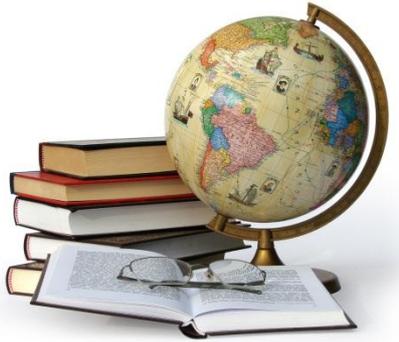
Humus dark, thick brown or black, organic material (substance) that forms in soil when plant and animal matter decays, remains after most of the organic litter has decomposed

Photosynthesis the process a plant or other *autotroph* uses to make food and oxygen from carbon dioxide and water

Soil composition a mix of soil ingredients that varies from place to place

Trophic level step in a nutritive series, or *food chain*, of an ecosystem





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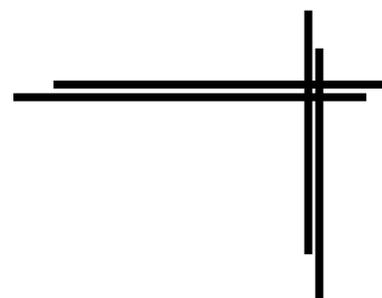
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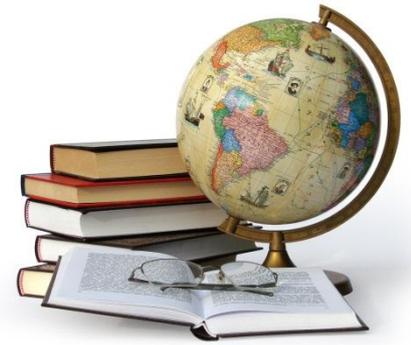


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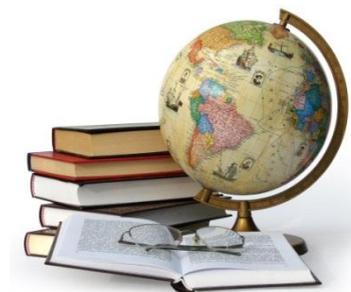
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